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Motorized Travel Management

Supplemental Draft Environmental Impact Statement

Volume 1: Chapters 1 – 4

Volunteers assisting Forest Service with maintenance of the Rubicon Jeep Trail

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Motorized Travel Management Supplemental Draft Environmental Impact Statement

Nevada, Placer, Plumas, Sierra and Yuba Counties, California
February 2010

Volume 1: Chapters 1 – 4

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Abstract: This Supplemental Draft Environmental Impact Statement (SDEIS) describes seven alternatives, six of which propose changes to the National Forest Transportation System (NFTS) and would prohibit cross country travel on the Tahoe National Forest (TNF). These actions are needed in order to implement the 2005 Travel Management Rule (36 CFR Part 212, Subpart B) while providing for a diversity of motor vehicle recreation opportunities and providing motorized access to dispersed recreation opportunities on the TNF. The SDEIS discloses environmental impacts associated with the Proposed Action, a No Action Alternative and 5 additional alternatives developed to meet the purpose and need and to respond to issues raised by the public.

Summary

Proposed Action as Described in the Notice of Intent

1. **Prohibition of Cross Country Travel**: Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside designated motorized use areas would be prohibited, except as allowed by permit or other authorization.
2. **Additions to the NFTS**:
   a. No unauthorized routes would be added as roads to the NFTS.
   b. 36.7 miles (36 routes) of unauthorized routes would be added as motorized trails to the NFTS.
3. **Establishment of Motorized "Open Areas"**: No additional motorized "Open Areas" would be established.
4. **Changes to the NFTS**:
   a. **Change Vehicle Classes through Mixed Use**: No changes would be made to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through approval of mixed use.
   b. **Change Vehicle Classes through Maintenance Levels:** Change vehicle class on 3.4 miles to allow operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through the conversion of ML 3 roads (maintained for passenger cars) to ML 2 (maintained for high clearance vehicles).
   c. **Changes in Seasonal Restrictions:** No changes in seasonal restrictions would be made.
   d. **Reopening Maintenance Level 1 Roads**: Two Maintenance Level 1 roads (1.1 miles) would be reopened to motorized use.

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

Including the additions and changes described above, the Proposed Action would result in a system of 2,068.5 miles of NFTS roads and 365.0 miles of NFTS motorized trails open to public motorized use. A more detailed description of the Proposed Action can be found in Chapter 2 (The Alternatives). A map of the Proposed Action is available on compact disc. Appendix A (Site Specific Road, Trail and Open Area Information) shows the specified vehicle class, season of use and any required mitigations associated with any facility added to the NFTS under this proposed action.

Significant Issues

Internal and external scoping identified the following significant issues which were used in developing the action alternatives. The significant issues include the following:

Table S-1. Significant Issues

Issue/Element	Cause and Effect
Significant Issue Statement #1. The route inventory identified approximately 1,596.3 miles of existing unauthorized routes and the Proposed Action only adds 36.7 miles of these to the NFTS. Reducing the miles of routes available for public motorized use and prohibiting cross country travel as described in the Proposed Action will adversely affect the quality and quantity of motorized recreation experiences	
Motorized Recreation Opportunities	• Does not provide adequate access to key destinations, including campsites, scenic overlooks, and hunting areas. • Reduces loops and connectors to provide longer riding time and spurs for exploration. • Reduces the diversity of opportunities for different vehicles (ATVs, motorcycles, 4WD). • Reduces semi-primitive riding opportunities and experiences.
Significant Issue Statement #2. Public motorized use of roads and trails as described in the Proposed Action will adversely affect non-motorized recreation experiences.	
Non-Motorized Recreation Opportunities	• Increases in engine noise will impact non-motorized recreation opportunities. • Increases in dust will impact non-motorized recreation opportunities. • Increases in motorized use will result in user conflicts between forest visitors. • Increases in motorized use will reduce aesthetic values.
Significant Issue Statement #3. Public motorized use of roads and trails as described in the Proposed Action will adversely affect forest resources.	
Resource Impacts	• Increased erosion, soil compaction, and reduction in water quality; • Degradation of habitat for fish, wildlife, and rare plants; • Damage to heritage resources; • Proliferation of weeds; and • Impacts to Inventoried Roadless Area character compromising future potential wilderness designation.
Significant Issue Statement #4: The NFTS is already too large to provide adequate maintenance and administration.	
Affordability	• Current and future budgets may not provide adequate funding for maintenance, administration and enforcement of the proposed road and trail system. • Additions to the NFTS may require additional mitigation measures to prevent serious and adverse environmental impacts.

Alternatives Considered in Detail

The TNF developed seven alternatives; the No Action, the Proposed Action, and 5 other action alternatives developed to meet the purpose and need and to respond to the significant issues listed above. Alternative 6 is the Preferred Alternative. The seven alternatives considered in detail for this analysis are listed in Table S-2 below. Complete details of the alternatives are found in Chapter 2 of the SDEIS.

Table S-2. List of Alternatives Considered in Detail

Alternative 1: **No Action Alternative**	The No Action Alternative provides a baseline for comparing the other alternatives. Under the No Action Alternative, no changes would be made to the NFTS and there would be no prohibition of cross country travel. Current management plans would continue to guide project area management. The Travel Management Rule would not be implemented, and no motor vehicle use map (MVUM) would be published. Motor vehicle travel by the public would not be limited to designated routes. Unauthorized routes would continue to proliferate and would have no status or authorization as NFTS facilities. · **Cross Country Travel**: Does not prohibit motorized cross country travel. · **Additions to the NFTS**: No unauthorized routes added to the NFTS as roads or motorized trails under this alternative. · **Establishment of Motorized "Open Areas"**: No additional motorized "Open Areas" established. · **Changes to the NFTS**: No changes to the NFTS made. · **Amendments to the Forest Plan**: No amendments made to the Forest Plan.
Alternative 2: **Increased Motorized Recreation and Access Opportunities**	Alternative 2 responds to the issue of inadequate motorized recreation opportunities. This alternative is based on the Proposed Action (Alternative 7), with additional routes and mixed use to provide more access and motorized recreation opportunities. During scoping, the Tahoe National Forest received numerous site specific suggestions for additional motorized roads, trails and established "Open Areas" that would improve public access and enhance motorized recreation opportunities. Unauthorized routes and closed NFTS roads site-specifically requested by the public during scoping were added in this alternative, provided they were consistent with law, regulation, and policy. In addition, site specific recommendations for "Open Areas" proposed by the public during scoping were also established in this alternative provided they were consistent with law, regulation and policy. · **Cross Country Travel**: Prohibits motorized cross country travel. · **Additions to the NFTS**: Adds 5.0 miles (114 segments) of unauthorized routes to the NFTS as roads. Adds 54.6 miles (87 segments) of unauthorized routes to the NFTS as motorized trails. · **Establishment of Motorized "Open Areas"**: Establishes four areas (2,649 acres) as motorized "Open Areas" open to all vehicles. · **Changes to the NFTS**: Allows 241.5 miles of mixed use. Changes Class of Vehicles on 157.2 miles by changing maintenance levels. Seasonal restrictions removed for deer winter range in Sugar Pine Area. No Maintenance Level 1 roads reopened. · **Amendments to the Forest Plan:** Amendment made to remove deer winter seasonal restriction in Sugar Pine area.

Alternative 3: **Cross Country Travel Prohibition Only – No Changes to the Existing National Forest Transportation System**	Alternative 3 responds to issues of (1) adverse effects of motorized recreation use on non-motorized recreation experiences and (2) potential adverse impacts from motorized recreation use on natural and cultural resources. This alternative provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS. · **Cross Country Travel**: Prohibits motorized cross country travel. · **Additions to the NFTS**: No unauthorized routes added to the NFTS. · **Establishment of Motorized "Open Areas":** No additional motorized "Open Areas" established. · **Changes to the NFTS**: No changes to the NFTS made in this alternative. · **Amendments to the Forest Plan**: No amendments made to the Forest Plan.
Alternative 4: **Increased Resource Protection**	Alternative 4 responds to issues of (1) adverse effects of motorized recreation use on non-motorized recreation experiences and (2) potential adverse impacts from motorized recreation use on natural and cultural resources. It addresses these issues by prohibiting cross country travel and adding fewer routes to the NFTS than the Proposed Action. Alternative 4 is based on the Proposed Action contained in the Notice of Intent as modified by an alternative submitted by an environmental group coalition during scoping. · **Cross Country Travel**: Prohibits motorized cross country travel. · **Additions to the NFTS**: Adds 3.7 miles (85 segments) of unauthorized routes to the NFTS as roads. Adds 22.6 miles (27 segments) of unauthorized routes to the NFTS as motorized trails. · **Establishment of Motorized "Open Areas"**: No additional motorized "Open Areas" established. · **Changes to the NFTS**: Allows no mixed use. Changes class of vehicles on 3.4 miles by changing maintenance levels. Wet weather seasonal closures added on native surface roads and motorized trails. One Maintenance Level 1 road (.1 mile) reopened. · **Amendments to the Forest Plan**: No amendments made to the Forest Plan.
Alternative 5: **Increased Motorized Recreation Access plus Reopening Maintenance Level 1 and Temporary Roads**	Alternative 5 responds to the issue of inadequate motorized recreation opportunities. This alternative is based on the Proposed Action contained in the Notice of Intent as modified by an alternative submitted by the Blue Ribbon Coalition during the scoping process. This alternative focuses on adding unauthorized routes to the NFTS and making changes to the existing NFTS to provide enhanced motorized vehicle access and motorized recreation opportunities across the Forest. · **Cross Country Travel**: Prohibits motorized cross country travel. · **Additions to the NFTS**: Adds 5.0 miles (112 segments) of unauthorized routes to the NFTS as roads. Adds 75.4 miles (141 segments) of unauthorized routes to the NFTS as motorized trails. · **Establishment of Motorized "Open Areas"**: No additional motorized "Open Areas" established. · **Changes to the NFTS**: Allows 241.5 miles of mixed use. Changes class of vehicles on 157.2 miles by changing maintenance levels. Wet weather seasonal closures added on native surface roads and motorized trails. 113 Maintenance Level 1 roads (93.4 miles) reopened. · **Amendments to the Forest Plan**: Amendment to remove deer winter seasonal restriction in Sugar Pine area.

Alternative 6: **Preferred Alternative Motorized Access and Resource Protection**	Alternative 6 is the Preferred Alternative. It responds to issues of providing motorized public access and recreation opportunities while minimizing impacts to natural and cultural resources. It is designed to provide a diversity of road and trail opportunities for experiencing a variety of environments and modes of travel consistent with the National Forest's recreation role and land capability. Alternative 6 would provide motorized access to dispersed recreation opportunities and a diversity of motorized recreation opportunities · **Cross Country Travel**: Prohibits motorized cross country travel. · **Additions to the NFTS**: Adds 13.1 miles (346 segments) of unauthorized routes to the NFTS as roads. Adds 48.3 miles (106 segments) of unauthorized routes to the NFTS as motorized trails. · **Establishment of Motorized "Open Areas"**: Establishes three areas (244 acres) as motorized "Open Areas" open to highway-legal vehicles only. · **Changes to the NFTS**: Allows 130.8 miles of mixed use, 117.5 miles of which open only during deer hunting season. Changes class of vehicles on 122.0 miles by changing maintenance levels. Wet weather seasonal closures added on native surface roads and motorized trails. Thirteen Maintenance Level 1 roads (11.4 miles) reopened. · **Amendments to the Forest Plan**: Amendment to remove deer winter seasonal restriction in Sugar Pine area.
Alternative 7: **Proposed Action as Identified in Notice of Intent (NOI)**	Alternative 7 is the Proposed Action as published in the Notice of Intent in the Federal Register. · **Cross Country Travel**: Prohibits motorized cross country travel. · **Additions to the NFTS**: Adds 36.7 miles (36 segments) of unauthorized routes to the NFTS as motorized trails. · **Establishment of Motorized "Open Areas"**: No additional motorized "Open Areas" established. · **Changes to the NFTS**: Allows no mixed use. Changes class of vehicles on 3.4 miles by changing maintenance levels. No changes to seasonal restrictions. Two Maintenance Level 1 roads (1.1 miles) reopened. · **Amendments to the Forest Plan**: No amendments made to the Forest Plan.

Comparison of Alternatives

The table below compares the activities that would occur under each alternative.

Table S-3. Comparison of Alternatives

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross Country Travel (Acres)		Prohibitions continue on 81,975 acres Continues on 754,066 acres	Prohibited on 833,392 acres 2,649 acres established open	Prohibited on 836,000 acres <100 acres established open	Prohibited on 836,000 acres <100 acres established open	Prohibited on 836,000 acres <100 acres established open	Prohibited on 835,800 acres <300 acres established open	Prohibited on 836,000 acres <100 acres established open
2. Additions to the NFTS	a. Roads added to the NFTS (Number of Miles) (Number of Roads)	 0.0 0	 5.0 114	 0.00 0	 3.7 85	 5.0 112	 13.1 346	 0.00 0
	b. Motorized Trails added to the NFTS (Number of Miles) (Number of Trails)	 0.0 0	 54.6 87	 0.0 0	 22.6 27	 75.4 141	 48.3 106	 36.7 36
3. Establishment of Motorized "Open Areas"		None	Greenhorn Area (60 acres) Prosser, Boca and Stampede Reservoirs (2,589 acres)	None	None	None	Prosser, Boca and Stampede Reservoirs (244 acres)	None

Action type		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
4. Changes to the NFTS	a. Change in Class of Vehicles resulting from approval of mixed use	0.0	241.5	0.0	0.0	241.5	130.8	0.0
	b. Change in Class of Vehicles resulting from changes in maintenance levels	0.0	157.2	0.00	3.4	157.2	122.0	3.4
	c. Change in Season of Use	0.0	10.5	0.00	1,312.1	1,396.7	1,369.5	0.00
	d. Reopening Maintenance Level 1 Roads (Number of Miles) (Number of Roads)	 0.0 0	 0.0 0	 0.0 0	 0.1 1	 93.4 113	 11.4 13	 1.1 2
5. Amendments to the Forest Plan		None	Management Area 84 (Humbug Sailor) Deer Winter Range Seasonal Restriction Removed	None	None	Management Area 84 (Humbug Sailor) Deer Winter Range Seasonal Restriction Removed	Management Area 84 (Humbug Sailor) Deer Winter Range Seasonal Restriction Removed	None

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Chapter 1

Purpose and Need

Chapter 1: Purpose and Need

Document Structure

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

1. **Chapter 1**: **Purpose and Need**. 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.
2. **Chapter 2**: **The 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 effects.
3. **Chapter 3**: **Affected Environment and Environmental Consequences**. This chapter describes the environmental impacts of the Proposed Action and alternatives.
4. **Chapter 4**: **Consultation and Coordination**. This chapter provides a list of preparers and agencies consulted during the development of the environmental impact statement.
5. **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 the Tahoe National Forest Supervisors Office, 631 Coyote Street, Nevada City California 95959.

Background

Over the past few decades, the availability and capability of motorized vehicles, particularly off-highway vehicles (OHVs) and sport utility vehicles (SUVs) has increased tremendously. Nationally, the number of OHV users has climbed sevenfold in the past 30 years, from approximately 5 million in 1972 to 36 million in 2000. California is experiencing the highest level of OHV use of any state in the Nation. There were 786,914 ATVs and OHV motorcycles registered in California in 2004, up 330 percent 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 in California also increased 1,500 percent to 3,046,866 from 1989 to 2002.

Unmanaged OHV use on National Forest System lands has 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 adverse impacts from OHV use. Unmanaged recreation, including impacts from

OHVs, is one of "Four Key Threats Facing the Nation's Forests and Grasslands." (USDA Forest Service, June 2004).

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

On November 9, 2005, the Forest Service published final travel management regulations in the Federal Register (FR Vol. 70, No. 216-Nov. 9, 2005, pp 68264-68291). This final Travel Management Rule requires designation of those roads, trails, and areas that are open to motor vehicle use on National Forest System lands. Roads and trails designated for motorized use must be included in the National Forest Transportation System (NFTS). Designations are made by class of vehicle and, where appropriate, by time of year. 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 and in areas 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 has resulted in unplanned, unauthorized roads and trails. These routes generally developed without environmental analysis or public involvement, and do not have the same status as NFS roads and NFS 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 NFS roads and NFS trails can be designated for motor vehicle use. In order for an unauthorized route to be designated, it must first be added to the Forest transportation system.

In 2005 the TNF completed an inventory of unauthorized routes on NFS lands and identified 897 miles of unauthorized routes and an additional 513.7 miles of Maintenance Level 1 roads still receiving motorized use by the public. The result was a total of 1,410.7 miles having unauthorized motorized use by the public. Between the DEIS and Supplementary DEIS corrections were made to the NFTS (see discussion below on Corrections to the NFTS) and these figures were revised to 868.7 miles of unauthorized routes and 829.6 miles of Maintenance Level 1 roads receiving motorized use for a total 1,698.3 miles having unauthorized motorized use by the public.

TNF used an interdisciplinary process to conduct travel analysis that included working with the public to identify proposals for changes to the existing TNF transportation system. Roads and trails that are currently part of the TNF transportation system and open to motor vehicle travel would remain designated for such use, except as described below under the Proposed Action. This proposal makes needed changes (seasonal restrictions, vehicle class restrictions, etc.) to the Tahoe National Forest NFTS roads and NFTS trails on NFS lands in accordance with the Travel Management Rule (36 CFR Part 212, Subpart B).

In accordance with 36 CFR Part 212, Subpart B of the Travel Management Rule (36 CFR §212.56), following a decision on this proposal, the TNF will publish a motor vehicle use map (MVUM) identifying all TNF 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 would require additional environmental analysis, public involvement, and documentation.

Travel Management –Tahoe National Forest Transportation System

The TNF currently manages and maintains approximately 2,067.6 miles of NFTS roads, 328.2 miles of NFS motorized trails, and 1 established "Open Area." This number has changed since the DEIS as explained below under **Corrections to the NFTS Data in the DEIS.** The Tahoe National Forest Transportation System (NFTS) was developed over many decades to meet a variety of needs, including timber management, fuel treatment, access to private inholdings, fire control, utility management, special-uses management, and recreation. Other roads were acquired with past land exchanges or acquisitions. Harvesting of special forest products such as greenery, firewood, mushrooms, and plants are among the many opportunities afforded by the NFTS. Management of the transportation system on the Tahoe National Forest is a dynamic process. Implementation of this proposal and the subsequent designation of motor vehicle routes through publication of the MVUM is just one project, among many, that affects the Forest's transportation system. Over the last decade, the Forest has moved away from a commodity (timber) focus to one of ecosystem health and integrated vegetation management. In response to this shift, the Forest Supervisor initiated the following actions that reduced both road maintenance needs and deferred maintenance needs:

Previous administrative decisions have reduced the number of miles of NFTS roads available for motorized use and restricted the season of use. These previous administrative decisions have resulted in 395 miles being closed to wheeled public motorized access, 672 miles being seasonally closed, and 125 miles decommissioned.

The amount of NFTS trails available for motorized use has also been reduced by previous administrative decisions. More than 433 miles of existing system trails have been closed to all motorized use and more than 63 miles seasonally closed.

Large geographic areas of the Forest in previous administrative decisions have been determined to be unsuitable for motorized use. 87,000 acres have been designated as unsuitable for any motorized use and 160,000 acres have been designated as suitable for seasonal use only.

Implementation of this proposal and the subsequent designation of motor vehicle routes through publication of the MVUM are only one step in the overall management of the TNF NFTS. Project-level planning efforts include reducing adverse environmental impacts associated with unauthorized motorized

routes. The Forest's road and trail maintenance program addresses impacts associated with the current NFTS.

The NFTS is managed and maintained to various road standards, depending on management objectives. The roads range from paved to roughly graded, high-clearance roads, depending on the type of access necessary. In some cases, where public and administrative access is not needed for extended periods of time, roads are "stored" for future management use. The entire NFTS ("stored", administrative-use and public-use roads) is displayed on the Forest Transportation Atlas. The Forest Transportation Atlas consists of the maps, inventories, and plans for Forest transportation facilities and associated information available as of January 12, 2001 (Forest Service Manual 7711.2). Details concerning the management of individual roads and trails are maintained in the Forest infrastructure database (INFRA).

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

Since then, adjustments to the Transportation Atlas and INFRA database have been made to correct errors and account for NFTS roads that were either newly constructed or overlooked in the 2002 effort. The current Forest Transportation Atlas identifies the existing NFTS and the management objectives for each transportation facility. These objectives have changed since the DEIS as explained below under **Corrections to the NFTS Data in the DEIS.** Decisions regarding changes to the NFTS (new road construction, addition of unauthorized routes as NFTS facilities, realignment, decommissioning, etc.) are subject to the National Environmental Policy Act (NEPA) and require public involvement and disclosure. The NFTS is continually changing, depending on resource needs and management concerns.

Corrections to the NFTS Data in the DEIS – Preparation of a Supplemental DEIS

The TNF undertook a comprehensive review of its existing NFTS after the release of the Draft Travel Management EIS (DEIS). This review was done to respond to the following two concerns expressed by the public during the comment period on the DEIS.

- **Status of NFTS**: Letters from both the environmental and OHV communities questioned the inclusion or exclusion of roads/trails from the existing NFTS. The environmental community felt many of the NFTS roads/trails should be considered "unauthorized" while the OHV community felt that many of the "unauthorized" routes were actually part of the previously approved NFTS.
- **Valid Rights-of-Way (ROW)**: Letters from private landowners, including Pacific Gas and Electric Company, Sierra Pacific Industries, and Nevada Irrigation District, stated that several of the NFTS roads/trails were shown in error on their land since the Forest Service did not have a valid existing ROW. They requested these roads/trails not be shown on their land in the Final EIS.

The Forest Service validated the status of every NFTS road and trail on the Forest by utilizing the following information:

- **INFRA Database**: Jurisdiction discrepancies between INFRA and the Project GIS database were corrected.
- **Previous NEPA Decisions**: Available NEPA decisions regarding road and trail management from last fifteen years were reviewed.
- **Rights-of-Way Atlas**: The rights-of-way (ROW) status of all NFTS roads and trails were validated based on the Forest ROW Atlas.

Based on this review, the following corrections were made to the NFTS motorized recreation opportunities. These corrections were incorporated into all of the alternatives. Refer to Tables 1-1 and 1-2.

Table 1-1. Summary of corrections to the motorized recreation opportunities

Category of correction	Reason for correction	Miles
Additional NFTS motorized recreation opportunities	State or County roads determined to be part of the NFTS	32.2
	Previous NEPA decision added road/trail to the NFTS	69.4
	Previous NEPA decision converted non-motorized trail to a motorized road or trail	2.7
	Subtotal	**104.3**
Changes in type of NFTS motorized recreation opportunities	Previous NEPA decision changed the class of vehicle allowed	76.8
	Previous NEPA decision changed season of use on NFTS road/trail	579.6
	Previous NEPA decision changed both season of use and class of vehicle allowed on NFTS road/trail	33.5
	Subtotal	**689.9**
Reductions in NFTS motorized recreation opportunities	Previous NEPA decision scheduled NFTS road/trail for decommissioning	20.7
	NFTS roads/trails on private land determined to not have a valid right of way	124.5
	NFTS roads determined to be under State or County Jurisdiction	8.8
	Previous NEPA decision converted motorized road/trail to a non-motorized trail	5.2
	Previous NEPA Decision closed the road/trail	349.7
	Subtotal	**508.9**

Table 1-2. Summary of NFTS Mileage Before and After Corrections

Class of Vehicle	DEIS Mileage	Supplemental DEIS Mileage	Change
Roads open to highway legal vehicles only	629.3	616.7	-12.6
Roads open to all vehicles	1,845.2	1,450.9	-394.3
Trails open to high clearance trail vehicles only	161.5	133.8	-27.7
Trails open to ATV's and motorcycles only	16.8	25.5	+8.7
Trails open to motorcycles only	147.6	168.8	+21.2
Total	**2,800.4**	**2,395.7**	**-404.7**

The Forest Supervisor reviewed this information and based on the interdisciplinary team's recommendation, determined the preparation of a Supplemental DEIS was warranted so that the public

has an opportunity to review the proposed action and alternatives in light of the corrections that have been made since the DEIS was circulated.

Project Location

This proposal includes the entire Tahoe National Forest. The Tahoe National Forest straddles the crest of the Sierra Nevada Mountains in northern California, and encompasses a vast territory, from the foothills on the western slope to the eastern slope of the Sierras (Figure 1-1). The Forest is bordered on the north by the Plumas National Forest, on the south by the Eldorado National Forest, and on the east by the Humboldt-Toiyabe National Forest and Lake Tahoe Basin Management Unit. On the Forest's western border are the foothills above the Sacramento Valley.

Figure 1-1. Vicinity Map

Purpose and Need

The following needs have been identified for this proposal:

There is a need for regulation of unmanaged cross country motor vehicle travel by the public.

The proliferation of unplanned, unauthorized, non-sustainable roads, trails, and areas created by cross country travel adversely impacts the environment. The 2005 Travel Management Rule, 36 CFR Section 212, Subpart B, provides for a system of NFS roads, NFS trails, and areas on NFS 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. 36 CFR Part 212, Subpart B is intended to prevent resource damage caused by unmanaged motor vehicle use by the public. In accordance with national direction, implementation of 36 CFR Part 212, Subpart B of the travel management rule for the Tahoe National Forest is scheduled for completion in January 2010.

There is a need for limited changes to the TNF transportation system to:

- Provide motorized access to existing dispersed recreation opportunities (camping, hunting, fishing, hiking, horseback riding, etc.). There is a need to maintain motor vehicle access to dispersed recreation activities that are known to have been historically accessed by motor vehicles. A substantial portion of known dispersed recreation activities (camping, fishing, hiking, horseback riding, hunting, etc.) are not located directly adjacent to an existing NFTS road or motorized trail. Some dispersed recreation activities depend on foot or horseback access, and some depend on motor vehicle access. These dispersed non-motorized activities depend on motor vehicle access using short spurs created and maintained 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, the regulatory changes noted above would make continued use of such routes illegal through the prohibition of cross country travel, and would preclude access to many dispersed recreation activities.
- Provide a diversity of motorized recreation opportunities (4X4 vehicles, motorcycles, ATVs, SUVs, passenger vehicles, etc.). It is Forest Service policy to provide a diversity of road and trail opportunities for experiencing a variety of environments and modes of travel consistent with the National Forest recreation role and land capability (FSM 2353.03(2)). Implementation of 36 CFR Part 212, Subpart B of the Travel Management Rule will 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 TNF will be considering criteria contained in 36 CFR Part 212, Subpart B of the Travel Management Rule, which include the following:

- Impacts to natural and cultural resources.
- Public safety.
- Access to public and private lands.
- Availability of resources for maintenance and administration.
- The need for maintenance and administration of roads trails and areas that would arise if the uses under consideration are designated.
- Minimizing damage to soil, watershed, vegetation, and other forest resources.
- Minimizing harassment of wildlife and significant disruption of wildlife habitat.
- Minimizing conflicts between motor vehicles and existing or proposed recreational uses of NFS lands or neighboring Federal lands.

- Minimizing conflicts among different classes of motor vehicle uses of NFS lands or neighboring Federal lands.
- 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 NTFS Roads, the TNF will also consider the following:

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

Table 1-3 provides a summary of the Purpose and Need details related to the five components of the Proposed Action.

Table 1-3. Relation of Purpose and Need to Proposed Actions

What	Where	Why	How
1. Prohibition of 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
2. Additions to the NFTS			
Add existing unauthorized routes to the NFTS	Specific routes shown in Appendix A and on alternative maps	Provide a variety of motorized trail opportunities; enhance loop opportunities; access destinations; reduce conflicts between different uses	Add unauthorized routes to the trail system; show on MVUM pending completion of mitigations
3. Establishment of Motorized "Open Areas":			
Establish "Open Areas"	Specific "Open Areas" shown in Appendix A and on alternative maps	Provide a diversity of motorized recreation opportunities; Provide motorized access to existing dispersed recreation opportunities.	Establish "Open Areas"; show on MVUM pending completion of mitigations
4a. Change Vehicle Classes through Mixed Use (Roads maintained for passenger cars available for use by non-highway legal vehicles):			
Change NFTS roads from Highway Legal Only to All Vehicles	Specific roads shown in Appendix J and on alternative maps	Provide a variety of motorized mixed use opportunities; enhance loop opportunities by connecting trails	Show on MVUM as open to all vehicles pending completion of mixed use mitigations
4b. Change Vehicle Classes through Maintenance Levels (Roads presently maintained for passenger cars to be maintained in the future for high clearance vehicles):			
Change NFTS roads from Highway Legal Only to All Vehicles	Specific routes shown in Appendix J and on alternative maps	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 mixed use mitigations

What	Where	Why	How
4c. Changes in Seasonal Restrictions:			
Wet Weather Closures	Forestwide outside of Wilderness on all native surface roads and motorized trails	Protect resources including road and trail surfaces during wet periods	During the wet season of use all native surfaced routes are closed; show on MVUM
4d. Reopening Maintenance Level 1 Roads:			
Change NFTS roads from Closed to Open	Specific routes shown in Appendix A and on alternative maps	Existing NFTS roads; access destinations; enhance loop opportunities by connecting trails	Open any existing gates or remove barriers as needed; show on MVUM
5. Amendments to the Forest Plan:			
Non-significant amendments	Specific routes in Management Area 84; shown in Appendix A and on alternative maps	Remove deer winter range seasonal restrictions to improve motorized recreation opportunities	Forest Plan Amendment for native surface roads and trails in Management Area 84; show on MVUM

Proposed Action as Described in the Notice of Intent

1. **Prohibition of Cross Country Travel**: Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside designated motorized use areas would be prohibited, except as allowed by permit or other authorization.
2. **Additions to the NFTS**:
   a. No unauthorized routes would be added as roads to the NFTS.
   b. 36.7 miles (36 routes) of unauthorized routes would be added as motorized trails to the NFTS.
3. **Establishment of Motorized "Open Areas"**: No additional motorized "Open Areas" would be established.
4. **Changes to the NFTS**:
   a. **Change Vehicle Classes through Mixed Use**: No changes would be made to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through approval of mixed use.
   b. **Change Vehicle Classes through Maintenance Levels:** Change vehicle class on 3.4 miles to allow operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through the conversion of ML 3 roads (maintained for passenger cars) to ML 2 (maintained for high clearance vehicles).
   c. **Changes in Seasonal Restrictions:** No changes in seasonal restrictions would be made.
   d. **Reopening Maintenance Level 1 Roads**: Two Maintenance Level 1 roads (1.1 miles) would be reopened to motorized use.
5. **Amendments to the Forest Plan**: No amendments would be made to the Forest Plan.

Appendix A (Site Specific Road, Trail and Open Area Information) shows the specified vehicle class, season of use and any required mitigations associated with any facility added to the NFTS.

Including the additions and changes described above, the Proposed Action would result in a system of 2,068.5 miles of NFTS roads and 365.0 miles of NFTS motorized trails open to public motorized use. A more detailed description of the Proposed Action can be found in Chapter 2 (The Alternatives). Maps of the Proposed Action are available on compact disc.

Principle Laws and Regulations that influence the scope of this EIS

The National Environmental Policy Act of 1969 (NEPA) requires that all major federal actions significantly affecting the human environment be analyzed to determine the magnitude and intensity of those impacts and that the results be shared with the public and the public be 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 Tahoe National Forest Land and Resource Management Plan (as amended, 2007), the Clean Air Act of 1955, the Clean Water Act of 1948, and the Forest and Rangeland Renewable Resources Planning Act of 1974. In addition, the TNF Travel Management EIS is designed specifically to implement the requirements of 36 CFR 212, Subpart B, of the November 5, 2005 Rule for Travel Management (36 CFR 212.50-57). Other laws, regulation, and guidance specific to individual resources are found within the respective resource section in Chapter 3 (Affected Environment and Environmental Consequences) of this document.

Decision Framework

The Forest Supervisor for the TNF will be the responsible official. The responsible official will decide whether to adopt and implement the Proposed Action, an alternative to the Proposed Action, or take no action at this time. This proposal does not revisit previous administrative decisions that resulted in the current NFTS. This proposal is focused on implementing 36 CFR 212, Subpart B of the Travel Management Rule. Previous administrative decisions concerning road construction, road reconstruction, trail construction, and land suitability for motorized use on the existing NFTS are outside of the scope of this analysis.

Public Participation

The Interdisciplinary Team relied on public involvement to ensure that a full range of alternatives, representing a broad array of perspectives, would be analyzed in this DEIS. Public involvement occurred during three key periods: first, during the public collaboration process that began in 2006; second, during the 30-day public scoping period for the Notice of Intent (NOI); and third, during meetings with public groups to refine alternatives they proposed during scoping.

During the summer 2006, a variety of trail users, including motorized and non-motorized users, provided suggestions on designing a public involvement process that would be meaningful to participants to help identify a starting point from which to build the Proposed Action. Approximately twenty

individuals assisted with this effort, which was open to the public. In the fall, 2006, using the suggestions from the public on how to structure the public involvement, a series of six workshops were initiated to recommend which routes and areas should become part of the Proposed Action, and the type of vehicle use that each would have. The concept of "mixed use" was also introduced during these meetings. At the first session of the two-part series, public workshops were held in Nevada City (Oct. 19), Truckee (Oct. 23) and Foresthill (Oct. 26). At these meetings, participants broke into three groups to review three different geographical areas and to discuss which of the routes they would or would not like to become part of the Proposed Action. Some of the groups continued to meet and/or to make field visits to review conditions on the ground. Later in the fall, at the second set of public workshops, these groups returned and presented their information back to the entire group at sessions in Grass Valley (Nov. 15), Truckee (Dec. 5) and Foresthill (Dec. 7). Public meeting participants shared their ideas and their various concerns with other group proposals. Roughly 300 people participated in these public workshops. In early 2007, an e-mail update was issued sharing information on the meetings and the outcome. The Forest Service Interdisciplinary team took this information and used it in the development of the Proposed Action for the Notice of Intent.

30-day public scoping period for the Notice of Intent

In April 2007, the Forest Service published the "Proposed Action and Notice of Intent to Prepare an Environmental Impact Statement" (Federal Register Vol. 72/No. 69/Wednesday April 11, 2007) based on comments from the meetings held in the fall. The public comment period began on April 11, 2007, and ended May 14, 2007. Presentations to a variety of groups, phone calls, news releases, website postings and emails were used to alert the public of the opportunity to comment on the Proposed Action. Public meetings were held in Truckee (April 18), in Foresthill (April 24) and in Grass Valley (April 26) to explain the Proposed Action. Over 3,500 comments were received via e-mail and regular mail; with most being e-mail form letters.

Issues

Comments from the public, other agencies, and the Tribes were used to formulate issues concerning the Proposed Action (see Project Record). 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 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 elements 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 1-4.

Table 1-4. Significant Issues

Issue/Element	Cause and Effect
Significant Issue Statement #1. The route inventory identified approximately 1,596.3 miles of existing unauthorized routes and the Proposed Action only adds 36.7 miles of these to the NFTS. Reducing the miles of routes available for public motorized use and prohibiting cross country travel as described in the Proposed Action will adversely affect the quality and quantity of motorized recreation experiences	
Motorized Recreation Opportunities	• Does not provide adequate access to key destinations, including campsites, scenic overlooks, and hunting areas. • Reduces loops and connectors to provide longer riding time and spurs for exploration. • Reduces the diversity of opportunities for different vehicles (ATVs, motorcycles, 4WD). • Reduces semi-primitive riding opportunities and experiences.
Significant Issue Statement #2. Public motorized use of roads and trails as described in the Proposed Action will adversely affect non-motorized recreation experiences.	
Non-Motorized Recreation Opportunities	• Increases in engine noise will impact non-motorized recreation opportunities. • Increases in dust will impact non-motorized recreation opportunities. • Increases in motorized use will result in user conflicts between forest visitors. • Increases in motorized use will reduce aesthetic values.

Issue/Element	Cause and Effect
Significant Issue Statement #3. Public motorized use of roads and trails as described in the Proposed Action will adversely affect forest resources.	
Resource Impacts	• Increased erosion, soil compaction, and reduction in water quality; • Degradation of habitat for fish, wildlife, and rare plants; • Damage to heritage resources; • Proliferation of weeds; and • Impacts to Inventoried Roadless Area character compromising future potential wilderness designation.
Significant Issue Statement #4: The NFTS is already too large to provide adequate maintenance and administration.	
Affordability	• Current and future budgets may not provide adequate funding for maintenance, administration and enforcement of the proposed road and trail system. • Additions to the NFTS may require additional mitigation measures to prevent serious and adverse environmental impacts.

Chapter 2

The Alternatives

Chapter 2: The Alternatives

This chapter describes and compares the alternatives considered for the Tahoe National Forest Motorized Travel Management EIS. It describes both alternatives considered in detail and those eliminated from detailed study. The end of this chapter presents the alternatives in tabular format so that the alternatives and their environmental impacts can be readily compared.

Based on the issues identified through public comment on the Proposed Action, the Forest Service developed five action alternative proposals to the Proposed 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, alternatives to the Proposed Action, and the No Action Alternative are described in detail below. This chapter is divided into five parts:

- How the alternatives were developed;
- Elements common to all alternatives, including motorized mixed use, routine maintenance, mitigation measures, monitoring and implementation strategy.
- Alternatives considered in detail, including cross country travel, additions to the National Forest Transportation System (NFTS), establishment of motorized "Open Areas," changes to the NFTS, and proposed Forest Plan amendments;
- Alternatives that were considered, but eliminated from detailed analysis. This section includes the rationale for eliminating these alternatives; and
- Comparison of the alternatives.

How the Alternatives Were Developed

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

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

In addition to the issues raised during the 30-day public scoping period, two groups submitted alternative proposals for consideration by the Forest Service. The six action alternatives incorporate elements of these proposals as well as other comments submitted by the public. In addition, information gathered by the Forest Service in their consultation and discussions with tribal representatives, local counties, State and Federal agencies, and Forest Service employees was used to develop and refine the alternatives.

Modifications to Alternatives between Draft and Supplemental Draft Environmental Impact Statement

The following modifications were to the alternatives as they were displayed in the Draft Environmental Impact Statement.

- The corrections to the existing NFTS as described in Chapter 1 were incorporated into each of the alternatives.
- Modifications were made to the Preferred Alternative (Alternative 6) in response to public comments on the Draft EIS including:
  - Shortened the seasonal restrictions on motorized vehicle use by one month for routes on the westside of the Forest to enhance opportunities for motorized recreation.
  - Allowed wheeled over-the-snow motorized vehicle use on 3.6 miles of the Fordyce jeep trail when 15 inches of snow is present on the ground.
  - Increased protection for the Forest's Inventoried Roadless Areas (IRAs) not to adding Route YRN-M3b, located in the West Yuba IRA, to the NFTS.
  - Limited year-round motorized mixed use (highway-legal vehicles sharing roads with non-highway legal vehicles) to roads less than 3 miles in length that have a low mixed use crash probability combined with a low mixed use crash severity, or that are consistent with the California Vehicle Code Division 16.5.
  - Allowed motorized mixed use on certain roads longer than 3 miles, but only during deer hunting season, which ensures a low mixed use crash probability and severity will be maintained on these roads.
  - Allowed motorized mixed use on certain routes recommended by the public during the comment period. These routes, which have been identified in our NFTS objectives as Maintenance Level 3 roads (typically low speed, single lane roads with turnouts maintained for travel by a prudent driver in a standard passenger car), will now be maintained as Maintenance Level 2 roads (roads open for use by high clearance vehicles).
  - Ensured that the public has adequate access to important non-motorized recreation opportunities on the Forest by allowing such places to be safely reached in highway legal vehicles.
  - Added numerous, primarily short unauthorized route segments recommended by the public, to the NFTS to provide motorized access to dispersed recreation sites where no significant adverse resource impacts were associated with such additions.
  - Established "Open Areas" at the Boca, Stampede, and Prosser Reservoirs to provide motorized access to the shorelines.
  - Incorporated additional mitigation measures for specific routes to minimize impacts associated with motorized vehicle use, which will allow these routes to be added to the NFTS in a sustainable manner.

Elements Common to All Alternatives

Motorized Mixed Use

Forest Service Manual (FSM) 7705 defines motorized mixed use as the designation of an NFTS road for use by both highway-legal and non-highway-legal motor vehicles. The Forest Service considers roads

maintained for use by high clearance vehicles (Maintenance Level 2) as roughly graded and considers operation of non-highway legal vehicles on these roads to be consistent with state law.

The following proposals related to motorized mixed use apply to all action alternatives:

- **Vehicle classes allowed on unauthorized routes added to the NFTS as roads.** Unauthorized routes considered for addition to the NFTS under one or more of the action alternatives have been determined not to have significant safety concerns that could not be mitigated (Appendix A, Site Specific Road, Trail and Open Area Information). All vehicle classes (including highway-legal and non-highway-legal vehicles) would be allowed if the route is added to the NFTS as a road. Use by non-highway-legal trail vehicles would be allowed on routes added to the NFTS as motorized trails.
- **Vehicle classes allowed on existing NFTS high clearance 4WD roads.** All existing high clearance NFTS four-wheel drive (4WD) roads have been determined to have minimal safety concerns (see Transportation section). All vehicles classes (including highway-legal and non-highway-legal vehicles) would be allowed on these types of roads in all action alternatives (Alternatives 2-7).
- **Vehicle classes allowed on existing NFTS passenger car roads.** Roads currently maintained for passenger cars are being considered for mixed use where such use is currently prohibited. (See Transportation section in Chapter 3 for more information.) All vehicle classes (highway-legal and non-highway-legal vehicles) would be allowed to use all or segments of these roads in the action alternatives (Alternatives 2-7). Non-highway-legal vehicles would not be allowed on any other passenger car roads, and operators of non-highway legal vehicles on roads where mixed use is allowed would be required to possess a valid driver's license and insurance.

Parking

Under all action alternatives, parking would be restricted to one vehicle length off of designated roads and motorized trails.

Routine Maintenance

Maintenance is defined as ongoing upkeep of a road necessary to maintain or restore the road in accordance with its road management objectives (FSM 7714). Under all alternatives, an annual maintenance plan for NFTS roads and trails would be developed at the beginning of the road maintenance season. Routine maintenance includes cleaning and repairing drainage structures (i.e., water bars, culverts and rolling dips); berm removal; clearing the travel surface of obstacles such as rock, slough, trees, and brush; clearing obstacles such as downed trees; blocking and naturalizing multiple routes or shortcuts; and incidental replacement or repair of existing structures such as barriers, walls, or causeways.

Roads and trails in need of maintenance at the beginning of the maintenance season (e.g., to address concerns related to spring run off, winter tree and snag fall and other environmental factors) are the first priority. Later in the season, maintenance focuses on maintaining high traffic volume roads; major repairs such as culvert replacement; and repairs needed to prevent or mitigate resource damage.

Mitigation Measures

Mitigation measures would be required for any of the motorized roads or trails proposed for addition to the NFTS and established "Open Areas" in any of the action alternatives. Mitigation measures are contained in Appendix A (Site Specific Road, Trail and Open Area Information). The mitigation measures fall in the following general categories. See Table 2-1 for the summary of proposed mitigation measures.

Table 2-1. Summary of Proposed Mitigation Measures by Alternative

		Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
Watershed (includes improving stream crossings, placing drainage structures, repairing gullies, minor rerouting, placing barriers, removing structures, constructing waterbars, and closing adjacent spurs)	Routes	36	11	37	28	25
	Acres	60	0	0	244	0
	Miles	41.5	16.6	42.4	34.6	30.4
	Cost	$154,700	$65,500	$136,200	$43,200	$119,500
Botany (includes installing waterbars, placing barriers, minor reroutes and noxious weed removal)	Routes	17	8	19	14	13
	Acres	2,589	0	0	244	0
	Miles	23.7	12.8	23.7	19.0	19.1
	Cost	$42,350	$6,250	$43,750	$22,550	$37,250
Wildlife (includes placing barriers and conducting bat surveys)	Routes	2	0	2	3	1
	Miles	.5	0	.5	.5	.2
	Cost	$1,000	0	$1,000	$1,500	$500
Safety (includes closing adits, approving mixed use, installing signs, removing logs and labeling water sources)	Routes	6	1	6	6	3
	Miles	5.9	2.9	5.9	5.9	3.6
	Cost	$6,000	$500	$6,000	$6,000	$2,000
Lands (includes completing law enforcement agreements and obtaining permission from private landowners)	Routes	6	3	19	4	6
	Acres	60	0	0	0	0
	Miles	6.4	1.9	14.6	3.2	6.3
	Cost	$2,250	$750	$5,000	$1,250	$1,750

		Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
Recreation (includes placing barriers, removing obstructions and restricting to day use only)	Routes	9	4	9	14	5
	Miles	4.6	1.5	4.6	4.0	4.3
	Cost	$5,500	$2,000	$5,500	$8,000	$3,500
Air Quality (encapsulating asbestos)	Routes	1	0	3	1	1
	Miles	.6	0	1.2	.5	.6
	Cost	$10,000	0	$30,000	$10,000	$10,000
Heritage (installing barriers)	Routes	5	2	6	5	2
	Acres	2,589	0	0	0	0
	Miles	6.5	2.0	7.0	5.0	2.4
	Cost	$8,850	$3,850	$8,350	$5,850	$3,850
Total Routes with Mitigation		**44**	**15**	**60**	**47**	**27**
Total Acres and Miles with Mitigation		**2,649 Acres 43.8 Miles**	**18.2 Miles**	**54.2 Miles**	**244 Acres 37.7 Miles**	**30.0 Miles**
Total Cost with Mitigation		**$240,650**	**$77,850**	**$256,300**	**$103,350**	**$173,350**

Note: Table 2-1 does not list any mitigation measures for Alternatives 1and 3 because there are no roads, trails, or areas being added to the National Forest Transportation System. Numbers may not add up due to rounding. Totals do not sum due to multiple mitigations required for individual routes.

Scheduling of mitigation measures would be based on the following considerations:

- Roads and trails where the location or deteriorated condition is causing substantial effects to riparian, watershed, threatened, endangered or sensitive species, or significant cultural resources whether or not motorized vehicle use is occurring.
- Mitigations on routes requiring relatively low-cost, easily implemented work, such as signage or simple barriers.
- Roads and trails that provide connectivity and important access for the transportation network or other routes that have been identified as providing key public benefit and opportunities.

Routes with mitigations would not be open to motorized use until this work is accomplished. After mitigation has been performed, the route would appear as a designated public motorized road or trail on the next revision of the MVUM. Mitigations have been analyzed for their potential to reduce or eliminate effects on specific resources associated with motorized use of the routes. These effects are disclosed in the resource sections of Chapter 3.

Monitoring

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 and would require additional NEPA analysis.

Proposed route-specific monitoring varies by alternative. As identified in Appendix A (Site Specific Road, Trail and Open Area Information), resource specialists have identified approximately 84 routes where site-specific monitoring would be needed if the routes are added to the system for public use in an alternative. These include monitoring effects of the routes on botany, heritage, watershed and recreation resources. In some cases, one route may be monitored to assess conditions of multiple resources.

In addition to effectiveness monitoring related to the actions of this project, many other forms of monitoring and data collection take place on the Forest. These include ongoing monitoring that is already prescribed, such as surveys of roads and trails for infrastructure condition, monitoring of cultural resource sites, noxious weed spread, rare plants, or wildlife surveys. Some of this monitoring may directly or indirectly assess the effects of roads or trails on resources, as well as generally assessing conditions of roads for stability and maintenance. While these monitoring efforts are not prescribed in this Travel Management EIS, these data would also be used whenever possible, in assessing either the effectiveness of the actions proposed or in adjusting future travel management actions. The Forest Service would conduct implementation monitoring based on Appendix M (OHV Monitoring) and summarized in Table 2-2.

Table 2-2. Summary of number of routes with monitoring requirements by resource category and alternative

Resource Category	Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
Botany (Number of routes)	5	1	5	6	4
Heritage (Number of routes)	48	18	50	65	9
Watershed (Number of routes)	13	4	16	16	13
Recreation (Number of routes)	1	0	1	1	0
Grand Total (Number of routes) (Total cost)	**67** **$20,865**	**23** **$5,755**	**72** **$21,115**	**88** **$24,020**	**26** **$9,250**

Note: Table 2-2 does not list monitoring requirements for Alternatives 1 and 3 because there are no roads or trails being added to the NFTS.

Implementation Strategy

After a decision is made, a Motor Vehicle Use Map (MVUM) would be created and made available to the public at no cost. This map would be the legal document displaying designated NFTS roads, trails, and established “Open Areas” on the Forest which may be legally traveled with a motorized vehicle, as well as the allowed vehicle class, and any seasonal or other use restrictions. As changes or corrections are made to the transportation system in the future, the MVUM would be periodically revised and reissued. NFTS roads and trails open to public use would be signed on the ground with a road or trail number and any regulatory information that may apply to the route.

Alternatives Considered in Detail

The action alternatives (Alternatives 2, 3, 4, 5, 6 and 7) and the No Action Alternative (Alternative 1) 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 1, required by the

implementing regulations of the National Environmental Policy Act (NEPA), serves as a baseline for comparison among the alternatives.

The planning area includes National Forest System land on the Tahoe National Forest. It does not include any private, state or other federal lands. Each alternative assumes that other adjacent federal lands will be managed according to existing management plans and applicable federal laws. Each alternative also assumes that private lands will meet applicable state and federal land use regulations.

The alternatives are described in five parts:

1. **Cross Country Travel**: All of the action alternatives prohibit wheeled motor vehicle travel off designated NFTS roads, NFTS motorized trails, and established "Open Areas" by the public except as allowed by permit or other authorization. Prohibition of cross country travel addresses the need to regulate unmanaged motor vehicle use.
2. **Additions to the NFTS**: Some action alternatives would add unauthorized routes as roads and trails to the NFTS by vehicle class and season of use. Additions are considered in order to respond to the need to provide motor vehicle access to dispersed recreation opportunities and to provide a diversity of motorized recreation opportunities. For purposes of this analysis, each of these roads and trails is identified by a unique number. Resource specialists conducted their site specific review of each proposed route. All proposed route additions have assigned road or trail management objectives. All proposed additions would receive the appropriate level of routine maintenance, such as brushing, signing, cleaning and clearing debris. For some routes, no work beyond routine maintenance would be needed. For others, additional mitigation would be 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 on the MVUM for public motorized use. Appendix A (Site Specific Road, Trail and Open Area Information) shows the specified vehicle class, season of use, and mitigations for all proposed route additions. Additional details on each route are contained in the Project Record.
3. **Establishment of Motorized "Open Areas"**: Two action alternatives would establish motorized "Open Areas" by vehicle class and season of use. Establishing new "Open Areas" are being considered in order to respond to the need to provide motor vehicle access for dispersed recreation opportunities and to provide a diversity of motorized recreation opportunities. For purposes of this analysis, each of these "Open Areas" is identified by name. Resource specialists conducted their site specific review of each proposed "Open Area." All established "Open Areas" would receive the appropriate level of routine maintenance such as brushing, signing, cleaning and clearing debris. For some "Open Areas", no work beyond routine maintenance would be needed. For others, additional mitigation is needed to bring the area up to a safe and environmentally sustainable condition. The specific mitigations must be completed prior to establishment of the "Open Area" on the MVUM for public motorized use. Appendix A shows the specified vehicle class, season of use and mitigations for all proposed established "Open Areas." Additional details on each "Open Area" are contained in the Project Record.

4. **Changes to the NFTS**: With the exception of Alternative 3, the action alternatives propose various changes to the existing NFTS including changes to vehicle class and season of use, and reopening Maintenance Level 1 roads. Appendix A (Site Specific Road, Trail and Open Area Information) shows the specified vehicle class, season of use, and mitigations for proposed changes to the existing NFTS under each alternative.
   a. **Vehicle class -** The action alternatives may include limited changes to the vehicle class allowed on existing NFTS roads and/or trails. Vehicle class indicates the type of vehicle (passenger car, motorcycle, all-terrain vehicle, etc) allowed to operate on a road or trail. Some alternatives add vehicle classes to roads and/or trails where that use is currently prohibited. Some alternatives add vehicle classes resulting from changes in maintenance levels. These changes respond to the need to provide a diversity of wheeled motorized recreation opportunities and access.
   b. **Season of Use -** The action alternatives vary in terms of which roads, trails and areas would have motorized travel prohibited during specified times of year. Wet weather seasonal restrictions are specified in some of the alternatives to minimize erosion and protect water quality.
   c. **Reopening Maintenance Level 1 Roads -** Some alternatives include opening Maintenance Level 1 (ML 1) roads to public use, where such use is currently prohibited, to enhance motorized recreation opportunities. These changes respond to the need to provide a diversity of wheeled motorized recreation opportunities and access.
5. **Amendments to the Forest Plan:** Some of the action alternatives include an amendment to the Tahoe National Forest Land and Resource Management Plan (LRMP 1990) to remove the November 1 to May 1 seasonal closure in the Sugar Pine area (Management Area 84 Humbug Sailor) on key winter deer range to improve motorized recreation opportunities.

Alternative 1: No Action

The No Action Alternative provides a baseline for comparing the other alternatives. Under the No Action Alternative, no changes would be made to the NFTS and there would be no prohibition of cross country travel (see Table 2-3). Current management plans would continue to guide project area management. The Travel Management Rule would not be implemented, and no motor vehicle use map (MVUM) would be published. Motor vehicle travel by the public would not be limited to designated routes. Unauthorized routes would continue to proliferate and would have no status or authorization as NFTS facilities.

1. **Cross Country Travel**: Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established “Open Areas” would continue, except as otherwise prohibited.
2. **Additions to the NFTS**: No unauthorized routes would be added to the NFTS as roads or motorized trails under this alternative.
3. **Establishment of Motorized “Open Areas”**: No additional motorized “Open Areas” would be established under this alternative.
4. **Changes to the NFTS**: No Changes to the NFTS would be made in this alternative.

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

Table 2-3 displays a summary of the existing conditions due to no action in this alternative. A map displaying this alternative is included in digital format on the CD attached to this document, and may be found in the Project Record located at the Tahoe National Forest Supervisors Office in Nevada City, California.

Table 2-3. Alternative 1 - Summary of Actions (Existing Condition)

Action type		Action Proposed
1. Cross Country Travel (Acres)		Prohibitions continue on 81,975 acres. Continues on 754,066 acres
2. Additions to the NFTS	a. Roads added to the NFTS open to high clearance vehicles	0.0 (miles), 0 (roads)
	b. Motorized Trails added to the NFTS	0.0 (miles) 0 (trails)
3. Establishment of Motorized "Open Areas"		None
4. Changes to the NFTS	a. Passenger car roads where both highway legal and non-highway legal vehicles will be allowed to use the same road.	0.0 miles
	b. Passenger car roads that will be downgraded to high clearance roads so that both highway legal and non-highway legal vehicles can use the same road	0.0 miles
	c. Change in Season of Use	0.0 miles
	d. Reopening Maintenance Level 1 Roads	0.0 (miles), 0 (roads)
5. Amendments to the Forest Plan		None

Alternative 2: Increased Motorized Recreation and Access Opportunities

Alternative 2 responds to the issue of inadequate motorized recreation opportunities. This alternative is based on the Proposed Action (Alternative 7), with additional routes and mixed use to provide more access and motorized recreation opportunities. During scoping, the Tahoe National Forest received numerous site specific suggestions for additional motorized roads, trails and established "Open Areas" that would improve public access and enhance motorized recreation opportunities. Unauthorized routes and closed NFTS roads site-specifically requested by the public during scoping were added in this alternative, provided they were consistent with law, regulation, and policy. In addition, site specific recommendations for "Open Areas" proposed by the public during scoping were also established in this alternative provided they were consistent with law, regulation and policy.

1. **Cross Country Travel**: Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization.

2. **Additions to the NFTS**:
   a. Under this alternative, 114 segments of unauthorized routes totaling 5.0 miles would be added as roads open to high clearance vehicles to the NFTS.
   b. 54.6 miles (87 routes) of unauthorized routes would be added as motorized trails to the NFTS.
3. **Establishment of Motorized "Open Areas"**: Four areas totaling 2,649 acres would be established as motorized "Open Areas" open to all vehicles under this Alternative.
4. **Changes to the NFTS**:
   a. **Change Vehicle Classes through Mixed Use**: Change vehicle class on 241.5 miles to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through approval of mixed use.
   b. **Change Vehicle Classes through Maintenance Levels:** Change vehicle class on 157.2 miles to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through the conversion of Maintenance Level 3 (ML 3) roads to Maintenance Level 2 (ML 2). For each of these roads an entrance strategy (i.e. waterbars) and road conditions would be implemented to be consistent with use by high clearance vehicles. These roads would then be maintained as ML 2 to prevent unacceptable resource damage from occurring. Once the Forest Engineer determines these roads have reached ML 2 conditions they would be placed on the MVUM and signed as available for use by non-highway legal vehicles.
   c. **Changes in Seasonal Restrictions:** Seasonal restrictions for deer winter range would be changed from "May 1 to November 1", to "Open Year Round" on 10.5 miles of roads resulting from the Forest Plan Amendment to Management Area 84 (Humbug-Sailor)
   d. **Reopening Maintenance Level 1 Roads**: No ML 1 roads would be opened to motorized use.
6. **Amendments to the Forest Plan:** The Tahoe National Forest LRMP would be amended to remove the November 1 to May 1 seasonal closure in the Sugar Pine area (Management Area 84 Humbug Sailor) on key winter deer range to improve motorized recreation opportunities.

Table 2-4 displays a summary of the actions proposed in this alternative. A complete listing of roads, trails and areas to be added into the NFTS; including the vehicle class and, if applicable, seasonal use restrictions; can be found in Appendix A (Site Specific Road, Trail and Open Area Information). A map displaying this alternative is included in digital format on the CD attached to this document, and may be found in the Project Record located at the Tahoe National Forest Supervisors Office in Nevada City, California.

Table 2-4. Alternative 2 - Summary of Actions

Action type		Action Proposed
1. Cross Country Travel (Acres)		Prohibited on 833,392 acres
2. Additions to the NFTS	a. Roads added to the NFTS	5.0 (miles), 114 (roads)
	b. Motorized Trails added to the NFTS Trails open to high clearance trail vehicles Trails open to ATVs and motorcycles only Trails open to motorcycles only **Total all trails**	 24.3 (miles), 69 (trails) 4.4 (miles), 3 (trails) 25.9 (miles), 15 (trails) **54.6 (miles), 87 (trails)**
3. Establishment of Motorized "Open Areas"		Greenhorn Area (60 acres) Prosser, Boca and Stampede Reservoirs (2,589 acres)
4. Changes to the NFTS	a. Passenger car roads where both highway legal and non-highway legal vehicles will be allowed to use the same road	241.5 (miles)
	b. Passenger car roads that will be downgraded to high clearance roads so that both highway legal and non-highway legal vehicles can use the same road	157.2 (miles)
	c. Change in Season of Use	10.5 (miles)
	d. Reopening Maintenance Level 1 Roads	0.0 (miles), 0 (roads)
5. Amendments to the Forest Plan		Management Area 84 (Humbug Sailor) Deer Winter Range Seasonal Restriction Removed

Alternative 3: Cross Country Travel Prohibition Only – No Changes to the Existing National Forest Transportation System

Alternative 3 responds to issues of (1) adverse effects of motorized recreation use on non-motorized recreation experiences and (2) potential adverse impacts from motorized recreation use on natural and cultural resources. As such, Alternative 3 would prohibit cross country travel, and proposes no new additions to the NFTS. This alternative also provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS. None of the unauthorized roads or trails would be added to the NFTS. No additional "Open Areas" would be established.

1. **Cross Country Travel**: Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization.
2. **Additions to the NFTS**: No unauthorized routes would be added to the NFTS as roads or motorized trails under this alternative.
3. **Establishment of Motorized "Open Areas"**: No additional motorized "Open Areas" would be established under this alternative.
4. **Changes to the NFTS**: No changes to the NFTS would be made in this alternative.
5. **Amendments to the Forest Plan**: No amendments would be made to the Forest Plan.

Table 2-5 displays a summary of the actions proposed in this alternative. A map displaying this alternative is included in digital format on the CD attached to this document, and may be found in the Project Record located at the Tahoe National Forest Supervisors Office in Nevada City, California.

Table 2-5. Alternative 3 - Summary of Actions

Action type		Action Proposed
1. Cross Country Travel (Acres)		Prohibited on 836,000 acres
2. Additions to the NFTS	a. Roads added to the NFTS	0.0 (miles), 0 (trails)
	b. Motorized Trails added to the NFTS	0.0 (miles), 0 (trails)
3. Establishment of Motorized "Open Areas"		None
4. Changes to the NFTS	a. Passenger car roads where both highway legal and non-highway legal vehicles will be allowed to use the same road	0.0 (miles)
	b. Passenger car roads that will be downgraded to high clearance roads so that both highway legal and non-highway legal vehicles can use the same road	0.0 (miles)
	c. Change in Season of Use	0.00
	d. Reopening Maintenance Level 1 Roads	0.0 (miles), 0 (roads)
5. Amendments to the Forest Plan		None

Alternative 4: Increased Resource Protection

Alternative 4 responds to issues of (1) adverse effects of motorized recreation use on non-motorized recreation experiences and (2) potential adverse impacts from motorized recreation use on natural and cultural resources. It addresses these issues by prohibiting cross country travel and adding fewer routes to the NFTS than the Proposed Action. Alternative 4 is based on the Proposed Action contained in the Notice of Intent as modified by an alternative submitted by an environmental group coalition during scoping.

1. **Cross Country Travel**: Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization.
2. **Additions to the NFTS**:
   a. Under this alternative, 85 segments of unauthorized routes totaling 3.7 miles would be added as roads open to high clearance vehicles to the NFTS.
   b. 22.6 miles (27 routes) of unauthorized routes would be added as motorized trails to the NFTS.
3. **Establishment of Motorized "Open Areas"**: No additional motorized "Open Areas" would be established under this alternative.
4. **Changes to the NFTS**:
   a. **Change Vehicle Classes through Mixed Use**: No changes would be made to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through approval of mixed use.

b. **Change Vehicle Classes through Maintenance Levels:** Change vehicle class on 3.4 miles to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2. For each of these roads an entrance strategy (i.e. waterbars) and road conditions would be implemented to be consistent with use by high clearance vehicles. These roads would then be maintained as ML 2 to prevent unacceptable resource damage from occurring. Once the Forest Engineer determines these roads have reached ML 2 conditions they would be placed on the MVUM and signed as available for use by non-highway legal vehicles.

c. **Changes in Seasonal Restrictions:** Wet weather seasonal closures would be added from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails. A total of 1,312.1 total miles would have changes in seasonal restrictions.

d. **Reopening Maintenance Level 1 Roads**: One ML 1 road (.1 miles) would be reopened to motorized use.

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

Table 2-6 displays a summary of the actions proposed in this alternative. A complete listing of roads, trails and areas to be added into the NFTS; including the vehicle class and, if applicable, seasonal use restrictions; can be found in Appendix A (Site Specific Road, Trail and Open Area Information). A map displaying this alternative is included in digital format on the CD attached to this document, and may be found in the Project Record located at the Tahoe National Forest Supervisors Office in Nevada City, California.

Table 2-6. Alternative 4 - Summary of Actions

Action type		**Action Proposed**
1. Cross Country Travel (Acres)		Prohibited on 836,000 acres
2. Additions to the NFTS	a. Roads added to the NFTS open to high clearance vehicles	3.7 (miles), 85 (roads)
	b. Motorized Trails added to the NFTS Trails open to high clearance trail vehicles Trails open to ATVs and motorcycles only Trails open to motorcycles only **Total all trails**	 5.6 (miles), 19 (trails) 2.9 (miles), 1 (trail) 14.1 (miles), 7 (trails) **22.6 (miles), 27 (trails)**
3. Establishment of Motorized "Open Areas"		None
4. Changes to the NFTS	a. Passenger car roads where both highway legal and non-highway legal vehicles will be allowed to use the same road	0.0 (miles)
	b. Passenger car roads that will be downgraded to high clearance roads so that both highway legal and non-highway legal vehicles can use the same road	3.4 (miles)
	c. Change in Season of Use	1,312.1 (miles)
	d. Reopening Maintenance Level 1 Roads as trails open to Motorcycles only	0.1 (miles), 1 (road)
5. Amendments to the Forest Plan		None

Alternative 5: Increased Motorized Recreation Access plus Reopening Maintenance Level 1 and Temporary Roads

Alternative 5 responds to the issue of inadequate motorized recreation opportunities. This alternative is based on the Proposed Action contained in the Notice of Intent as modified by an alternative submitted by the Blue Ribbon Coalition during the scoping process. This alternative focuses on adding unauthorized routes to the NFTS and making changes to the existing NFTS to provide enhanced motorized vehicle access and motorized recreation opportunities across the Forest.

1. **Cross Country Travel**: Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization.
2. **Additions to the NFTS**:
   a. Under this alternative, 112 segments of unauthorized routes totaling 5.0 miles would be added as roads open to high clearance vehicles to the NFTS.
   b. 75.4 miles (141 routes) of unauthorized routes would be added as motorized trails to the NFTS.
3. **Establishment of Motorized "Open Areas"**: No additional motorized "Open Areas" would be established under this alternative.
4. **Changes to the NFTS**:
   a. **Change Vehicle Classes through Mixed Use**: Change vehicle class on 241.5 miles to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through approval of mixed use.
   b. **Change Vehicle Classes through Maintenance Levels:** Change vehicle class on 157.2 miles to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2. For each of these roads an entrance strategy (i.e. waterbars) and road conditions would be implemented to be consistent with use by high clearance vehicles. These roads would then be maintained as ML 2 to prevent unacceptable resource damage from occurring. Once the Forest Engineer determines these roads have reached ML 2 conditions they would be placed on the MVUM and signed as available for use by non-highway legal vehicles.
   c. **Changes in Seasonal Restrictions:** Wet weather seasonal closures would be added from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails. A total of 1,396.7 total miles would have changes in seasonal restrictions.
   d. **Reopening Maintenance Level 1 Roads**: One hundred thirteen ML 1 roads (93.4 miles) would be reopened to motorized use.
5. **Amendments to the Forest Plan:** The Tahoe National Forest LRMP would be amended to remove the November 1 to May 1 seasonal closure in the Sugar Pine area (Management Area 84 Humbug Sailor) on key winter deer range.

Table 2-7 displays a summary of the actions proposed in this alternative. A complete listing of roads, trails and areas to be added into the NFTS; including the vehicle class and, if applicable, seasonal use restrictions; can be found in Appendix A (Site Specific Road, Trail and Open Area Information). A map displaying this alternative is included in digital format on the CD attached to this document, and may be found in the Project Record located at the Tahoe National Forest Supervisors Office in Nevada City, California.

Table 2-7. Alternative 5 - Summary of Actions

Action type		Action Proposed
1. Cross Country Travel (Acres)		Prohibited on 836,000 acres
2. Additions to the NFTS	a. Roads added to the NFTS open to high clearance vehicles	5.0 (miles), 112 (roads)
	b. Motorized Trails added to the NFTS Trails open to high clearance trail vehicles Trails open to ATVs and motorcycles only Trails open to motorcycles only **Total all trails**	 44.7 (miles), 120 (trails) 4.8 (miles), 5 (trails) 26.0 (miles), 16 (trails) **75.4 (miles), 141 (trails)**
3. Establishment of Motorized "Open Areas"		None
4. Changes to the NFTS	a. Passenger car roads where both highway legal and non-highway legal vehicles will be allowed to use the same road	241.5 (miles)
	b. Passenger car roads that will be downgraded to high clearance roads so that both highway legal and non-highway legal vehicles can use the same road	157.2 (miles)
	c. Change in Season of Use	1,396.7 (miles)
	d. Reopening Maintenance Level 1 Roads (total) (as Roads open to all vehicles) (as Trails open to ATVs and motorcycles only) (as Trails open to motorcycles only)	93.4 (miles), 113 (roads) 79.3 (miles) 13.9 (miles) 0.1 (miles)
5. Amendments to the Forest Plan		Management Area 84 (Humbug Sailor) Deer Winter Range Seasonal Restriction Removed

Alternative 6: Preferred Alternative Motorized Access and Resource Protection

Alternative 6 is the preferred alternative. It responds to issues of providing motorized public access and recreation opportunities while minimizing impacts to natural and cultural resources. It is designed to provide a diversity of road and trail opportunities for experiencing a variety of environments and modes of travel consistent with the National Forest's recreation role and land capability. Alternative 6 would provide motorized access to dispersed recreation opportunities (camping, hunting, fishing, hiking, horseback riding, etc.) and a diversity of motorized recreation opportunities (4WD Vehicles, motorcycles, ATVs, passenger vehicles, and so forth).

1. **Cross Country Travel**: Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization.
2. **Additions to the NFTS**:
   a. Under this alternative, 346 segments of unauthorized routes totaling 13.1 miles would be added as roads open to high clearance vehicles to the NFTS.
   b. 48.3 miles (106 routes) of unauthorized routes would be added as motorized trails to the NFTS.
3. **Establishment of Motorized "Open Areas"**: Under this alternative, three areas totaling 244 acres would be established as motorized "Open Areas" open to highway legal vehicles only.
4. **Changes to the NFTS**:
   a. **Change Vehicle Classes through Mixed Use**: Change vehicle class on 130.8 miles to allow licensed operators of non-highway legal vehicles to operate on NFS roads where such use is currently prohibited through approval of mixed use. Of this total, approximately 117.5 miles would be open to mixed use only during deer hunting season (September 22 to November 4). Outside of hunting season, these roads would be open to highway legal vehicles only.
   b. **Change Vehicle Classes through Maintenance Levels:** Change vehicle class on 122.0 miles to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2. For each of these roads an entrance strategy (i.e. waterbars) and road conditions would be implemented to be consistent with use by high clearance vehicles. These roads would then be maintained as ML 2 to prevent unacceptable resource damage from occurring. Once the Forest Engineer determines these roads have reached ML 2 conditions they would be placed on the MVUM and signed as available for use by non-highway legal vehicles.
   c. **Changes in Seasonal Restrictions:** Wet weather seasonal closures from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails would be added to minimize erosion and protect water quality. In addition, over the snow travel would be permitted on 3.6 miles of the Fordyce Jeep trail when 15 inches of snow is present on the ground. A total of 1,369.5 total miles would have changes to seasonal restrictions.
   d. **Reopening Maintenance Level 1 Roads**: Thirteen ML 1 roads (11.4 miles) would be reopened to motorized use.
5. **Amendments to the Forest Plan:** The Tahoe National Forest LRMP would be amended to remove the November 1 to May 1 seasonal closure in the Sugar Pine area (Management Area 84 Humbug Sailor) on key winter deer range.

Table 2-8 displays a summary of the actions proposed in this alternative. A complete listing of roads, trails and areas to be added into the NFTS; including the vehicle class and, if applicable, seasonal use restrictions; can be found in Appendix A (Site Specific Road, Trail and Open Area Information). A map

displaying this alternative is included in digital format on the CD attached to this document, and may be found in the Project Record located at the Tahoe National Forest Supervisors Office in Nevada City, California.

Table 2-8. Alternative 6 - Summary of Actions

Action type		Action Proposed
1. Cross Country Travel (Acres)		Prohibited on 835,800 acres
2. Additions to the NFTS	a. Roads added to the NFTS open to high clearance vehicles	13.1 (miles), 346 (roads)
	b. Motorized Trails added to the NFTS Trails open to high clearance trail vehicles Trails open to ATVs and motorcycles only Trails open to motorcycles only **Total all trails**	 22.6 (miles), 89 (trails) 4.8 (miles), 5 (trails) 20.9 (miles), 12 (trails) **48.3 (miles), 106 (trails)**
3. Establishment of Motorized "Open Areas"		Prosser, Boca and Stampede Reservoirs (244 acres)
4. Changes to the NFTS	a. Passenger car roads where both highway legal and non-highway legal vehicles will be allowed to use the same road	130.8 (miles)
	b. Passenger car roads that will be downgraded to high clearance roads so that both highway legal and non-highway legal vehicles can use the same road	122.0 (miles)
	c. Change in Season of Use	1,369.5 (miles)
	d. Reopening Maintenance Level 1 Roads (total) (as roads open to all vehicles) (as trails open to ATV's and motorcycles only) (as trails open to motorcycles only)	11.4 (miles), 13 (roads) 2.7 (miles) 8.5 (miles) 0.1 (miles)
5. Amendments to the Forest Plan		Management Area 84 (Humbug Sailor) Deer Winter Range Seasonal Restriction Removed

Alternative 7: Proposed Action as Identified in Notice of Intent (NOI)

Alternative 7 is the Proposed Action as published in the Notice of Intent in the Federal Register.

1. **Cross Country Travel**: Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization.
2. **Additions to the NFTS**:
   a. Under this alternative, no unauthorized routes would be added as roads to the NFTS.
   b. 36.7 miles (36 routes) of unauthorized routes would be added as motorized trails to the NFTS.
3. **Establishment of Motorized "Open Areas"**: No additional motorized "Open Areas" would be established under this alternative.

4. **Changes to the NFTS**:
   a. **Change Vehicle Classes through Mixed Use**: No changes would be made to allow licensed operators of non-highway legal vehicles to operate on NFS roads, where such use is currently prohibited, through approval of mixed use.
   b. **Change Vehicle Classes through Maintenance Levels:** Change vehicle class on 3.4 miles to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2. For each of these roads an entrance strategy (i.e. waterbars) and road conditions would be implemented to be consistent with use by high clearance vehicles. These roads would then be maintained as ML 2 to prevent unacceptable resource damage from occurring. Once the Forest Engineer determines these roads have reached ML 2 conditions they would be placed on the MVUM and signed as available for use by non-highway legal vehicles.
   c. **Changes in Seasonal Restrictions:** No changes in seasonal restrictions would be made.
   d. **Reopening Maintenance Level 1 Roads**: Two ML 1 roads (1.1 miles) would be reopened to motorized use.
5. **Amendments to the Forest Plan**: No amendments would be made to the Forest Plan.

Table 2-9 displays a summary of the actions proposed in this alternative. A complete listing of roads, trails and areas to be added into the NFTS; including the vehicle class and, if applicable, seasonal use restrictions; can be found in Appendix A (Site Specific Road, Trail and Open Area Information). A map displaying this alternative is included in digital format on the CD attached to this document, and may be found in the Project Record located at the Tahoe National Forest Supervisors Office in Nevada City, California.

Table 2-9. Alternative 7 - Summary of Actions

Action type		**Action Proposed**
1. Cross Country Travel (Acres)		Prohibited on 836,000 acres
2. Additions to the NFTS	a. Roads added to the NFTS open to high clearance vehicles	0.0 (miles), 0 (roads)
	b. Motorized Trails added to the NFTS Trails open to high clearance trail vehicles Trails open to ATVs and motorcycles only Trails open to motorcycles only **Total all trails**	 16.9 (miles), 26 (trails) 3.4 (miles), 2 (trails) 16.4 (miles), 8 (trails) **36.7 (miles) 36 (trails)**
3. Establishment of Motorized "Open Areas"		None
4. Changes to the NFTS	a. Passenger car roads where both highway legal and non-highway legal vehicles will be allowed to use the same road	0.0 (miles)
	b. Passenger car roads that will be downgraded to high clearance roads so that both highway legal and non-highway legal vehicles can use the same road	3.4 (miles)
	c. Change in Season of Use	0.0 (miles)
	d. Reopening Maintenance Level 1 Roads (total) (as roads open to all vehicles) (as trails open to motorcycles only)	1.1 (miles) 2 (roads) 0.9 (miles) 0.1 (miles)
5. Amendments to the Forest Plan		None

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 and are briefly described below along with a brief response discussing the reasons for eliminating them from detailed study.

Alternative A: Prohibit OHV (Non-Highway Legal) Use

This alternative would prohibit all non-highway legal use and allow only highway legal vehicles on the Tahoe 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. OHVs (4X4 vehicles, motorcycles, ATVs) are an important component of the diversity of motorized recreation. Also, it is not consistent with California Vehicle Code or Forest Service policy.

Alternative 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 rights-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 since it fails to address the criteria contained in 36 CFR Part 212, Subpart B of the Travel Management Rule. Also, it is not consistent with the Forest Plan direction for Restricted Motor Vehicle Travel Management (TNF LRMP 2007 as amended). 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 rights-of-way acquisition.

Alternative C: 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 TNF.

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. In addition, implementation of rainfall based restrictions are not practical for many for many reasons including; 1) rainfall amounts vary locally, 2) soil conditions vary depending on

aspect and soil type and 3) difficulty of on-again off-again enforcement. Alternatives 1, 4 and 5 incorporate this concept to deal with rain events during the proposed season of use.

Alternative D: 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.

Alternative E: 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."

Alternative F: 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.

Response: Adding all unauthorized routes to the system is not feasible as many do not currently meet Forest Plan direction. 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 5 incorporates many of the proposed additions and other

components of this alternative. Also, it is against Forest Service policy to add routes to its transportation system that do not have legal access.

Alternative G: 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 F (above), adding all routes receiving current OHV use is not consistent with the Forest Plan direction for Restricted Motor Vehicle Travel Management (TNF LRMP 2007 as amended). 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.

Alternative H: 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. Other resource management considerations are necessary to determine whether a route should be decommissioned (e.g. fuel treatment, vegetation management, fire suppression, special uses, special forest products, etc.) and those activities are outside the scope of this decision. Alternative 4 includes some components of this alternative.

Alternative I: 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 feet 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.

Alternative J: Designate Staging Areas in Addition to Proposed Routes and NFTS Changes

This alternative was developed in response to comments received during scoping from people who would like staging areas designated in addition to proposed routes and NFTS changes.

Response: Designation of staging areas is outside the scope of this process. OHV users may stage from existing designated roads if they are within about 30 feet of the road. Separate staging areas would require construction, signing, and possibly other improvements. If needed in the future, such areas will be analyzed and authorized under separate analysis processes.

Alternative K: Allow Cross Country Motorized Use off Designated Routes in order to Retrieve Legally Taken Big Game Animals

This alternative was developed in response to comments received during scoping from people who would like to utilize motorized vehicles off designated routes to retrieve downed big game.

Response: Allowing motorized off-road travel to any site where an animal is taken means that all lands on the Forest would be open to off-road vehicle use (for a specific purpose) during hunting season. While the period of use would be limited (+/- 8 weeks for rifle and archery seasons), the resulting impacts are considered to be similar to, but less intense than, those that would occur under the No Action Alternative. In addition enforcement would be difficult, if not impossible.

Alternative L: Responsible Recreation Alternative

The Responsible Recreation Alternative would consider the value of historic human experience in the forest (including the 1850s). Such an alternative would provide the public with needed access to the Tahoe National Forest while meeting the ultimate goal of prohibiting cross country travel. All requested trails are currently in use, and user maintained as also demonstrated by the fact they were included in the inventory.

Response: The Responsible Recreation Alternative was considered but eliminated from detailed study due to its lack of site specificity in any actual proposals or recommendations. There was not sufficient substance to this proposal to judge its merits. In addition, the goals and objectives of this alternative were incorporated into Alternative 5.

Alternative M: Stewards of the Sierra Alternative

Suggested by the Stewards of the Sierra, this alternative addresses issues and resource concerns raised in the DEIS. It prohibits cross country use, and meets public motorized access needs.

Response: This alternative was considered but eliminated from detailed study. Each of the site specific recommendations contained in this alternative were incorporated into the changes made to the Preferred Alternative including additional motorized access opportunities. The rationale for each of the site specific proposals in this alternative is described in Appendix A (Site Specific Road, Trail and Open Area Information) and/or the Project Record.

Comparison of Alternatives

This section of Chapter 2 compares the alternatives by summarizing key differences between the alternatives and provides a summary of the effects analysis for all alternatives. See Table 2-10 for the summary of proposed actions by alternative. See Table 2-11 for the summary comparison of NFTS road mileage by class of vehicle and season of use. See Table 2-12 for the summary comparison of NFTS motorized trail mileage by class of vehicle and season of use. See Table 2-13 for the criteria for adding motorized trails to the NFTS and establishing lands as “Open Areas.”

Table 2-10. Summary of Proposed Actions by Alternative

Action type		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
1. Cross Country Travel (Acres)		Prohibitions continue 81,975 acres Continues on 754,066 acres	Prohibited on 833,392 acres 2,649 acres established open	Prohibited on 836,000 acres <100 acres established open	Prohibited on 836,000 acres <100 acres established open	Prohibited on 836,000 acres <100 acres established open	Prohibited on 835,800 acres <300 acres established open	Prohibited on 836,000 acres <100 acres established open
2. Additions to the NFTS	a. Roads added to the NFTS (Number of Miles) (Number of Roads)	 0.0 0	 5.0 114	 0.00 0	 3.7 85	 5.0 112	 13.1 346	 0.00 0
	b. Motorized Trails added to the NFTS (Number of Miles) (Number of Trails)	 0.0 0	 54.6 87	 0.0 0	 22.6 27	 75.4 141	 48.3 106	 36.7 36
3. Establishment of Motorized "Open Areas"		None	Greenhorn Area (60 acres) Prosser, Boca and Stampede Reservoirs (2,589 acres)	None	None	None	Prosser, Boca and Stampede Reservoirs (244 acres)	None

Action type		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
4. Changes to the NFTS	a. Change in Class of Vehicles resulting from approval of mixed use	0.0	241.5	0.0	0.0	241.5	130.8	0.0
	b. Change in Class of Vehicles resulting from changes in maintenance levels	0.0	157.2	0.00	3.4	157.2	122.0	3.4
	c. Change in Season of Use	0.0	10.5	0.00	1,312.1	1,396.7	1,369.5	0.00
	d. Reopening Maintenance Level 1 Roads (Number of Miles) (Number of Roads)	 0.0 0	 0.0 0	 0.0 0	 0.1 1	 93.4 113	 11.4 13	 1.1 2
5. Amendments to the Forest Plan		None	Management Area 84 (Humbug Sailor) Deer Winter Range Seasonal Restriction Removed	None	None	Management Area 84 (Humbug Sailor) Deer Winter Range Seasonal Restriction Removed	Management Area 84 (Humbug Sailor) Deer Winter Range Seasonal Restriction Removed	None

Table 2-11. Summary Comparison of NFTS Road Mileage by Class of vehicle and Season of Use

Class of Vehicle	Season of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Roads Open to Highway Legal Vehicles Only	Apr. 1 - Sep. 15	5.2	0.0	5.2	5.2	0.0	0.0	5.2
	Apr. 1 - Dec. 31	88.1	31.4	88.1	88.1	31.4	59.1	88.1
	May 1 - Dec. 31	150.7	29.7	150.7	150.7	29.7	57.9	150.7
	May 1 - Nov. 1	21.3	15.8	21.3	21.3	15.8	17.0	21.3
	All Year	351.4	141.4	351.4	348.1	141.4	230.2	348.1
Roads Open to All Vehicles	Jun. 1 - Nov. 1	3.4	3.4	3.4	3.4	3.4	3.4	3.4
	Aug. 1 - Dec. 31	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	May 1 - Jun. 15 & Jul. 15 - Dec. 31	3.4	3.4	3.4	3.4	3.4	3.4	3.4
	Apr. 1 - Sep. 15	0.8	6.0	0.8	0.8	6.0	6.0	0.8
	Apr. 1 - Dec. 31	54.9	111.7	54.9	87.4	144.3	798.4	54.9
	May 1 - Dec. 31	268.0	389.7	268.0	1,286.2	1,563.4	715.6	268.0
	May 1 – Nov. 1	69.9	65.1	69.9	70.1	73.9	63.7	69.9
	May 1 – Sep. 15	5.3	5.3	5.3	5.3	5.3	5.3	5.3
	All Year	1,044.0	1,268.2	1,044.0	0.0	132.6	4.6	1,048.3
Roads Open to Highway Legal Vehicles Only except open to all vehicles during deer season (9/22-11/4)		0.0	0.0	0.0	0.0	0.0	74.2	0.0
Roads Open to Highway Legal Vehicles Only 5/1-9/21; All vehicles during deer season 9/22-11/4; and Highway legal vehicles 11/5-12/31.		0.0	0.0	0.0	0.0	0.0	43.3	0.0
	Total NFTS Roads	**2,067.6**	**2,072.6**	**2,067.6**	**2,071.3**	**2,152.0**	**2,083.4**	**2,068.5**

Note: numbers may not add up due to rounding.

Table 2-12. Summary Comparison of NFTS Motorized Trail Mileage by Class of Vehicle and Season of Use

Class of Vehicle	Season of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Trails Open to High Clearance Trail Vehicles (4WD, ATV & Motorcycle)	May 1 – Jun. 15 & Jul. 15 – Dec. 1	4.4	4.4	4.4	4.4	4.4	4.4	4.4
	Apr. 1 – Dec. 31 & When 15" snow present	0.0	0.0	0.0	0.0	0.0	3.5	0.0
	Apr. 1 – Dec. 31	4.8	4.8	4.8	5.1	6.1	88.5	4.8
	May 1 – Dec. -31	24.0	32.3	24.0	128.9	166.8	58.9	31.4
	May 1 – Nov. 1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	May 1 – Sep. 15	0.0	0.0	0.0	0.0	0.2	0.0	0.0
	All Year	99.6	115.5	99.6	0.0	0.0	0.0	109.0
	Subtotal	**133.9**	**158.1**	**133.9**	**139.5**	**178.6**	**156.4**	**150.7**
Trails Open to ATV's and Motorcycles Only	Apr. 1 – Dec. 31	2.2	2.2	2.2	2.2	2.2	34.2	2.2
	May 1 – Dec. 31	3.6	4.6	3.6	26.2	41.9	4.6	3.6
	All Year	19.6	23.1	19.6	0.0	0.0	0.0	23.1
	Subtotal	**25.4**	**29.9**	**25.4**	**28.4**	**44.1**	**38.8**	**28.9**
Trails Open to Motorcycles Only	Apr. 1 – Dec. 31	1.0	1.0	1.0	29.0	40.2	157.8	1.0
	May 1 – Dec. 31	18.1	28.0	18.1	150.8	151.4	28.8	24.7
	May 1 – Nov. 1	3.3	3.3	3.3	3.3	3.3	3.3	3.3
	All Year	146.4	162.5	146.4	0.0	0.0	0.0	156.4
	Subtotal	**168.8**	**194.8**	**168.8**	**183.1**	**194.9**	**189.9**	**185.4**
	Total NFTS Trails	**328.1**	**382.8**	**328.1**	**351.0**	**417.6**	**385.1**	**365**

Note: numbers may not add up due to rounding.

Table 2-13. Criteria for additions to the NFTS, re-opening Maintenance Level 1 roads and establishing lands as "Open Areas"

Criteria	Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
Site specifically recommended by the public during collaboration meetings held prior to the NOI	X	X	X	X	X
Site specifically recommended by the public during scoping on the Proposed Action in the NOI	X	X	X	X	X
Consistent with Forest Plan Standards and Guidelines	X	X	X	X	X
No significant resource concerns which could not be mitigated at this time	X	X	X	X	X
If access is required across private land, private landowner has not expressed opposition to public access	X	X	X	X	X
Not closed by a previous Forest Order	X	X	X	X	X
Not already a NFTS non-motorized trail	X	X	X	X	X
Not closed or scheduled for decommissioning in a recent NEPA decision (last 15 years)	X	X	X	X	X
No unacceptable public safety risks	X	X	X	X	X
Not adverse impacts to Lahontan Cutthroat Trout	X	X	X	X	X
Does not require new construction or significant re-routing	X	X	X	X	X
Previous NFTS road still receiving motorized use in the Cal-Ida, French Meadows, Mosquito Ridge or Boca/Prosser/ Stampede Reservoir areas			X		
Trail gradient less than 15%		X			
Not located within an Inventoried Roadless Area		X			
No significant impact on Inventoried Roadless Area characteristics				X	X
Not located within a Citizens Inventoried Roadless Area		X			
Not located within a proposed or designated Wild & Scenic River		X			
Provides a high quality off highway vehicle recreation opportunity				X	
Maintains the "Outstandingly Remarkable Values" of proposed and designated Wild & Scenic River	X		X	X	X
Not located within a California Spotted Owl or northern goshawk protected activity center (PAC)		X			
Not redundant with an existing NFTS road or motorized trail open to all vehicles				X	
No mitigation measures which could not implemented in a cost effective manner				X	
No conflicts with an approved mining Plan of Operation				X	
Does not encourage non-highway legal vehicles to use a road designated for highway legal vehicles only				X	

Criteria for Alternatives 1 and 3: No motorized roads or trails would be added to the NFTS. No additional lands would be established as "Open Areas."

Table 2-14 below summarizes the effects analysis for all the resources by ranking each alternative regarding how well it provides for each of the indicators. The following rankings were used: A score of 7 indicates the alternative has the least impact for the resource related to the indicator. A score of 1 indicates the alternative has the greatest adverse impact for the resource. This information is listed at the end of

each resource section in Chapter 3, which describes the environmental consequences of the alternatives in detail.

Table 2-14. Comparison Summary of Effects to All Resources across All Alternatives

Indicator	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Air Quality	1	3	7	6	2	4	5
Soil Resources	1.2	2.4	5.4	5.4	3.4	4.0	4.2
Hydrology Resources	1	2	7	6	3	4	5
Terrestrial Species	1	3.6	7	6	2.2	3.2	5
Aquatic Species	1	3.2	7	6	2	3.8	5
Fire and Fuels Management	4	4.5	4	4	4	2.5	5
Heritage Resources	1	2	7	5	4	3	6
Plant Communities	1	3	7	5.8	2	4.4	4.8
Recreation - non-motorized	1	3	7	6	2	4	5
Recreation - motorized	7	4	1	2	6	5	3
Visual Resources	1	4	7	6	2	3	5
Transportation	5.7	3.3	5.3	4	3	3.7	3
Inventoried Roadless & Special Areas	1	3	5	7	2	6	4
Adjacent Ownerships	1	3.5	7	6	2	4	4.5
Society, Culture & Economy	4	4	4	4	4	4	4

Table 2-15 provides a summary comparison of the key environmental effects and outputs for each affected resource by alternative. This information is presented in detail in each resource section in Chapter 3.

Table 2-15. Summary comparison of key environmental outputs and effects for specific resources by alternative

Resource	Indicator Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Air Quality	**Amount of Native Surface Roads, Trails and Areas Open to Motorized Vehicles** (Fugitive Dust)	5,293.8	4,053.5	3,595.6	3,625.3	4,167.8	3,803.4	3,636.7
	Native Surface Roads, Trails on Lands "Most Likely" to Contain Naturally Occurring Asbestos	121.0	76.1	67.4	70.3	77.5	73.0	70.9
Watershed	**Amount of Native Surface Roads by Erosion Hazard Rating**							
	Very High	287	205	176	176	215	179	177
	High	3,896	2,975	2,624	2,649	3,054	2,791	2,657
	Moderate	1,042	828	752	759	854	787	758
	None	59	42	38	39	42	40	40
	Cumulative Watershed Effects (Equivalent Road Acres)	16,030.1	13,253.7	13,179.5	13,205.9	13,446.3	13,275.9	13,219.6
Terrestrial Species	**Old Forest Emphasis Areas within a 200-meter Zone of Influence of All motorized Routes** (percent)	55%	39%	38%	38%	40%	39%	38%
	Motorized and Non-motorized Routes within Spotted Owl Protected Activity Centers (miles)	293.5	199.5	195.4	195.4	214.0	199.2	198.6
Aquatic Species	**Native Surface Stream Crossings** (number of crossings)	3,310	2,593	2,462	2,480	2,622	2,580	2,481
	Native surface routes open to motorized use in RCA's (miles)	800	519.3	472.7	480.3	543.7	507.0	481.5
Cultural Resources	**Cultural resource sites potentially impacted and/or requiring mitigation** (number of sites)	926	110	0	25	104	90	18
Botany Resources	**Sensitive/watchlist species and/or watchlist plant communities located within 0-100 feet of routes with weed occurrences within 0-100 feet of the route** (relative amount)	Highest	High	Lowest	Low	High	Moderate	Low

Resource	Indicator Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Recreation Opportunities	**NFTS Year round road and trail motorized opportunities** (miles)*	1,661.1	1,710.6	1,661.1	348.1	274.0	234.8	1,684.8
	NFTS Seasonal road and trail motorized opportunities (miles)	734.7	744.7	734.7	2,074.1	2,295.6	2,233.7	748.8
	Sub-Total	**2,395.8**	**2,455.3**	**2,395.8**	**2,422.2**	**2,569.6**	**2,468.5**	**2,433.6**
	"Open Areas" (acres)	754,066	2,649	<100	<100	<100	244	<100
	Dispersed recreation sites with motorized access (number of sites)**	N/A	182	0	107	188	437	29
Non-motorized "Quiet" Recreation Opportunities	**National Forest System (NFS) lands greater than ½ mile form any motorized road or trail** (percentage of NFS lands)	12.2%	16.6%	16.9%	16.8%	16.1%	16.7%	16.6%
Affordability	**Annual Operation and Maintenance Cost** (millions of dollars)	$10.7	$9.3	$10.7	$10.7	$9.4	$9.7	$10.8
Inventoried Roadless Areas	**Total motorized roads and trails within Inventoried Roadless Areas** (miles)	206.9	156.6	149.0	149.0	160.3	152.6	155.2
Social Impacts	**Support for the lifestyles of motorized use advocates**	Substantial	General	Little	Little	General	General	General
	Support for the lifestyles of non-motorized use advocates	Little	Little	General	General	Little	General	General

* Alternative 1 includes unauthorized routes and closed NFTS roads still receiving some motorized use

** Under Alternative 1, access to dispersed recreation sites would continue. The number of sites accessed is difficult to determine. With continued cross country motorized travel under Alternative 1, access to dispersed recreation sites would be available on lands open to cross country motorized travel.

Chapter 3

Affected Environment & Environmental Consequences

Chapter 3: Affected Environment and Environmental Consequences

Introduction

This chapter summarizes the physical, biological, social, and economic environments that are affected by the proposed action and alternatives ("Affected Environment") and the effects on that environment that would result from implementation of any of the alternatives ("Environmental Consequences"). This chapter also presents the scientific and analytical basis for comparison of the alternatives presented in "Chapter 2: The Alternatives." The environmental consequences discussion centers on direct, indirect, and cumulative effects, along with applicable mitigation measures. 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 for the TNF. This effects analysis was done at the site-specific and forest scales (the scale of the proposed action as discussed in Chapter 1). Each affected road, trail, and area proposed in the alternatives has been reviewed by resource specialists. These findings are summarized in Appendix A (Site Specific Road, Trail and Open Area Information). Readers seeking information concerning the environmental effects associated with a specific road, trail, or area are directed to this Appendix, where details concerning any mitigation measures or any other findings are documented.

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

Cross Country Travel: All of the action alternatives prohibit wheeled motor vehicle travel off designated NFTS roads, NFTS motorized trails, and areas by the public except as allowed by permit or other authorization. Prohibition of cross country travel is included in order to address the need to regulate unmanaged motor vehicle use.

Additions to the NFTS: Some action alternatives would add unauthorized routes as roads and trails to the NFTS by vehicle class and season of use. Additions are considered in order to respond to the need to provide motor vehicle access to dispersed recreation opportunities and to provide a diversity of motorized recreation opportunities. For purposes of this analysis, each of these roads and trails is identified by a unique number. Resource specialists conducted their site specific review of each proposed

route. All road additions have a proposed road management objective (RMO). All proposed additions would receive the appropriate level of routine maintenance such as brushing, signing, cleaning and clearing debris. For some routes, no work beyond routine maintenance would be needed. For others, additional mitigation would be 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 on the MVUM for public motorized use. All proposed route additions have assigned road or trail management objectives. Appendix A shows the specified vehicle class, season of use and mitigations for all proposed route additions. Additional details on each route are contained in the Project Record.

Establishment of Motorized "Open Areas": Some action alternatives would establish motorized "Open Areas" by vehicle class and season of use. Establishments are considered in order to respond to the need to provide motor vehicle access to dispersed recreation opportunities and to provide a diversity of motorized recreation opportunities. For purposes of this analysis, each of these established "Open Areas" is identified by name. Resource specialists conducted their site specific review of each proposed "Open Area." All established "Open Areas" would receive the appropriate level of routine maintenance such as brushing, signing, cleaning and clearing debris. For some "Open Areas", no work beyond routine maintenance would be 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 establishment of the "Open Area" on the MVUM for public motorized use. Appendix A shows the specified vehicle class, season of use and mitigations for all proposed established "Open Areas." Additional details on each "Open Area" are contained in the Project Record.

Changes to the NFTS: Changes to the existing NFTS include Vehicle Class, Season of Use and Reopening Maintenance Level 1 roads.

Vehicle class - The action alternatives may include limited changes to the vehicle class allowed on existing NFTS roads and/or trails. Vehicle class indicates the type of vehicle (passenger car, motorcycle, all-terrain vehicle, etc) allowed to operate on a road or trail. Some alternatives add vehicle classes to roads and/or trails where that use is currently prohibited. Some alternatives add vehicle classes resulting from changes in maintenance levels. These changes respond to the need to provide a diversity of wheeled motorized recreation opportunities and access.

Season of Use - The action alternatives vary in terms of which roads, trails and areas would have motorized travel prohibited during specified times of year. Wet weather seasonal restrictions are specified in some of the alternatives to minimize erosion and protect water quality.

Reopening Maintenance Level 1 Roads - Some alternatives include opening Maintenance Level 1 roads to public use where such use is currently prohibited to enhance motorized recreation opportunities. These changes respond to the need to provide a diversity of wheeled motorized recreation opportunities and access. Appendix A (Site Specific Road, Trail and Open Area Information) shows the specified vehicle class, season of use and mitigations for all proposed changes to the existing NFTS.

Amendments to the Forest Plan: Some of the action Alternatives include an amendment to The Tahoe National Forest Land and Resource Management Plan (LRMP) to remove the November 1 to May

1 seasonal closure in the Sugar Pine area (Management Area 84 Humbug Sailor) on key winter deer range to improve motorized recreation opportunities.

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 TNF 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. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects.

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one can not reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human action risks ignore the important residual effects of past natural events, which may contribute to cumulative effects just as much as human action. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." Past actions are treated similarly in the recently published Forest Service Regulations for implementing the National Environmental Policy Act (36 CFR 220). For these reasons, the analysis of past actions in this section is based on current environmental conditions.

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) lists present and reasonably foreseeable future actions potentially contributing to cumulative effects. While the appendix lists all

actions, every resource is not affected by every action. For example, a future project may affect wildlife but not affect water quality. Appendix H indicates which resources are potentially affected by each action.

In addition to considering the effects of this proposal on other lands, this EIS considers the likely effects on lands administered by the Forest Service from past, ongoing, and reasonably foreseeable management actions occurring on other forest lands. Management of other lands could directly affect terrestrial and aquatic wildlife species that move between ownerships during the year or during their life cycle. The possible contribution of management actions on other lands has been considered in analyzing the effects of the alternatives on species and habitats that are not confined to national forests. This information is presented in this chapter, which describes likely environmental consequences of the alternatives.

Affected Environment Overview

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

Unmanaged OHV use has resulted in unplanned roads and trails, erosion, watershed and habitat degradation, and impacts to cultural resource sites. On some Tahoe National Forest System (NFS) lands, long managed as open to cross-country motor vehicle travel, repeated use has resulted in unplanned, unauthorized roads and trails. These routes generally developed without environmental analysis or public involvement, and do not have the same status as NFTS roads and NFTS trails included in the forest transportation system.

On October 26, 2007, a temporary forest order was implemented which prohibited travel off of existing routes shown on a forest order exhibit map. The order was established for a period not to exceed one year to protect resources and help prevent additional user-created routes from being established while the TNF undertook implementation of the Travel Management Rule and the production of their Motor Vehicle Use Map (MVUM). This Forest Order was reissued for an additional year on July 13, 2009.

Appendix A (Site Specific Road, Trail and Open Area Information)

Appendix A lists each road, trail and “Open Area” proposed for addition to the NFTS and identifies the alternative(s) under which the route is proposed, the type of vehicle(s) allowed, and the season when the route would be open. In addition, Appendix A identifies any resource concerns and necessary mitigation measures.

Law Enforcement

Law enforcement authority and jurisdiction, cooperation, implementation and tracking, implementation strategy, assumptions and measures of success are discussed in detail in Appendix K (Law Enforcement).

Law Enforcement Assumptions Common to Effects Analysis:

- Enforcement of the laws and regulations related to Travel Management will be enforced equally in authority and weight as with all other Federal laws and regulations.
- As with any change in a regulation on NFS lands, there is usually a transitional period for the public to understand the changes. It is anticipated there will be a higher number of violations to the Travel Management Rule the first few years and the number of violations will decline as the users understand and comply with the rules.
- Once the motor use vehicle map is published, the implementation of the established dedicated network of roads, trails, and areas with signs, and user education programs, will reduce the number of violations.
- Providing motorized recreation opportunities in popular, key areas will help relieve pressure to travel off of designated routes.

Climate Change

The Environmental Protection Agency (EPA) (2007) developed a "State of Knowledge" paper that outlines what is known and what is uncertain about global climate change. The following elements of climate change are known with near certainty:

- Human activities are changing the composition of Earth's atmosphere. Increasing levels of greenhouse gases like carbon dioxide (CO_2) in the atmosphere since pre-industrial times are well-documented and understood.
- The atmospheric buildup of CO_2 and other greenhouse gases is largely the result of human activities such as the burning of fossil fuels.
- An "unequivocal" warming trend of about 1.0 to 1.7 F occurred from 1906-2005. Warming occurred in both the Northern and Southern Hemispheres and over the oceans (IPCC, 2007).
- The major greenhouse gases emitted by human activities remain in the atmosphere for periods ranging from decades to centuries. It is therefore virtually certain that atmospheric concentrations of greenhouse gases will continue to rise over the next few decades.
- Increasing greenhouse gas concentrations tend to warm the planet.

According to EPA (2007), however, it is uncertain how much warming will occur, how fast that warming will occur, and how the warming will affect the rest of the climate system including precipitation patterns. Given what is and is not known about global climate change, the following discussion outlines the cumulative effects of this project on greenhouse gas emissions and effects of climate change on forest resources.

Carbon Dioxide (CO_2), Methane (CH_4) and Nitrous Oxide (N_20) emissions generated by public motorized vehicle travel on NFTS facilities are expected to contribute to the global concentration of greenhouse gases that affect climate change. Projected climate change impacts include air temperature increases, sea level rise, changes in the timing, location, and quantity of precipitation, and increased frequency of extreme weather events such as heat waves, droughts, and floods. The intensity and severity

of these effects are expected to vary regionally and even locally, making any discussion of potential site-specific effects of global climate change on forest resources speculative.

Because greenhouse gases from vehicle emissions mix readily into the global pool of greenhouse gases, it is not currently possible to discern the effects of this project from the effects of all other greenhouse gas sources worldwide, nor is it expected that attempting to do so would provide a practical or meaningful analysis of project effects. Potential regional and local variability in climate change effects add to the uncertainty regarding the actual intensity of this project's effects on global climate change. Further, emissions associated with this project are extremely small in the global atmospheric CO_2 context, making it impossible to measure the incremental cumulative impact on global climate from emission associated with this project. In summary, the potential for cumulative effects is considered negligible for all alternatives because none of the alternatives would result in measurable direct and indirect effects on air quality or global climatic patterns.

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 3, 4, 7, 6, 2 and 5 respectively from most to least, all have the potential to improve the long-term productivity by reducing the number of existing routes on the landscape. Routes that are not designated for public motor vehicle use will have the potential to revert to vegetated conditions, which will reduce many of the adverse effects related to these routes.

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 potential adverse effects, some adverse effects could occur that cannot be completely mitigated. The environmental consequences section for each resource area discusses these effects.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. 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.

It is not anticipated that designating, or not designating, some existing NFS and unauthorized routes for public motor vehicle use would cause an irreversible or irretrievable commitment of resources.

Incomplete and Unavailable Information

The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) describes how Federal agencies must handle instances where information relevant to evaluating reasonably foreseeable adverse impacts of the alternatives is incomplete or unavailable. Federal agencies must make clear that such information is lacking, and decide whether this incomplete or unavailable information is "essential to a reasoned choice among alternatives" (Title 40 of the Code of Federal Regulations, 40 CFR, Part 1502.22). If the information is deemed essential to a reasoned choice among the alternatives, it must be included or addressed in the environmental impact statement.

Incomplete or unavailable information is made clear in sections titled Assumptions and Limitations so the reader understands how unavailable information was addressed. The EIS summarizes existing credible scientific evidence relative to environmental effects and makes estimates of effects on theoretical approaches or research methods generally accepted in the scientific community.

Knowledge about the biological, physical, and social aspects of ecosystems is, and always will be, incomplete. The ecology, inventory, and management of large landscapes are complex and constantly changing. For example, analysis of the impacts of alternatives on specific plant or animal species prompts questions about population dynamics and habitat relationships. Key relationships and basic data are well established for only a few Tahoe National Forest ecosystems and species. The alternatives were analyzed using the best available information. As data gaps were encountered during analysis, the interdisciplinary team posed the question of whether the missing information was "essential to a reasoned choice among alternatives." The team concluded that while new information could add precision to estimates or better specify relationships; it would be unlikely to significantly change our understanding of the basic relationships that were used to analyze the effects of the alternatives. New information is always welcome, but no missing information was deemed essential to making a reasoned choice among the alternatives being considered in this EIS. In some instances, information was unavailable to confidently estimate environmental effects; the text indicates that this information is incomplete or unavailable. In such situations, the EIS summarizes existing credible scientific evidence relative to the significant effects and makes estimates of effects on theoretical approaches or research methods generally accepted in the scientific community.

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 has been prepared in accordance with the following regulations:

National Historic Preservation Act (NHPA) of 1966: Section 106 of the NHPA of 1966 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 of the Act 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 have been evaluated in compliance with Section 106 of the NHPA.

Executive Order 11644 ORV Management: Executive Order 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: Executive Order 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 have been eliminated and that measures have been implemented to prevent further recurrences.

Executive Order 12898 Environmental Justice: Executive Order 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: The Clean Water Act, as amended, regulates the dredging and filling of freshwater and coastal wetlands. Section 404 (33 USC 1344) of the Clean Water Act 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: The Clean Air Act of 1970 and its amendments provide 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: 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 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

endangered and threatened species under their jurisdiction. Biological evaluations for Proposed, Endangered, Threatened, and Sensitive (PETS) species have been prepared for the proposed action and informal consultation with the USFWS is ongoing.

National Forest Management Act (NFMA) of 1976: The National Forest Management Act 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 alternatives are consistent with the NFMA.

Chapter 3.01

Air Quality

3.01. Air Quality

The Tahoe National Forest (TNF) Travel Management project is intended to designate routes for public motor vehicle use for the TNF, as required by the Travel Management Regulations (36 CFR Part 212, Subpart B). The regulations require that each National Forest or Ranger District designate the roads, trails and establish "Open Areas" on National Forest System lands that are open to motor vehicles.

This chapter contains an evaluation of how air resources would be affected by implementation of each of the alternatives. The chapter contains policy and direction as well as a discussion of the affected environment and existing air quality conditions. This chapter describes potential impacts of implementation of the different alternatives. Further details are available in the project record.

Regulatory Framework

Direction relevant and specific to the proposed action as it applies to air quality resources includes:

Federal Clean Air Act

The Federal Clean Air Act (CAA) is a federal law passed in 1970, and last amended in 1990, (42 U.S.C. §7401 et seq.) which is the basis for national control of air pollution. The CAA was designed to "protect and enhance" the quality of the nation's air resources. Basic elements of the CAA include national ambient air quality standards (NAAQS) for criteria air pollutants, technology based emission control standards for hazardous air pollutants (HAPs), state attainment plans (SIPs), a comprehensive approach to reducing motor vehicle emissions, control standards and permit requirements for stationary air pollution sources, acid rain control measures, stratospheric ozone protection and enforcement provisions (California Air Resources Board [CARB], 2007).

Regional Haze Rule (1990 Clean Air Act Amendments), 40 CFR Part 51

The Regional Haze Rule requires states to demonstrate "reasonable progress" toward improving visibility in each Class I area over a sixty-year period (to 2064), during which visibility should be returned to natural conditions. Class I areas include Wilderness Areas or National Parks greater than 5,000 acres which existed on August 7, 1977.

General Conformity Rule (1990 Clean Air Act Amendments) (Section 176 (c) of the Clean Air Act (part 51, subpart W, and part 93, subpart B.)

The U.S. Environmental Protection Agency (EPA) passed the final General Conformity rule in 1993. Under the rule, federal agencies must work with state and local governments in a nonattainment or maintenance area to ensure that federal actions conform to the initiatives established in the applicable state implementation plan (U.S. EPA, 2008). A project is non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. The rule divides the conformity process into two phases: applicability and determination.

California Clean Air Act (H&S §§ 39660 et seq.)

California adopted the California Clean Air Act (CCAA) in 1988. The Act provides the basis for air quality planning and regulation in California independent of federal regulations, and establishes ambient

air quality standards for the same criteria pollutants as the federal clean air legislation (CARB, 2007). Under the Federal CAA, States can adopt air quality standards that are more stringent than the Federal NAAQS. California has chosen to adopt standards for criteria pollutants that are generally more restrictive than Federal standards. The California Air Resources Board (CARB) is the agency responsible for establishing California ambient air quality standards (CAAQs), setting vehicle emission standards and fuel specifications and regulating emissions from certain types of mobile equipment and consumer products.

CARB Off-Road Recreational Vehicle Emissions Standards Rulemaking

In 1994, the CARB approved new off-highway recreational vehicle regulations (since amended in 1998). This rulemaking established emission standards for off-highway vehicles (OHVs) including off-road motorcycles (dirt bikes) and all-terrain vehicles (ATVs) (CARBc, 2006). OHV registration became contingent on vehicle compliance to California emission standards. Dirt bikes and ATVs that meet emission standards are eligible for OHV Green Sticker registration and have a year-round operating period, while noncompliant vehicles fall under the OHV Red Sticker program which may have a limited operational season, depending upon the location.

Affected Environment

Introduction

The two primary potential impacts to air quality resulting from the Travel Management Project are: 1) Air Pollution and 2) Naturally Occurring Asbestos.

Air Pollution

The climate, geography and population growth within and/or adjacent to the Tahoe National Forest (TNF) are the major reasons that air pollution is an issue on the TNF. The mountains on the TNF encircle cities and create conditions where air and pollution are trapped. Therefore, the pollution created by population growth and its supporting infrastructure in those cities is often trapped near the TNF. Sunlight triggers chemical reactions that lead to secondary pollutants and haze commonly known as “smog.”

Radiative transfer, atmospheric transport and dispersion, and chemical reactions play major roles in creating high concentrations of ozone in the Sierra Nevada. Nitrogen Oxides (NO_2) and Volatile Organic Compounds (VOCs), precursors to ozone, are emitted by mobile sources and carried by wind from the Bay Area, Sacramento and the Central Valley to the western slopes of the TNF. During the transport process the precursors react to form ozone in the presence of sunlight. Other aerosols (e.g., ammonia, nitrates, sulfates, pesticides, herbicides and fine particulates) are also carried by wind. These are deposited on vegetation (dry deposition) or brought down in rain, clouds, fog or mist (wet deposition generally called acid rain) affecting vegetation. This polluted air coming from outside the forest can impact the forest’s flora, fauna, watersheds, and surrounding communities. Forest management activities also generate pollutants that can affect forest resources, as well as surrounding communities, for example smoke from prescribed burning.

Visibility is also impacted by pollutants. Visibility impairment results from both the scattering and absorption of light by particles and gases in the air. Fine particles less than 2.5 microns in diameter ($PM_{2.5}$) are especially efficient at scattering light. Fine elemental carbon particles (soot) and nitrogen dioxide gas are the typical absorbers of light. Scattering by "air" molecules (primarily oxygen and nitrogen with a diameter less than 0.0001 microns) causes the sky to appear blue and, in the absence of natural particulates, sets the upper limit visibility in a specific geographic region.

Affected Air Basins and Air Pollution Control Districts: California is divided into 14 geographic air basins. An air basin is an area surrounded by topographic features that provide for common air quality and transport. The California Air Resources Board (CARB) maintains air quality data by air basin. The TNF is located within the Mountain Counties air basin.

The State is directly responsible for regulating emissions from mobile sources. However, authority to regulate stationary sources has been delegated to Air Pollution Control and Air Quality Management Districts (APCDs and AQMDs) within the provisions of the CCAA and oversight by the California Environmental Protection Agency. Figure 3.01-1 shows air basins and Air Pollution Control Districts.

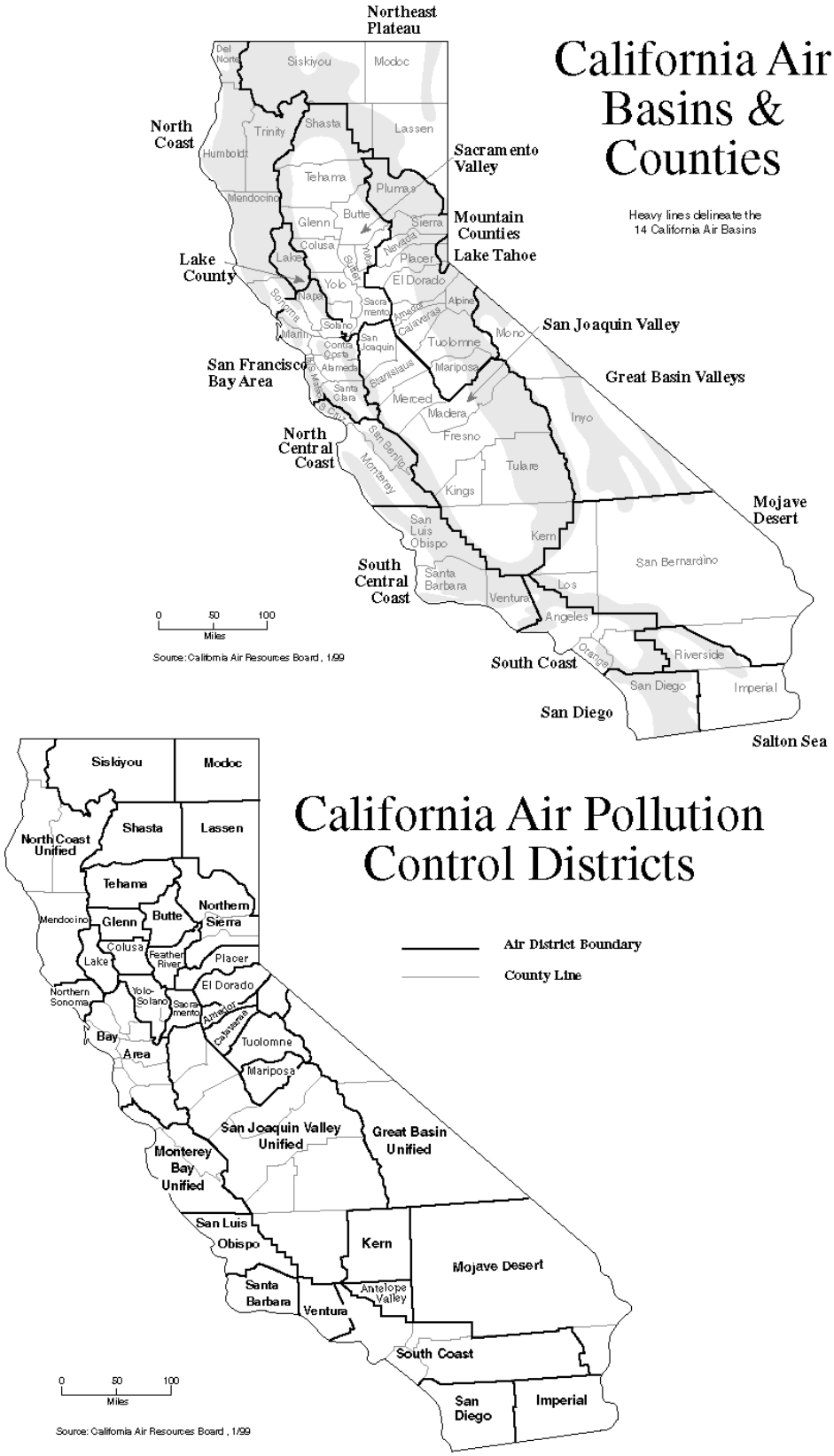

Figure 3.01-1. California Air Basins/Counties and Air Pollution Control Districts

Pollutants of Concern: The primary air pollutants, that can cause detrimental effects to public health and/or native ecosystems, are produced in part by motorized vehicle use and include particulates, sulfur compounds, nitrogen compounds, ozone, and carbon oxides.

- **Particulates**: The term "particulate" is used to describe dispersed solid and liquid airborne particles that are suspended in the atmosphere for a period of time. Particulate matter includes dust, dirt, soot, smoke and liquid droplets directly emitted into the air by sources such as factories, power plants, vehicles, construction activity, fires and natural windblown dust. Particles formed in the atmosphere, such as sulfur dioxide (SO_2) and VOCs are also considered particulate matter. They can contribute to visibility impairment and human health problems. Particulate matter less than 10 microns in diameter (PM_{10}) are those which can enter the human respiratory system. Motorized vehicles produce particulates that are primarily referred to as fugitive dust. Fugitive dust is particulate matter suspended in the air. Fugitive dust can cover vegetation reducing the amount of photosynthesis (refer to Chapter 3.06, Plant Communities).
- **Sulfur Compounds**: Sulfur compounds (oxides, sulfuric acid, and sulfates) are present in the air naturally as a result of seasalt, biogenic gases, and volcanic emissions. Globally, human industrial emissions have almost doubled the amount of sulfur inputs to air compared to pre-industrial levels. Deposition of sulfur compounds can cause acidification of water and soils, decrease visibility, and affect such life forms as cryptogams (such as fungi, algae, mosses, and ferns). Some of the sulfur in diesel fuel is converted to sulfate particles in motorized vehicle exhaust.
- **Nitrogen Compounds**: The primary releases of nitrogen compounds (oxides, ammonium, and nitrates) naturally to the air are from microbial activity, lightning and wildfires. The historical levels of nitrogen compounds in the air have almost doubled on a global basis as a result of fossil fuel combustion, animal husbandry practices, and fertilization. Nitrogen compounds can negatively affect aquatic systems, can affect visibility, and are a precursor compound to ozone, which is toxic to plants. Motorized vehicles emit nitrogen oxides in their exhaust. A 1991 EPA report showed that non-road engines (lawn and garden equipment, farm and construction equipment, recreational vehicles, marine vessels, and airport service equipment) had total emissions almost as high as highway motor vehicles. Non-road emissions from diesel engines were significantly higher than highway emissions in this 1991 study.
- **Ozone**: Ozone is formed when emissions of VOCs combine with nitrogen compounds in the presence of sunlight and warm temperatures. It is naturally present in small quantities; however, amounts have increased substantially due to increased levels of nitrogen compounds and VOCs. Ozone is a major component of smog and affects human health. It has been suggested as a factor contributing to the decline of sensitive forest tree species in the Sierra Nevada, and has been shown to cause injurious effects to both Jeffrey and ponderosa pine.
- **Carbon Oxides**: Carbon monoxide (CO) and carbon dioxide (CO_2) are produced by natural and human sources. CO is a poisonous gas produced by incomplete burning of carbon in fuels. CO_2 is natural constituent of the troposphere (lowest level of the atmosphere). It has a role in global

climate change, making it a significant pollutant. Motorized vehicles emit carbon monoxide in their exhaust.

Sources of Pollutants: Air pollutants affecting the health of TNF resources can result from natural or human processes. Natural air pollution may occur from forest fires, decomposition of plants and animals, soil erosion, pollen and mold spores, VOCs emitted by vegetation, electrical storms and photochemical reactions. Human caused air pollution sources include: industrial sources, prescribed wildland burning, animal production, agricultural burning, residential and business development, and vehicle emissions.

Emissions from National Forest Activities: Forest activities that generate air pollutants include prescribed burns, recreation use, vehicle traffic, site preparation, mining, livestock and pack animals, and vegetation management. This analysis focuses on those air pollutants generated from motorized vehicle use.

The growing popularity of motorized vehicles has led to concerns about impacts to air quality. Motorized vehicle engines can be either two-stroke or four-stroke. It is estimated that 60-65 percent of the motorcycles used off highways (in the United States) have two-stroke engines (EPA 2001 in Kassar 2005). Between 10-15 percent of ATVs in the United States use two-stroke engines (ibid). Two stroke engines are less fuel efficient and emit more unburned hydrocarbons (HC) and particulate matter (PM) than four-stroke engines. The EPA estimates that 25-30 percent of the fuel in a two-stroke engine remains unburned and is released into the air and water. Emissions from engines include carbon monoxide, hydrocarbons, particulate matter, and a variety of gases classified as “air toxins” such as formaldehyde, other related aldehydes, and VOCs such as benzene. Motorcycles with two-stroke engines have been found to release ten times the amount of HC emissions as four-stroke motorcycles (CARB 2001 in Kassar 2005). The emissions released by two-stroke engine motorcycles are considered responsible for 90 percent of the emissions from OHVs that contribute to the formation of smog in California (ibid).

As mentioned above, ozone is formed when emissions of VOCs combine with nitrogen compounds in the presence of sunlight and warm temperatures. Many of the off-road vehicles registered in California emit 50 times more pollution than a current model passenger car reflecting their lack of regulation in the past and designs that emphasize performance over fuel economy (CARB 1997 in Kassar 2005). Some estimates state that off-road vehicles produce as much as 4000 times more carbon monoxide emissions and 118 times as many smog-forming pollutants as modern automobiles on a per-mile basis (CARB 1998 in Kassar 2005).

Off-road diesel-powered equipment is considered highly polluting. Diesel is one of the largest contributors to environmental pollution problems worldwide (Lloyd and Cackette 2001). Atmospheric deposition of air pollutants released from diesel exhaust is considered a significant source of ecosystem contamination (ibid). In addition, heavy metals and dioxins common to diesel exhaust can be transported long distances as gases or PM. EMFAC2000, California’s emissions inventory model, estimated that even though diesel-powered vehicles contribute only 5 percent of the daily vehicle miles of travel in California, these diesel-powered vehicles produced at least 56 percent of the vehicle exhaust particulate matter in

California in the year 2000. However, there is no new data available on the particulate matter after October 2006, when all diesel fuels were required to switch to low sulfur.

Fugitive Dust, PM_{10} and $PM_{2.5}$: Motorized vehicle use of native surface roads/trails/areas also has the potential to create fugitive dust and increase PM_{10} and $PM_{2.5}$ concentrations. The amount of fugitive dust, PM_{10} and $PM_{2.5}$ concentrations generated by motorized vehicles using native surface roads/trails/areas is dependent on many factors including the type of vehicle, vehicle speed, and number of vehicles. Exposure to high concentrations of engine emissions and fugitive dust can negatively affect human health, damage vegetation; negatively impact animals, reduce soil health and water quality, have atmospheric effects, and affect visibility. A summary of possible impacts follows:

- **Effects to Human Health**: High concentrations of particles can affect human health by: making it difficult to breath, aggravating existing respiratory and cardiovascular disease, reducing the body's defense systems against foreign materials, damaging lung tissue, and contributing to the development of cancer and premature death. The major subgroups of the population most sensitive to the effects of particulate matter are individuals with chronic obstructive pulmonary or cardiovascular disease or influenza, asthmatics, the elderly and children.
- **Effects on Vegetation**: Visible impacts to plants from motorized vehicle emissions include: changes in leaf structure such as chlorophyll destruction (chlorosis), tissue death (necrosis), and pigment formation. Damage may occur even when no visible injury is apparent. Such effects can include reductions in photosynthesis, growth reduction, and predisposition to attack by insects.
- **Effects on Animals**: Animal health is at risk when animals are exposed to high levels of air pollutants via inhalation of gases or small particles, ingestion of particles suspended in food or water, and absorption of gases through the skin. In general, only soft bodied invertebrates (for example, earth worms), or animals with thin, moist skin (for example, amphibians) are affected by dermal absorption of pollutants.
- **Effects on Soil and Water**: Chemicals from motorized vehicle engines (such as SO_2 and NO_2) can be washed into the soil by low-pH rainwater. The soil then neutralizes much of the acidity by dissolving and mobilizing minerals. These minerals such as aluminum, calcium, magnesium, sodium and potassium may then be leached from the soil into surface waters. The ability of soil to tolerate this acidic deposition is very dependent on the alkalinity of the soil. Many of the steep slopes on the TNF are covered by shallow soils with relatively limited neutralizing capacity. Watersheds with steep slopes with shallow soils and acid rain have lakes and streams that are susceptible to low pH and high levels of aluminum. This combination has been found to be toxic to some fish species. Our ability to predict the effects of air pollution on aquatic systems is limited by the lack of deposition monitoring sites across the range of ecological conditions in the TNF.
- **Atmospheric Effects**: The atmosphere serves as a sink for pollutants and has a considerable capacity for self-renewal. However, the atmosphere is susceptible to short and/or long-term pollution-induced changes. Atmospheric changes can include reduced visibility, changes to urban climate/frequency of rainfall/precipitation chemistry, changes in stratosphere ozone levels, and global climate changes.

Current Conditions

Area Designations (Attainment vs. Non-Attainment Area): State and federal agencies have established ambient air quality standards for criteria pollutants. If the permissible levels of a particular pollutant are not exceeded in an area, the area is said to be in attainment for that pollutant; if the standards are violated, the area is designated as non-attainment. Table 3.01-1 shows the designation for the affected counties in the TNF. None of the counties are in non-attainment for federal PM_{10} standards and only Placer County is in non-attainment for federal ozone standards. All counties are in non-attainment for state PM_{10} standards.

Table 3.01-1. Area Designation for State and Federal Standards for PM_{10} and Ozone

County	PM_{10}		$PM_{2.5}$	Ozone	
	Federal	State	Federal	Federal	State
Nevada (eastern)	U	N	A	U/A	N
Nevada (western)	U	N	A	N	N
Placer	A	N	A	U/A	T
Plumas	U	N	A	A	U
Sierra	U	N	A	U/A	U
Yuba	A	N	A	A	N

Note: A – Attainment; **N** – Non-attainment; **T** – Transitional; and **U** – Unclassified

Visibility: Visibility conditions in the Sierra Nevada improve from south to north and also from low elevation to high elevations. In general terms, the visibility conditions on the TNF are considered good. The TNF is located within a class II airshed.

Ozone: The amounts of ozone on the TNF have increased substantially as a result of increased levels of nitrogen compounds and volatile organic compounds. A Pacific Southwest Regional ozone study confirms injurious effects to both the Jeffrey and ponderosa pines. Ozone production varies significantly with changing atmospheric conditions. Models are not available to predict ozone formation resulting from motorized vehicle emissions. Instead, emissions of ozone precursors (NO_2 and VOCs) are usually modeled to help predict the effects. Relative contributions to ozone production can be estimated based on quantity of ozone precursors emitted and climatic conditions at the time of the emissions.

Sulfur and Nitrogen Compounds: The amount of Sulfur compounds that are being released into the air are considered very low (SNFPA 2001). However, the amount of Nitrogen (N) compounds in the air has increased (ibid). Levels of wet and dry N deposition in the Sierra Nevada are still considered well below saturation levels in the northern forests (ibid).

Interaction among Sulfur and Nitrogen compounds and ozone: The three primary pollutants that interact at a broad scale across the TNF and have been demonstrated to impact terrestrial systems include sulfur dioxide, nitrogen oxides, and ozone. Many native plant species, particularly ponderosa pine and a host of lichens and mosses are susceptible to increasing levels of ozone. In addition, high-elevation plant communities are at substantial risk to ozone effects while low-elevation native plant communities may be affected by elevated nitrogen levels. Most plant communities adjacent to urban areas are or would be

affected by nitrogen compounds, ozone and sulfur compounds. The TNF has a higher risk of ozone damage due to it's proximity to major pollution centers and the prevailing air currents.

Naturally Occurring Asbestos (NOA)

Introduction: Asbestos is a term used for several types of naturally-occurring fibrous minerals found in many parts of California. The most common type of asbestos is chrysotile, but other types are also found in California. Serpentine rock often contains chrysotile asbestos. Serpentine rock, and its parent material, ultramafic rock, are abundant in the TNF. Serpentine rock is typically grayish-green to bluish-black in color and may have a shiny appearance.

Asbestos is commonly found in ultramafic rock, including serpentine, and near fault zones. The amount of asbestos that is typically present in these rocks ranges from less than 1percent up to about 25 percent, and sometimes more. Asbestos is released from ultramafic and serpentine rock when it is broken or crushed. This can happen when motor vehicles drive over native surface roads that contain these rocks. It is also released naturally through weathering and erosion. Once released from the rock, asbestos can become airborne and may stay in the air for long periods of time.

Background on Naturally Occurring Asbestos: "Asbestos" is a commercial term used to identify a group of six silicate minerals (chrysotile, crocidolite, amosite, tremolite, actinolite, anthophyllite) of fibrous or asbestiform habit, which have the properties of high tensile strength, flexibility, chemical resistance, and heat resistance. These properties have made these minerals useful in many manufactured products and industrial processes during the Twentieth Century. A few examples of the many uses of asbestos include brake and clutch linings, insulation, fireproof textiles, and filtration products. The use of asbestos in manufactured goods and processes in the United States has significantly decreased over the last 30 years because of health concerns related to asbestos exposure.

"Naturally Occurring Asbestos" (NOA) is the term applied to the natural geologic occurrence of any of the six types of asbestos. The presence of asbestos in nature is related to the chemistry of rocks in an area and the different geologic processes that have acted on those rocks through time. Formation of asbestos requires certain chemical conditions (available silica, magnesium, calcium, iron, sodium and water) and physical conditions (appropriate temperature, pressure, and possibly stress). These conditions may be present in a variety of geologic settings, but are more common in some settings than in others. In addition to the six asbestos minerals listed above, other asbestiform amphiboles such as richterite and winchite are known or suspected of posing a health risk (Wylie and Verkouteren, 2000). Further discussion of the mineralogy and geology of asbestos can be found in Clinkenbeard and others (2002).

Location of Areas "Most Likely" to contain Naturally Occurring Asbestos on The TNF: To evaluate the geology of the TNF and the likelihood of the presence of NOA, information on geologic units and soils units was reviewed. The locations most likely to contain NOA are distributed principally in the Foresthill region. Their distribution in the TNF is shown in Figure 3.01-2.

Soils derived from asbestos-bearing rocks may contain free asbestos (asbestos fibers broken down to the size they could become airborne and inhaled by humans). Soils derived from ultramafic rocks and serpentinite commonly are distinctive; they often are identified in soils studies as serpentine- or

ultramafic- related soils. Typically, they are found as linear belts along major fault zones in the western part of the Forest. The areas represent a composite of both the areas of ultramafic rocks and serpentinite and the areas of soil derived from these rocks.

Serpentinite and partially serpentinized ultramafic rocks often can contain chrysotile asbestos. These rocks may also host amphibole asbestos, typically tremolite, actinolite, or anthophyllite. Also, soils derived from weathering of ultramafic rocks and serpentinite may contain NOA. Soil maps include the following ultramafic- and serpentinite related soils series: Dubakella and Forbes.

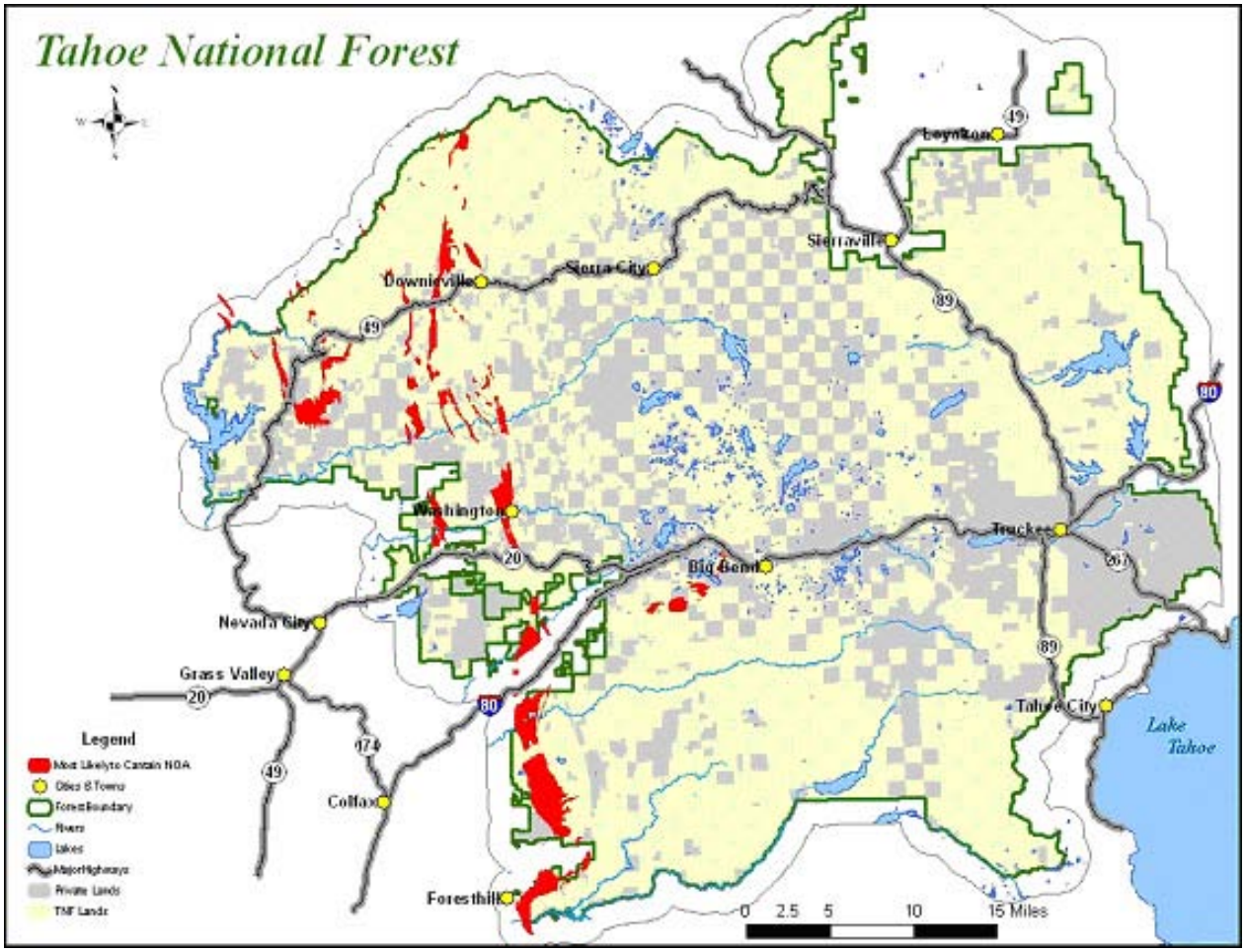

Figure 3.01-2. Areas "Most Likely" to Contain Naturally Occurring Asbestos

Potential Human Effects: Motorized vehicle users on native surface roads and trails with NOA may have increased potential risks for adverse effects to their health. Asbestos is classified as a known human carcinogen by state, federal, and international agencies. State and federal health officials consider all types of asbestos to be hazardous. Information on the health effects of asbestos can be found in the *Toxicological Profile for Asbestos* by the Agency for Toxic Substances and Disease Control (2001). Table 3.01-2 displays the current area available for motor vehicle use on lands "most likely" to contain naturally occurring asbestos.

Table 3.01-2. Motor vehicle use on native surface roads, trails and areas "most likely" to contain naturally occurring asbestos

Category	Amount
Cross Country Travel	
Unauthorized routes and closed NFTS roads still receiving some motorized use (miles)	53.6
Area (acres)	1,660
NFTS Roads (miles)	26.4
NFTS Trails (miles)	42.8
Private roads	24.6

Environmental Consequences

Air Pollution

Emissions: Predictions about changes in total amount of emissions (sulfur compounds, nitrogen compounds and carbon oxides) generated from motorized recreational use that may occur on the Forest are difficult to make and would be highly speculative. The Forest Service believes that under all alternatives, levels of emissions (other than fugitive dust) from motorized recreation use would increase by the same amount based on population growth in the market area. Although the use patterns may change, it is expected that total visitation, and hence emissions, would increase by the same amount in all alternatives. For example, even though the overall number of available motorized roads and trails is reduced in all of the action alternatives, the same levels of use would occur and simply become more concentrated in those areas. Therefore, the amount of pollutants other than fugitive dust is anticipated to increase by the same amount in all alternatives**.**

It is acknowledged that there are many unknowns regarding future regulations on emissions from non-road engines (lawn and garden equipment, farm and construction equipment, recreational vehicles, marine vessels, and airport service equipment). New standards to reduce hydrocarbon (HC) emissions from gasoline powered non-road recreational vehicles were adopted by EPA in 2002. These new emission standards for new gasoline-powered recreational non-road vehicles were phased in beginning in 2006. EPA expects these standards to reduce HC emissions from these vehicles by 67 percent and CO emissions by 28 percent – nationally – over time. EPA expects that manufacturers would primarily increase their use of 4-stroke engine system designs and improve materials and barrier treatments to reduce the permeation of gasoline through fuel tanks and hoses.

Since EPA has shown that non-road equipment (lawn and garden equipment, farm and construction equipment, recreational vehicles, marine vessels, and airport service equipment) emits large amounts of nitrogen oxides as well as HC and CO, it is likely that regulations would be developed to reduce the amounts of nitrogen oxides produced from recreational gasoline powered vehicles also. New non-road diesel engines already have emission standards designed to reduce nitrous oxide emissions (EPA 2003). However, current regulations still allow the sale of non-complying OHVs with two-stroke engines found on most non-compliant OHVs (CARB 2007). Table 3.01-3 shows average emissions in tons/day for

Placer, Nevada and Sierra Counties within the Mountain Counties Air Basin. It is unknown if these emissions would go up or down over time.

Table 3.01-3. 2006 Estimated Annual Average Emissions for Off-Road Recreational Vehicles (tons per day)

Area	TOG	ROG	CO	NO_2	SO_2	PM	PM_{10}
Statewide	70.54	66.18	184.19	2.04	.57	.83	.75
Sierra County	2.10	1.96	4.75	.05	.02	.03	.02
Nevada County	1.45	1.36	3.24	.03	.01	.02	.02
Placer County	1.98	1.85	4.16	.04	.02	.03	.02

Note: TOG - Total organic gases; **ROG** - Reactive organic gas; **CO** - Carbon monoxide; **NO_2** - Nitrogen oxides; and **SO_2** - Sulfur oxides.

Ozone: As mentioned previously the western Nevada County portion of the TNF is in federal non-attainment for ozone. Motorized vehicle use does not generate significant amounts of ozone precursors and if generated these ozone precursors are generally below *de minimis* (so small or minimal in difference that it does not matter or the law does not take it into consideration) and are thus exempt from conformity determination. This statement is based on a 1991 non-road and vehicle emission study done by EPA and SNFPA 2001 air quality modeling. The emissions of ozone precursors (NO_2 and VOCs) are expected to increase over time with levels of wet and dry nitrogen deposition in the Sierra Nevada also increasing. However, levels are still below saturation levels in the northern forests (SNFPA 2001) and non-road recreational vehicles are not considered a significant source of ozone precursors at this time. New emission regulations would further reduce contributions from non-road vehicles in the future.

Fugitive Dust (Particulate Matter): To assess the air quality effects from fugitive dust, the alternatives are compared by the number of miles of native surface (dirt) motorized roads, trails and areas available for use. Those alternatives with the greatest amount of native surface roads, trails and areas have the greatest potential to release fugitive dust (particulate matter) into the air. The amount and timing of the motorized vehicle use and the type of motorized vehicle recreating on each road/trail/area is unknown. Other unknown factors that contribute to the amount of fugitive dust produced include: the weather at the time of use and the condition of the road/trail/area, etc.

Fugitive dust from unpaved roads/trails/areas can add suspended particles into the air especially during summer use when the soils are dry. There is currently no way to know exactly how much particulate matter is being generated on the TNF through use of motorized vehicles or to speculate how much would be produced by alternative in the future. Therefore, it is assumed that the alternatives that provide the greatest number of miles available for use by motorized vehicles have the greatest potential for producing fugitive dust. Refer to Table 3.01-4.

Table 3.01-4. Amount of Native Surface Roads, Trails and Areas Open to Motorized Vehicles

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross country travel (acres)		Prohibitions continue 81,975 acres Continues on 754,066 acres	Prohibited on 833,392 acres 2,649 acres established open	Prohibited on 836,000 acres <100 acres established open	Prohibited on 836,000 acres <100 acres established open	Prohibited on 836,000 acres <100 acres established open	Prohibited on 835,800 acres <300 acres established open	Prohibited on 836,000 acres <100 acres established open
2. Additions to the NFTS	**a. Roads added to the NFTS**	0.0	5.0	0.0	3.7	5.0	13.1	0.0
	b. Motorized Trails added to the NFTS	0.0	54.6	0.0	22.6	75.4	48.3	36.7
3. Establishment of Motorized "Open Areas" (acres)		0	2,649	0	0	0	244	0
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	No Effect						
	b. Change in Class of Vehicles resulting from changes in maintenance levels	0.0	157.2	0.00	3.4	157.2	122.0	3.4
	c. Change in Season of Use	No Effect						
	d. Reopening Maintenance Level 1 Roads	0.0	0.0	0.0	0.1	93.4	11.4	1.1
5. Amendments to the Forest Plan		No Effect						
	Total Miles*	**5,293.8**	**4,053.5**	**3,595.6**	**3,625.3**	**4,167.8**	**3,803.4**	**3,636.7**
	Total Acres	**754,066**	**2,649**	**0**	**0**	**0**	**244**	**0**

*Includes State, County and private roads. Alternative 1 includes unauthorized routes and closed NFTS roads still receiving some motorized use.

Alternative 1 poses the greatest risk of impacts to air quality due to the continuation of cross country travel on 754,066 acres including 1,698.3 miles of native surface roads and trails unauthorized for motorized use. All of the action alternatives reduce the potential risks to air quality by prohibiting cross country travel and reducing the amount of native surface roads and trails available for motorized travel.

It is anticipated that implementation of Alternative 1 would have the highest potential risk for producing fugitive dust. Implementation of Alternative 1 could potentially contribute to air quality degradation more than any of the action alternatives. All of the action alternatives could potentially improve air quality.

Alternative 1

Cross Country Travel: Cross country travel would not be prohibited in Alternative 1. Predicting where cross country motorized vehicle use would occur is not possible. It is likely that this cross country travel would damage and/or kill some vegetation and increase the amount of bare soil. Cross country travel also results in the continued use of 754,066 acres resulting in approximately 1,700 miles of unauthorized routes and closed NFTS roads on native surfaces. This use could contribute to increased air quality degradation.

Additions to the NFTS: There are no additions of any native surface roads or motorized trails to the NFTS in Alternative 1. Since there are no additions, there would be no potential adverse impacts on air quality from this element.

Establishment of Motorized "Open Areas": "Open Areas" would not be established in Alternative 1and would therefore have no potential adverse impacts to air quality from this element.

Changes to the NFTS: There are no changes to the NFTS in this alternative.

Amendments to the Forest Plan: There are no amendments to the Forest Plan in this alternative.

Cumulative Effects: By not prohibiting cross country travel, motorized use would continue on 754,066 acres resulting in 5,293.8 miles of native surface roads and trails. The proliferation of additional unauthorized native surface roads and trails by motor vehicles would continue.

Alternative 2

Cross Country Travel: Cross country travel would be prohibited in Alternative 2. This would stop the proliferation of new unauthorized routes with native surfaces. The prohibition of cross country travel also results in reducing use of all unauthorized roads, trails and areas not added to the NFTS. These changes could have a positive effect on air quality conditions.

Additions to the NFTS: Alternative 2 would add an additional 5 miles of roads and 54.6 miles of motorized trails on native surface soils to the NFTS. These additional roads and motorized trails have the potential to produce fugitive dust and thus contribute to air quality degradation.

Establishment of Motorized "Open Areas": Four areas totaling 2,649 acres would be established as "Open Areas." These additional established "Open Areas" could increase the potential for fugitive dust and have an adverse impact on ambient air quality.

Changes to the NFTS: Approval of mixed use and changing season of use on NFTS roads and trails would have no effect on ambient air quality. Changing maintenance levels on 157.2 miles of NFTS roads would result in an increased mileage of native surface roads and could have potential adverse effects on ambient air quality. No changes in seasonal restrictions are proposed. No Maintenance Level 1 roads would be reopened, and therefore no increased risk of fugitive dust.

Amendments to the Forest Plan: The Forest Plan Amendment of removing the Deer Winter Range Seasonal Restrictions in Management Area 84 would not increase the potential for fugitive dust and therefore would have no effect on ambient air quality.

Cumulative Effects: Alternative 2 potentially improves air quality by reducing the amount of acreage open to motorized vehicle use on native surfaces from 754,066 acres to 2,649. It also reduces the total number of native surface roads and trails available for motorized use from 5,293.8 to 4,053.5 miles.

Alternative 3

Cross Country Travel: Cross country travel would be prohibited in Alternative 3. This would stop the proliferation of new unauthorized routes with native surfaces. The prohibition of cross country travel also results in reducing use of all unauthorized roads, trails and areas not added to the NFTS. These changes could have a positive effect on air quality conditions.

Additions to the NFTS: There are no additions to the NFTS in Alternative 3. Since there are no additions, there would be no potential adverse impacts on air quality from this element.

Establishment of Motorized "Open Areas": "Open Areas" would not be established in Alternative 3 and would therefore have no potential adverse impacts to air quality from this element.

Changes to the NFTS: There are no changes to the NFTS in this alternative.

Amendments to the Forest Plan: There are no amendments to the Forest Plan in this alternative

Cumulative Effects: Alternative 3 potentially improves air quality by reducing the amount of acreage open to motorized vehicle use on native surfaces from 754,066 acres to less than 100. It also reduces the total number of native surface roads and trails available for motorized use from 5,293.8 to 3,595.6 miles.

Alternative 4

Cross Country Travel: Cross country travel would be prohibited in Alternative 4. This would stop the proliferation of new unauthorized routes with native surfaces. The prohibition of cross country travel also results in reducing use of all unauthorized roads, trails and areas not added to the NFTS. These changes could have a positive effect on air quality conditions.

Additions to the NFTS: Alternative 4 would add an additional 3.7 miles of roads and 22.6 miles of motorized trails on native surface soils to the NFTS. These additional roads and motorized trails have the potential to produce fugitive dust and thus contribute to air quality degradation.

Establishment of Motorized "Open Areas": "Open Areas" would not be established in Alternative 4 and would therefore have no potential adverse impacts to air quality from this element.

Changes to the NFTS: Approval of mixed use and changing season of use on NFTS roads and trails would have no effect on ambient air quality. Changing maintenance levels on 3.4 miles of NFTS roads

would result in an increased mileage of native surface roads and could have potential adverse effects on ambient air quality. Wet weather seasonal restrictions would be applied to all native surface roads and motorized trails. This change might slightly improve air quality conditions by reducing emissions from vehicles during the winter months. The wet weather seasonal restrictions would have no benefit in terms of the amount of fugitive dust produced on native surface roads and trails during the dry season. One Maintenance Level 1 road at 0.1 mile would be reopened with a minimal increased risk of fugitive dust.

Amendments to the Forest Plan: There are no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 4 potentially improves air quality by reducing the amount of acreage open to motorized vehicle use on native surfaces from 754,066 acres to less than 100. It also reduces the total number of native surface roads and trails available for motorized use from 5,293.8 to 3,625.3 miles.

Alternative 5

Cross Country Travel: Cross country travel would be prohibited in Alternative 5. This would stop the proliferation of new unauthorized routes with native surfaces. The prohibition of cross country travel also results in reducing use of all unauthorized roads, trails and areas not added to the NFTS. These changes could have a positive effect on air quality conditions.

Additions to the NFTS: Alternative 5 would add an additional 5 miles of roads and 75.4 miles of motorized trails on native surface soils to the NFTS. These additional roads and motorized trails have the potential to produce fugitive dust and thus contribute to air quality degradation.

Establishment of Motorized "Open Areas": "Open Areas" would not be established in Alternative 5 and would therefore have no potential adverse impacts to air quality from this element.

Changes to the NFTS: Approval of mixed use and changing season of use on NFTS roads and trails would have no effect on ambient air quality. Changing maintenance levels on 157.2 miles of NFTS roads would result in increased mileage of native surface roads available for motorized use and could have potential adverse effects on ambient air quality. Wet weather seasonal restrictions would be applied to all native surface roads and motorized trails. This change might slightly improve air quality conditions in terms of emissions from vehicles during the winter months. The wet weather seasonal restrictions would have no benefit in terms of the amount of fugitive dust produced on native surface roads and trails during the dry season. About 93 miles of Maintenance Level 1 roads would be reopened, and could result in an increased risk of fugitive dust.

Amendments to Forest Plan: The Forest Plan Amendment of removing the Deer Winter Ranger Seasonal Restrictions in Management Area 84 would not increase the potential for fugitive dust and therefore would have no effect on ambient air quality.

Cumulative Effects: Alternative 5 potentially improves air quality by reducing the amount of acreage open to motorized vehicle use on native surfaces from 754,066 acres to less than 300. It also reduces the total number of native surface roads and trails available for motorized use from 5,293.8 to 4,167.8 miles.

Alternative 6

Cross Country Travel: Cross country travel would be prohibited in Alternative 6. This would stop the proliferation of new unauthorized routes with native surfaces. The prohibition of cross country travel also results in reducing use of all unauthorized roads, trails and areas not added to the NFTS. These changes could have a positive effect on air quality conditions.

Additions to the NFTS: Alternative 6 would add an additional 13.1 miles of roads and 48.3 miles of motorized trails on native surface soils to the NFTS. These additional roads and motorized trails have the potential to produce fugitive dust and thus contribute to air quality degradation.

Establishment of Motorized "Open Areas": Four new areas totaling 244 acres would be established as "Open Areas." These additional designated "Open Areas" could increase the potential for fugitive dust and have an adverse impact on ambient air quality.

Changes to the NFTS: Approval of mixed use and changing the season of use on NFTS roads and trails would have no effect on ambient air quality. Changing maintenance levels on 122.0 miles of NFTS roads would result in an increased mileage of native surface roads available for motorized use and could have potential adverse effects on ambient air quality. Wet weather seasonal restrictions would be applied to all native surface roads and motorized trails. This change may have a slight improvement on air quality conditions by reducing emissions from vehicles during the winter months. The wet weather seasonal restrictions would have no benefit in terms of the amount of fugitive dust produced on native surface roads and trails during the dry season. A total of 11.4 miles of Maintenance Level 1 roads would be reopened, and could result in an increased risk of fugitive dust.

Amendments to Forest Plan: The Forest Plan Amendment of removing the Deer Winter Range Seasonal Restrictions in Management Area 84 would not increase the potential for fugitive dust and therefore would have no effect on ambient air quality.

Cumulative Effects: Alternative 6 potentially improves air quality by reducing the amount of acreage open to motorized vehicle use on native surfaces from 754,066 acres to less than 300. It also reduces the total number of native surface roads and trails available for motorized use from 5,293.8 to 3,803.4 miles.

Alternative 7

Cross Country Travel: Cross country travel would be prohibited in Alternative 7. This would stop the proliferation of new unauthorized routes with native surfaces. The prohibition of cross country travel also results in reducing use of all unauthorized roads, trails and areas not added to the NFTS. These changes could have a positive effect on air quality conditions.

Additions to the NFTS: Alternative 7 would add an additional 36.7 miles of motorized trails on native surface soils to the NFTS. These additional motorized trails have the potential to produce fugitive dust and thus contribute to air quality degradation.

Establishment of Motorized "Open Areas": "Open Areas" would not be established in Alternative 7 and would therefore have no potential adverse impacts to air quality from this element.

Changes to the NFTS: Approval of mixed use and changing season of use on NFTS roads and trails would have no effect on ambient air quality. Changing maintenance levels on 3.4 miles of NFTS roads

would result in an increased mileage of native surface roads available for motorized use and could have potential adverse effects on ambient air quality. A total of 1.1 miles of Maintenance Level 1 roads would be reopened, and could result in minor increase in risk of fugitive dust.

Amendments to the Forest Plan: There are no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 7 potentially improves air quality by reducing the amount of acreage open to motorized vehicle use on native surfaces from 754,066 acres to less than 100. It also reduces the total number of native surface roads and trails available for motorized use from 5,293.8 to 3,636.7 miles.

Naturally Occurring Asbestos

Motorized vehicle users on native surface roads and trails with Naturally Occurring Asbestos (NOA) may have increased potential risks for adverse effects to their health. Asbestos is classified as a known human carcinogen by state, federal, and international agencies. Table 3.01-5 displays the area available for motor vehicle use on lands “most likely” to contain naturally occurring asbestos by alternative. Each of these routes was tested under the "Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California" and; 1) it was determined there was no significant risks of human exposure to airborne asbestos or 2) the route will be encapsulated to assure there are no significant risks of human exposure to airborne asbestos prior to the route being opened to public motorized use see Appendix A (Site Specific Road, Trail and Open Area Information).

Table 3.01-5. Native Surface Roads, Trails and Areas Open to Motorized Vehicles on Lands "Most Likely" to Contain Naturally Occurring Asbestos

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross country travel : Unauthorized routes and closed NFTS roads still receiving some motorized use (miles) (acres)		53.6 1,660	0 0	0 0	0 0	0 0	0 0	0 0
2. Additions to the NFTS	**a. Roads added to the NFTS**	0.0	0.1	0.0	0.0	0.1	0.1	0.0
	b. Motorized Trails added to the NFTS	0	3.9	0.0	2.9	4.1	3.3	3.5
3. Establishment of Motorized "Open Areas" (acres)		0	0	0	0	0	0	0
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	No Effect						
	b. Change in Class of Vehicles resulting from changes in maintenance levels							
	c. Change in Season of Use							
	d. Reopening Maintenance Level 1 Roads	0	0.0	0.0	0.0	1.2	0.3	0.0
5. Amendments to the Forest Plan		No Effect						
	Total Miles* Total Acres	**121.0 1,660**	**76.1 0**	**67.4 0**	**70.3 0**	**77.5 0**	**73.0 0**	**70.9 0**

*Includes State, County and private roads. Alternative 1 includes unauthorized routes and closed NFTS roads still receiving some motorized use.

Alternative 1 poses the greatest potential risk of human exposure to airborne asbestos due to the continuation of country travel on 1,660 acres that are "Most Likely" to contain naturally occurring asbestos. This includes 53.6 miles of unauthorized routes and closed NFTS roads still receiving some motorized use. All of the action alternatives reduce the potential human exposure to asbestos by prohibiting cross country travel and use of those unauthorized routes not being added to the NFTS.

Alternative 1

Cross Country Travel: Cross country travel would not be prohibited in Alternative 1. Predicting where cross country motorized vehicle use would occur is not possible. It is likely that this cross country travel would include travel on lands "Most Likely" to contain naturally occurring asbestos. Cross country travel also results in the continued unauthorized use of approximately 53.6 miles of native surface routes "Most Likely" to contain naturally occurring asbestos. This use would contribute to an increased risk of human exposure to naturally occurring asbestos.

Additions to the NFTS: There are no additions to the NFTS in Alternative 1. Since there are no additions, there would be no increased risks to asbestos exposure from this element.

Establishment of Motorized "Open Areas": This alternative would not establish any new motorized "Open Areas."

Changes to the NFTS: There are no proposed changes to the NFTS in this alternative.

Amendments to the Forest Plan: There are no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 1 poses the greatest potential risk of human exposure to airborne asbestos due to the continuation of cross country travel on 1,660 acres that are "Most Likely" to contain naturally occurring asbestos. This includes 53.6 miles of unauthorized routes and closed NFTS roads still receiving some motorized use.

Alternative 2

Cross Country Travel: Cross country travel would be prohibited in Alternative 2. This would stop the proliferation of new unauthorized routes in areas "Most Likely" to contain naturally occurring asbestos. The cross country travel ban also results in reducing the use of all unauthorized routes not added to the NFTS located on these lands. These changes would reduce the risk of human exposure to airborne asbestos.

Additions to the NFTS: Alternative 2 would add an additional 4 miles of native surface roads and trails to the NFTS on land "Most Likely" to contain naturally occurring asbestos. These routes have mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) to assure there are no significant risks to human health prior to being opened to public motorized use.

Establishment of Motorized "Open Areas": This alternative would not establish any new motorized "Open Areas" on lands most likely to contain naturally occurring asbestos.

Changes to the NFTS: Changing the class of vehicles or season of use on existing NFTS roads and motorized trails would have no effect on risks to human health associated with exposure to airborne asbestos. Alternative 2 would not reopen any Maintenance Level 1 roads on lands "Most Likely" to contain naturally occurring asbestos.

Amendments to the Forest Plan: The Forest Plan Amendment would have no impact on the potential risk of human exposure to airborne asbestos.

Cumulative Effects: Alternative 2 reduces the risk of human exposure to airborne asbestos by prohibiting cross country travel on 1,660 acres and reducing the total amount of native surface roads and trails available for motorized vehicles from 121.0 to 76.1 miles on lands "Most Likely" to contain naturally occurring asbestos.

Alternative 3

Cross Country Travel: Cross country travel would be prohibited in Alternative 3. This would stop the proliferation of new unauthorized routes on areas "Most Likely" to contain naturally occurring asbestos. The cross country travel ban also results in reducing use of all unauthorized routes not added to the NFTS located on these lands. These changes would reduce the risk of human exposure to airborne asbestos.

Additions to the NFTS: Alternative 3 would not add additional miles of native surface trails to the NFTS on land "Most Likely" to contain naturally occurring asbestos. Implementation of Alternative 3 would not increase the potential risk of human exposure to asbestos.

Establishment of Motorized "Open Areas": This alternative would not establish any new motorized "Open Areas."

Changes to the NFTS: There are no proposed changes to the NFTS in this alternative.

Amendments to the Forest Plan: There are no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 3 reduces the risk of human exposure to airborne asbestos by prohibiting cross country travel on 1,660 acres and reducing the total amount of native surface roads and trails available for motorized vehicles from 121.0 to 67.4 miles on lands "Most Likely" to contain naturally occurring asbestos.

Alternative 4

Cross Country Travel: Cross country travel would be prohibited in Alternative 4. This would stop the proliferation of new unauthorized routes on areas "Most Likely" to contain naturally occurring asbestos. The cross country travel ban also results in reducing use of all unauthorized routes not added to the NFTS located on these lands. These changes would reduce the risk of human exposure to airborne asbestos.

Additions to the NFTS: Alternative 4 would add an additional 2.9 miles of native surface roads and trails to the NFTS on land "Most Likely" to contain naturally occurring asbestos. These routes have mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) to assure there are no significant risks to human health prior to being opened to public motorized use.

Establishment of Motorized "Open Areas": This alternative would not establish any new motorized "Open Areas."

Changes to the NFTS: Changing the class of vehicles or season of use on existing NFTS roads would have no effect on risks to human health associated with exposure to airborne asbestos. Alternative 4 would not reopen any Maintenance Level 1 roads on lands "Most Likely" to contain naturally occurring asbestos.

Amendments to the Forest Plan: There are no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 4 reduces the risk of human exposure to airborne asbestos by prohibiting cross country travel on 1,660 acres and reducing the total amount of native surface roads and trails available for motorized vehicles from 121.0 to 70.3 miles on lands "Most Likely" to contain naturally occurring asbestos.

Alternative 5

Cross Country Travel: Cross country travel would be prohibited in Alternative 5. This would stop the proliferation of new unauthorized routes on areas "Most Likely" to contain naturally occurring asbestos. The cross country travel ban also results in reducing use of all unauthorized routes not added to the NFTS located on these lands. These changes would reduce the risk of human exposure to airborne asbestos.

Additions to the NFTS: Alternative 5 would add an additional 4.2 miles of native surface roads and trails to the NFTS on land "Most Likely" to contain naturally occurring asbestos. These routes have mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) to assure there are no significant risks to human health prior to being opened to public motorized use.

Establishment of Motorized "Open Areas": This alternative would not establish any new motorized "Open Areas."

Changes to the NFTS: Changing the class of vehicles or season of use on existing NFTS roads would have no effect on risks to human health associated with exposure to airborne asbestos. Alternative 5 would reopen 1.2 miles Maintenance Level 1 roads on lands "Most Likely" to contain naturally occurring asbestos. These routes have mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) to assure there are no significant risks to human health prior to being opened to public motorized use.

Amendments to the Forest Plan: The Forest Plan Amendment would have no impact on the potential risk of human exposure to airborne asbestos.

Cumulative Effects: Alternative 5 reduces the risk of human exposure to airborne asbestos by prohibiting cross country travel on 1,660 acres and reducing the total amount of native surface roads and trails available for motorized vehicles from 121.0 to 77.5 miles on lands "Most Likely" to contain naturally occurring asbestos.

Alternative 6

Cross Country Travel: Cross country travel would be prohibited in Alternative 6. This would stop the proliferation of new unauthorized routes on areas "Most Likely" to contain naturally occurring asbestos. The cross country travel ban also results in reducing use of all unauthorized routes not added to the NFTS located on these lands. These changes would reduce the risk of human exposure to airborne asbestos.

Additions to the NFTS: Alternative 6 would add an additional 3.4 miles of native surface roads and trails to the NFTS on land "Most Likely" to contain naturally occurring asbestos. These routes have mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) to assure there are no significant risks to human health prior to being opened to public motorized use.

Establishment of Motorized "Open Areas": This alternative would not establish any new motorized "Open Areas" on lands "Most Likely" to contain naturally occurring asbestos.

Changes to the NFTS: Changing the class of vehicles or season of use on existing NFTS roads would have no effect on risks to human health associated with exposure to airborne asbestos. Alternative 6 would reopen .3 miles Maintenance Level 1 roads on lands "Most Likely" to contain naturally occurring asbestos. These routes have mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) to assure there are no significant risks to human health prior to being opened to public motorized use.

Amendments to the Forest Plan: The Forest Plan Amendment would have no impact on the potential risk of human exposure to airborne asbestos.

Cumulative Effects: Alternative 6 reduces the risk of human exposure to airborne asbestos by prohibiting cross country travel on 1,660 acres and reducing the total amount of native surface roads and trails available for motorized vehicles from 121.0 to 73.0 miles on lands "Most Likely" to contain naturally occurring asbestos.

Alternative 7

Cross Country Travel: Cross country travel would be prohibited in Alternative 7. This would stop the proliferation of new unauthorized routes on areas "Most Likely" to contain naturally occurring asbestos. The cross country travel ban also results in reducing use of all unauthorized routes not added to the NFTS located on these lands. These changes would reduce the risk of human exposure to airborne asbestos.

Additions to the NFTS: Alternative 7 would add an additional 3.5 miles of native surface roads and trails to the NFTS on land "Most Likely" to contain naturally occurring asbestos. These routes have mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) to assure there are no significant risks to human health prior to being opened to public motorized use.

Establishment of Motorized "Open Areas": This alternative would not establish any new motorized "Open Areas."

Changes to the NFTS: Changing the class of vehicles or season of use on existing NFTS roads would have no effect on risks to human health associated with exposure to airborne asbestos. Alternative 7 would not reopen any Maintenance Level 1 roads on lands "Most Likely" to contain naturally occurring asbestos.

Amendments to the Forest Plan: There are no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 7 reduces the risk of human exposure to airborne asbestos by prohibiting cross country travel on 1,660 acres and reducing the total amount of native surface roads and trails available for motorized vehicles from 121.0 to 70.9 miles on lands "Most Likely" to contain naturally occurring asbestos.

Summary of Effects Analysis across All Alternatives

The following table 3.01-6 summarizes the effects analysis for air quality by ranking each alternative regarding how well it provides for each of the indicators. The following rankings were used: A score of 7 indicates the alternative has the least impact for air quality related to the indicator. A score of 1 indicates the alternative has the greatest adverse impact for air quality. This information is to be used to fill out the alternatives summary at the end of Chapter 2 of the EIS.

Table 3.01-6. Comparison of Effects to Air Quality

Indicator	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Amount of Native Surface Roads, Trails and Areas Open to Motorized Vehicles	1	3	7	6	2	4	5
Native Surface Roads, Trails and Areas Open to Motorized Vehicles on Lands "Most Likely" to Contain Naturally Occurring Asbestos	1	3	7	6	2	4	5
Average	**1**	**3**	**7**	**6**	**2**	**4**	**5**

Chapter 3.02

Watershed Resources: Geology, Soil, Hydrology

3.02. Watershed Resources: Geology, Soil, Hydrology

Introduction

This section discusses the physical aspects of watershed resources: geology, soil, and hydrology. The biological and botanical aspects of watershed resources are discussed in Section 3.03 (Terrestrial and Aquatic Species) and 3.06 (Plant Communities). Several attributes of watershed resources can be impacted by management activities: soil hydrologic function and erosion rates and the amount and rate of sedimentation, stream flow (quantity, timing, and quality), and flooding; (Kattelmann and Dozier 1991). However, the relative importance of the alterations and the ability of natural and human communities to adapt to or recover from alterations in hydrologic processes in the Sierra Nevada are highly dependent upon the degree, extent, and location of change and the sensitivity of the watershed.

Forest management activities, including development of geologic resources, can result in ecosystem damage when the activity's location, construction, or implementation is not based on an understanding of geologic conditions and geomorphic processes. The protection of soil and water quantity and quality are important parts of the mission of the Forest Service (Forest Service Strategic Plan for 2007 to 2012, July 2007). Management activities on National Forest System lands must be planned and implemented to protect the health of forest soils and watersheds, including the productivity and hydrologic functions of soils and the volume, timing, and quality of streamflow. The use of roads, trails, and "Open Areas" on National Forests for the operation of motor vehicles has the potential to affect these hydrologic functions through the compaction of soils; interception of runoff; and detachment, transport, and deposition of sediment (e.g., Foltz, 2006). Management decisions to prohibit cross country travel, add new motorized trails to the National Forest Transportation System (NFTS), establish "Open Areas, and/or make changes to the existing vehicle class and season of use on the National Forest Transportation System (NFTS) must consider effects on soil and watershed functions. Information in this analysis has been summarized at a variety of scales, including: forest level, river basin, the Hydrologic Unit Code 6 (HUC6) scale (watershed approximately 10,000 to 40,000 acres in size), the Hydrologic Unit Code 7 (HUC 7) scale (watersheds approximately 2,500 to 10,000 acres in size), and site specifically by individual route. The HUC7 watershed is the scale usually used for cumulative watershed effects for projects on the TNF.

Land Ownership Patterns

Land ownership patterns can influence watershed effects analysis. Some HUC7 watersheds within the boundaries of the Tahoe National Forest are managed primarily by the Forest Service, some are mixed National Forest System lands and private ownership, and others are primarily under private ownership. It is difficult to show the direct and indirect effects of this proposal in watersheds with a high percentage of private ownership. For example, the Donner Lake HUC7 watershed is 74 percent privately owned. There are 369 native surface, motorized stream crossings in this watershed. Of these 369 crossings, only 36 are under Forest Service jurisdiction. Given that the Forest Service only owns ten percent of the crossings, any changes in this watershed associated with proposals in this document would be masked by the impacts associated with those on private land. However, this document analyzes the cumulative effects of activities on all lands regardless of ownership.

Most National Forest System (NFS) lands have roads and motorized trails that are not under Forest Service control (federal, state and county routes). For example, Figure 3.02-1 shows road and trail density by HUC7 watershed for the No Action Alternative and two of the action alternatives. In each alternative the first set of bars is total motorized road and trail density all ownerships and the second set is National Forest Transportation System (NFTS) motorized road and trail density. In every case the percent of HUC7 watersheds with road and trail density less than 2.5 miles per square mile is highest when looking only at NFTS motorized road and trail density. NFTS motorized road and trail density in excess of 5.5 miles per square mile occurs only in Alternative 1. All action alternatives would decrease the density of motorized roads and trails on NFS lands below 5.5 miles per square mile at the HUC7 watershed scale.

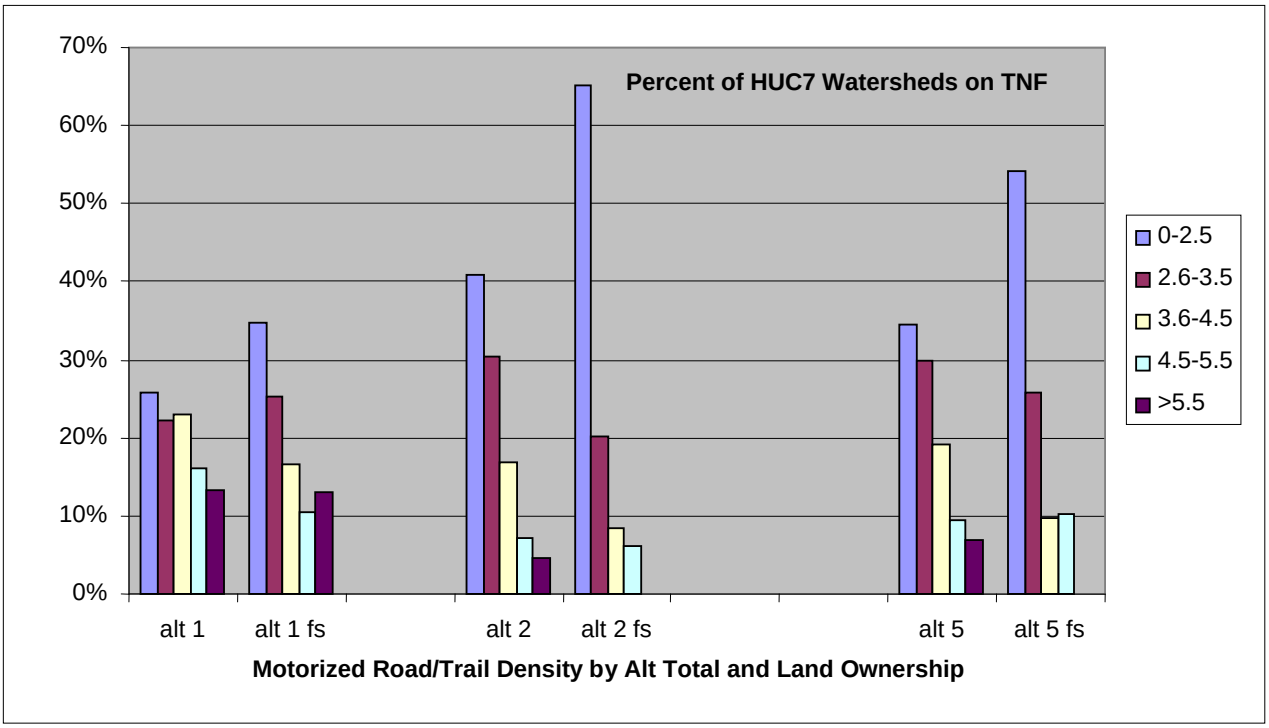

Figure 3.02-1. Total Route Density and Forest Service Route Density for Alternatives 1, 2 and 5

Geology

Introduction: Geological resources affect all aspects of National Forest System lands. Geological resources include cave resources, paleontological resources, geological special interest areas, and ground water resources. Geological hazards can impact public safety on NFS lands. Hazards can include mine shafts, rock falls, debris flows, slope stability issues, caves and public health concerns. Geology determines watershed morphology, soils types, and other essential ecosystem functions. Ground water is a valuable resource that may be affected by this project. Mining related hazards are a concern for public safety as the National Forests could have potentially dangerous abandoned mine shafts and hazardous products in the areas of the proposed action.

Regulatory Framework

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

FSM-2880.11 - Statutory Authority

- **Organic Administrative Act of June 4, 1897, as Amended (30 Stat. 34, as Supplemented and Amended; 16 U.S.C. 473-478, 482-482(a), 551. (FSM 2501.1.)** This act authorizes the Secretary of Agriculture to issue rules and regulations for the occupancy and use of the National Forests. This is the basic authority for issuing special use permits for the collection of vertebrate paleontological resources for scientific and educational purposes on National Forest System lands.
- **Preservation of American Antiquities Act of June 8, 1906 (34 Stat. 225; 16 U.S.C. 431 et seq.). (FSM 2361.01.)** This act authorizes permits for archeological and paleontological exploration involving excavation, removal, and storage of objects of antiquity or permits necessary for investigative work requiring site disturbance or sampling which results in the collection of such objects.
- **Federal Aid Highway Act (72 Stat. 913; 23 U.S.C. 305)**. This section of the United States Code allows federal funding for mitigation of archeological and paleontological resources recovered pursuant to Federal aid highway projects.
- **Multiple Use - Sustained Yield Act of June 12, 1960 (MUSY) (74 Stat. 215; 16 U.S.C. 528-531). (FSM 2501.1.)** This act requires due consideration for the relative values of all resources and implies that the administration of nonrenewable resources must be considered.
- **Watershed Protection and Flood Prevention Act of August 4, 1954, as Amended (68 Stat. 666; 16 U.S.C. 1001). (FSM 2501.1.)** This act authorizes the Secretary of Agriculture to share costs with other agencies in recreational development, ground-water recharge, and water-quality management, as well as the conservation and proper use of land.
- **Federal Water Pollution Control Act of July 9, 1956, as Amended (33 U.S.C. 1151) (FSM 2501.1); Federal Water Pollution Control Act Amendments of 1972 (86 Stat. 816) (FSM 2501.1), and Clean Water Act of 1977 (91 Stat. 1566; 33 U.S.C. 1251). (FSM 2501.1, 7440.1.)** These acts are intended to enhance the quality and value of the water resource and to establish a national policy for the prevention, control, and abatement of water pollution. Ground water information, including that concerning recharge and discharge areas, and information on geologic conditions that affect ground water quality are needed to carry out purposes of these acts.
- **Wilderness Act of September 3, 1964 (78 Stat. 890; 16 U.S.C. 1131-1136). (FSM 2501.1.)** This act describes a wilderness as an area which may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. These geological features are generally identified for wilderness classification purposes.
- **National Forest Roads and Trails Systems Act of October 13, 1964 (78 Stat. 1089; 16 U.S.C. 532-538). (FSM 7701.1.)** This act provides for the construction and maintenance of an adequate system of roads and trails to meet the demands for timber, recreation, and other uses. It further provides that protection, development, and management of lands will be under the principles of

multiple use and sustained yield of product and services (16 U.S.C. 532). Geologic conditions influence the final selection of route locations.

- **Wild and Scenic Rivers Act of October 2, 1968 (82 Stat. 906 as Amended; 16 U.S.C. 1271-1287)**. This act states that it is the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstanding scenic, recreation, geologic, fish and wildlife, cultural, or other similar values shall be preserved in free-flowing condition.
- **National Environmental Policy Act of January 1, 1970 (NEPA) (83 Stat. 852 as Amended; 42 U.S.C. 4321, 4331-4335, 4341-4347). (FSM 1950.2.)** This act directs all agencies of the Federal Government to utilize a systematic interdisciplinary approach which will ensure the integrated use of the natural and social sciences in planning and in decision making which may have an impact on man's environment. Geology is one of the applicable sciences.
- **Mining and Minerals Policy Act of December 31, 1970 (84 Stat. 1876; 30 U.S.C. 21a)**. This act provides for the study and development of methods for the disposal, control, and reclamation of mineral waste products and the reclamation of mined lands. This requires an evaluation of geology as it relates to ground water protection and geologic stability.
- **Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531-1536, 1538-1540)**. This act provides for the conservation of endangered and threatened species and their habitats.
- **Archeological and Historical Conservation Act of 1974 (AHCA) (88 Stat. 174; 16 U.S.C. 469). (FSM 2361.01.)** This act requires all Federal agencies to notify the Secretary of the Interior when a construction project threatens to irreparably harm or destroy significant scientific, prehistoric, historic, or archeological data. The paleontological resource may have significant scientific and historic value.
- **Disaster Relief Act of 1974 (88 Stat. 143; 42 U.S.C. 5121, 5132). Section 202(b) states that the President shall direct appropriate Federal agencies to ensure timely and effective disaster warnings for such hazards as earthquakes, volcanic eruptions, landslides, and mudslides.** The Federal Register, Vol. 42, No. 70 of April 12, 1977, "Warnings and Preparedness for Geologic Related Hazards," implies coordination with the U.S. Geological Survey in such warnings.
- **Forest and Rangeland Renewable Resources Planning Act of August 17, 1974 (RPA) (88 Stat. 476; 16 U.S.C. 1600-1614) as Amended by National Forest Management Act of October 22, 1976 (90 Stat. 2949; 16 U.S.C. 1609). (FSM 1920 and FSM 2550.)** This act requires consideration of the geologic environment through the identification of hazardous conditions and the prevention of irreversible damages. The Secretary of Agriculture is required, in the development and maintenance of land management plans, to use a systematic interdisciplinary approach to achieve integrated consideration of physical, biological, economic, and other sciences.
- **Resource Conservation and Recovery Act of 1976 (RCRA) (90 Stat. 2795; 42 U.S.C. 6901) as Amended by 92 Stat. 3081**. This act, commonly referred to as the Solid Waste Disposal Act,

requires protection of ground water quality and is integrated with the Safe Drinking Water Act of December 16, 1974, and Amendments of 1977 (42 U.S.C. 300(f)). (FSM 7420.1.)

- **Surface Mining Control and Reclamation Act of August 3, 1977 (SMCRA) (30 U.S.C. 1201, 1202, 1211, 1221-43, 1251-79, 1281, 1291, 1309, 1311-16, 1321-28).** This act enables agencies to take action to prevent water pollution from current mining activities, and also promote reclamation of mined areas left without adequate reclamation prior to this act.
- **Archaeological Resource Protection Act (ARPA) October 31, 1979 (93 Stat. 721; 16 U.S.C. 470 aa)**. This act protects archeological resources, and prohibits the removal, sale, receipt, and interstate transport of archeological resources obtained illegally from public lands. Archeological resources include paleontological resources in context with archeological resources. Also, this act authorizes the Secretary of Agriculture to issue permits for archeological research, investigations, studies, and excavations.
- **Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA) (94 Stat. 2767; 42 U.S.C. 9601, et seq)**. This act provides authority to the Environmental Protection Agency and to other federal agencies, including the United States Department of Agriculture, to respond to release of hazardous substances, pollutants, and constituents. It also provides for joint and several liability to potentially responsible parties (PRPs) for cleanup costs of existing water contamination. See also FSM 2160.
- **Federal Cave Resources Protection Act of 1988 (102 Stat. 4546; 16 U.S.C. 4301 et seq)**. This act provides that Federal lands be managed to protect and maintain, to the extent practical, significant caves.

FSM-2880.12 - Executive Orders

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

- **Executive Order 11593, Protection and Enhancement of Cultural Environment, May 13, 1971 (3 CFR 559, 1971-75 Compilation)**. This Executive Order directs agencies to preserve, restore, and maintain the historic and cultural environment of the Nation.
- **Executive Order 12113, Independent Water Project Review, January 5, 1979.** This Executive Order requires an independent water project review by the Water Resources Council on preauthorization reports and preconstruction plans for Federal and federally assisted water and related land resource plans. The technical review will evaluate each plan for compliance with the Council's principles and standards, agency procedures, other Federal laws, and goals for public involvement.

Affected Environment: Geology

Physiography, Relief and Drainage

The Tahoe National Forest (TNF) is located in the central Sierra Nevada. It is roughly divided into three physiographic areas by a glacially sculpted crest zone that trends north-south. The western third of the

survey area is dominated by deeply incised canyons separated by long, narrow, gently sloping ridges. The eastern third is characterized by low foothills and broad valleys.

The ascent from the Central Valley through the western third of the Forest toward the crest is gentle; with the average slope through a west-to-east transect about 3 to 5 percent. The underlying rock formations generally trend northwest by southeast. Drainages are generally toward the southwest, with main stream channels cut through and across geologic formations. The headwaters of major drainages start in the glaciated crest zone, and descend through gently sloping volcanic and granitic bedrock to deeply entrenched V-shaped canyons along the western edge of the area, where metamorphic rocks are exposed. Typically, the land surfaces of the folded and faulted metamorphic rocks are steep and angular, the land surfaces of granitic rocks rounded, smooth, and often have a basin-like appearance, and the land surfaces of volcanic rocks are flat and relatively smooth, reflecting their origin.

The primary potential impacts to geologic resources resulting from the Travel Management Project are associated with cave management, geological special interest areas, paleontological resources, ground water management, and areas with a risk of mass movement (primarily debris slides).

Cave Resources, Geologic Special Interest Areas, and Paleontological Resources

The term “cave” means any naturally occurring void, cavity, recess, or system of interconnected passages which occurs beneath the surface of the earth or within a cliff or ledge (including any cave resource therein, but not including any vug, mine, tunnel, aqueduct, or other manmade excavation) and which is large enough to permit an individual to enter, whether or not the entrance is naturally formed or manmade. Such term shall include any natural pit, sinkhole, or other feature which is an extension of the entrance. There are two known caves on the TNF.

There are two Geologic Special Interest Areas on the TNF: Devil’s Postpile Geologic Area (69 acres, postpile geologic feature) and Glacier Meadow Geologic Area (84 acres, glacial geologic features).

There are six known Paleontological sites currently identified on the TNF. These sites are listed below in Table 3.02-1.

Table 3.02-1. Paleontological sites currently identified on the Tahoe National Forest

Site	Description	Potential Impacts
1	Fossilized mastodon remains	One unauthorized route
2	Petrified Wood	One existing NFTS road
3	Petrified Wood	One existing NFTS Motorized Trail
4	Petrified Wood	One unauthorized route
5	Paleo Botanical Fossils	One unauthorized route and one existing NFTS road
6	Paleo Botanical Fossils	One unauthorized route

Groundwater Resources

Groundwater is water located beneath the ground surface in soil pore spaces and in the fractures of rock formations. Groundwater is recharged from, and eventually flows to, the surface naturally. Discharge of groundwater often occurs at springs and seeps and can form wetlands. Roads and motorized trails near

springs and seeps can intercept flow and channel water movement and/or can pollute groundwater resources. There are three unauthorized routes and three closed NFTS routes that have the potential to impact groundwater resources. These are shown below in Table 3.02-2.

Table 3.02-2. Ground Water Resources Potentially Impacted By Unauthorized or Closed NFTS Routes

Route ID	Ground Water Resource
ARM-13	Spring
H45-2	Spring
SV-005	Seep
TKN-J5	Seep/Spring
YRS-066	Spring
YRS-SF4	Seep/Spring

Debris Slides

Road and motorized trail networks in mountainous forest landscapes have the potential to increase the susceptibility to shallow landsliding by altering subsurface flow paths. The most common type of landslide feature found on the TNF is debris slides. Debris slides are a type of soil movement that usually occurs on steep slopes with shallow soils over bedrock. Roads and motorized trails that cross debris slides can increase debris slide activity, increasing sediment delivery to channels. The risk of debris slides is covered in the erosion model presented in the Soils Section.

Abandoned Mine Lands

Some abandoned mine land (AML) sites can be a concern for public safety (e.g., mine shafts, hazardous substances, etc). There are 74 AML sites currently identified on the TNF that are within 100 feet of roads or motorized trails. Thirty-eight sites are along existing National Forest Transportation System (NFTS) roads or NFTS motorized trails. The other 36 of these AML sites are along unauthorized or closed NFTS routes.

Environmental Consequences: Geology

Cave Resources, Geologic Special Interest Areas, and Paleontological Resources

Neither of the two known caves on the TNF is within ¼ mile of a road or motorized trail and therefore would not be affected by any of the alternatives.

No changes in management of the Geologic Special Interest Areas (GSIA) would occur under implementation of any of the alternatives. Motorized vehicle use within these GSIAs is either excluded or discouraged. Therefore, native geologic features within these GSIAs would not be impacted by motorized vehicle activity. There are no environmental consequences associated with GSIAs in any of the alternatives.

Paleontological resources on the TNF include plant and animal fossils and petrified wood. There are six known Paleontological sites currently identified on the TNF. All six of the sites could be impacted by motorized use in Alternative 1 (no action). All of the action alternatives reduce the number of sites

potentially impacted by motorized use. The number of sites potentially impacted by motorized use in each alternative is shown in Table 3.02-3.

Table 3.02-3. Paleontological resources on the TNF potentially impacted by motorized vehicles by alternative

Site	Description	Potential Impacts	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1	Fossilized mastodon remains	Motorized trail added to NFTS	X				X		
2	Petrified Wood	One existing NFTS road	X	X	X	X	X	X	X
3	Petrified Wood	One existing NFTS Motorized Trail	X	X	X	X	X	X	X
4	Petrified Wood	Motorized trail added to NFTS	X	X			X	X	X
5	Paleo Botanical Fossils	Motorized trail added to NFTS One existing NFTS road	X	X	X	X	X	X	X
6	Paleo Botanical Fossils	One motorized trail un-authorized for motorized use	X						
		Total Number	**6**	**4**	**3**	**3**	**5**	**4**	**4**

Groundwater Resources

The potential effects of routes on aquatic species are covered in Section 3.03 (Terrestrial and Aquatic Species). The potential effects of groundwater on erosion rates are covered in the Soil Resource section and in the Appendix A (Site Specific Road, Trail and Open Area Information). Given the scale of this project, there would be little measurable effect of this project to water quality of groundwater resources. All additions to the NFTS which could impact groundwater resources have mitigation measures specified in Appendix A to reduce or eliminate any potential adverse effects. These mitigation measures for ground water resources are summarized by alternative in Table 3.02-4.

Table 3.02-4. Mitigation measures to protect groundwater resources by alternative

Route ID	Ground Water Resource	Mitigation Measure Required	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
ARM-13	Spring	None, no impact to spring							
H45-2	Spring	Place barriers					X		
SV-005	Seep	None, no impact to seep							
TKN-J5	Seep/Spring	Redirect water flow		X			X	X	X
YRS-066	Spring	Install drainage structures		X			X	X	
YRS-SF4	Seep/Spring	Install waterbars to control road drainage					X	X	
		Total Number of Mitigations	**0**	**2**	**0**	**0**	**4**	**3**	**1**

Abandoned Mine Lands (AML)

To assess the potential health and safety risks from abandoned mine lands effects, the alternatives are compared by the number of known, mapped AML sites within 100 feet of roads and motorized trails. There are currently 74 AML sites within 100 feet of existing NFTS and unauthorized motorized routes.

Those alternatives with the greatest number of AML sites within 100 feet of roads and motorized trails are expected to have the highest risk to public safety. There is no way of knowing how many people using the roads and motorized trails may be accessing the mine sites. Table 3.02-5 shows the number of AML sites which could have potential public safety concerns related to motorized public access. The No Action Alternative (Alternative 1) would have the highest risk to public safety. Alternative 3 would have the lowest risk to public safety because it does not add any unauthorized routes to the NFTS and it therefore has the lowest number of AML sites. All other action alternatives would add between two and four unauthorized routes to the NFTS near AML sites. Mitigation measures to assure public safety is included in Appendix A (Site Specific Road, Trail and Open Area Information) for these sites. Mitigation measures typically are to seal off any hazardous openings such as mine adits.

Table 3.02-5. Number of Abandoned Mine Land (AML) Sites within 100 Feet of NFTS Roads and Motorized Trails by Alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of AML Sites within 100 feet	74	42	38	40	42	41	41

Prohibition of Cross Country Travel: All of the action alternatives prohibit cross country travel. This prohibition would reduce the public risk caused by the presence of AML features across the forest. It would also prevent the proliferation of any new motorized trails unauthorized for motorized use which could increase the public safety risk. Prohibition of cross country travel would decrease the number AML sites within 100 feet of roads and motorized trails by 38 sites. The changes in the number of AML sites within 100 feet of roads and motorized trails resulting from the prohibition of cross country travel are displayed in Table 3.02-6.

Table 3.02-6. Changes in the number AML sites within 100 feet of motorized vehicle access due to the prohibition of cross country travel

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Changes in number of AML Sites within 100 ft.	0	-36	-36	-36	-36	-36	-36

Additions to the National Forest Transportation System (NFTS): There are no additions to the NFTS under Alternative 1. Adding motorized trails to the NFTS within 100 feet of abandoned mine land (AML) sites would have minimal new effects to public safety. Appendix A (Site Specific Road, Trail and Open Area Information), has mitigations needed to add the routes to the NFTS with minimal impacts to user safety. The changes in AML sites within 100 feet resulting from the additions to the NFTS are displayed in Table 3.02-7.

Table 3.02-7. Changes in AML sites within 100 feet of roads and motorized trails due to additions to the NFTS

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of AML Sites within 100’	0	+4	0	+2	+4	+3	+3

Establishing motorized "Open Areas": There are no "Open Areas" being established within 100 feet of AML sites in any of the action alternatives.

Changes to NFTS: Changing the class of vehicle allowed to use a particular NFTS road or motorized trail or the season of use does not change the impacts to and from AML sites. There are no Maintenance Level 1 roads being reopened within 100 feet of AML sites in any of the action alternatives.

Cumulative Effects: All action alternatives would result in a decrease in public health and safety risks associated with motorized access to abandoned mine land sites. Alternative 3 would decrease the number of AML sites within 100 feet of roads and motorized trails by 36 sites. The rest of the action alternatives would decrease the number of AML sites adjacent to roads and motorized trails by 32 to 34 sites. The cumulative effects to public health and safety from AMLs are the same as displayed in Table 3.02-5.

Soil Resources

Introduction

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

The primary concern or effect of this project on the soil resource is the potential for soil erosion and subsequent effects on soil productivity or the ability of the soil to produce vegetation. Secondary effects from erosion are a reduction in the soil hydrologic function (e.g., the loss of soil depth, infiltration capacity and permeability).

The erosion that may occur from the trail or road surface is a concern regarding loss or degradation of the facility, but not a particular concern for the soil resource, because the travel-way surface is a dedicated use and no longer dedicated to growing vegetation. The effects analysis for the soil resource will focus on the risk of soil erosion from trail/road runoff water to the soil adjacent to or down slope from the route. Erosion and sediment generated by the trail or road surface may be a concern to water quality if there is the potential for its delivery to a drainage feature. (Refer to the Hydrology section).

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

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

- **National Forest Management Act of 1976**. Renewable Resource Program. "(C) recognize the fundamental need to protect and where appropriate, improve the quality of soil, water, and air resources."
- **National Soil Management Handbook**. The Soil Management Handbook (USDA 1991) is a national soils handbook that defines soil productivity and components of soil productivity,

establishes guidance for measuring soil productivity, and establishes thresholds to assist in forest planning.

Management activities cause varying degrees of soil disturbances, which may or may not cause a significant change in productivity. Soil quality standards (threshold values where soil disturbances become detrimental, that is, result in significant change) are intended for areas where management prescriptions are being applied, such as timber harvest areas and range allotments. They are not intended to apply to administrative sites or other areas with dedicated uses.

- **Region 5 Soil Management Handbook Supplement**. The Forest Service Region 5 Soil Management Handbook Supplement establishes regional soil quality analysis standards (SQS, USDA 1995). The Region 5 soil quality 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 apply only to those 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, both licensed or non-licensed.
- **Regional Forester's Letter** (dated Feb 5, 2007). This letter provided clarification to Forest Supervisors on the appropriate use of the R5 Soil Management Handbook Supplement (R5 FSH Supplement 2509.18-95-1). It states in part:
  - Analysis or evaluation of soil condition is the intended use of the thresholds and indicators in R5 FSH 2509.18-95-1. They are not a set of mandatory standards or requirements. They should not be referred to as binding or mandatory requirements in NEPA documents. Standards and guidelines in Forest Land and Resource Management Plans provide the relevant substantive standard to comply with NFMA.
  - The thresholds and indicators represent desired conditions for the soil resource. Utilization of the thresholds and indicators provides a consistent method to analyze, describe, and report on soil condition throughout the Region.
- **Tahoe National Forest Land and Resources Management Plan** (LRMP) direction for soil and water resources includes the following:
  - Standards and Guidelines for Riparian Conservation Areas and Critical Aquatic Refuges (TNF LRMP as amended by the SNFPA ROD (2004), pp. 62 - 65). *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.*
  - Consistent with the first standard and guideline above, a Riparian Conservation Objective (RCO) analysis has been completed for this project. (Refer to Appendix I "Riparian

Conservation Objectives.") Appendix I describes how the project is consistent with the RCOs and the applicable standards and guidelines (listed above).

- Water Quality Protection (TNF LRMP, pg. V-35). *Use Best Management Practices (BMPs) to meet water quality objectives and maintain and improve the quality of surface water on the Forest.*
- Best Management Practices (BMPs) are implemented as mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) for any motorized trail to be added to the National Forest Transportation System or any lands to be established as "Open Areas." These mitigation measures would meet water quality objectives and maintain and improve the quality of surface water on the Forest.
- Soil Restoration (TNF LRMP, pg. V-35). *During project planning, identify areas of soil damage and abandoned roads in need of rehabilitation. Include these areas in project plans for restoration and improvement.*
- Areas of soil damage and abandoned roads in need of rehabilitation were identified in association with this project and documented in the project record. Project plans for restoration and improvement would be implemented through separate NEPA decisions as funding permits.
- Unstable Areas (TNF LRMP, pg. V-38). *Allow no land-disturbing activities on land classed as extremely unstable, unless a geotechnical investigation determines certain activities are appropriate.*
- Any motorized trail additions to the NFTS on extremely unstable lands requiring geotechnical investigation were excluded from consideration in all alternatives.

Effects Analysis Methodology

This is a site specific project, for which there is two levels of analysis. First, there is site-specific analysis of the individual routes proposed for addition to the NFTS. This detailed analysis is by route and is included in Appendix A (and the project record).

Second, there is the analysis of each alternative as a whole, which is informed by the site-specific route analysis noted above and other information. The discussion of the direct, indirect, and cumulative effects of each alternative is in a summary form. For ease of documentation and understanding, the effects of the alternatives are described separately for five 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 five discreet actions common to all action alternatives are: (1) Prohibition of cross country motor vehicle travel; (2) Additions to the NFTS; (3) Establishment of motorized "Open Areas"; (4) Changes to the existing NFTS (which includes: change in class of vehicles resulting from approval of mixed use, change in class of vehicle resulting from changes in maintenance levels, change in season of use, and reopening Maintenance Level 1 roads to motorized use); and (5) Amendments to the Forest Plan. This discussion is the focus of this Effects Analysis Methodology section.

The Effects Analysis Methodology section describes the methodology used for the effects analysis in Chapter 3, not the site-specific analysis of each route. It addresses impacts relevant to the soil resource, soil resource-specific assumptions, soil resource indicators to be measured, including justification as to why they were chosen, sources of information used to support the analysis, timeframes (short term and long term), and spatial boundary of the effects analysis.

The Effects Analysis Methodology focuses on the assumptions, methodology, and indicators for addressing the direct and indirect effects of each of the five actions and the cumulative effects of implementing the alternative as a whole. The conclusions of the analysis in the Environmental Consequences section present the direct and indirect effects of implementing the alternative as a whole addressing the effects of each of the five proposed actions. Then, the cumulative effects of implementing each alternative (the direct and indirect effects of this action in combination with the effects of past, present, and reasonably foreseeable future actions) are displayed.

Assumptions specific to the soil resources analysis

- Authorized travel routes are a dedicated use of the soil resource and are not a concern for productivity because the soil is no longer dedicated to growing vegetation. The soil dedicated to growing vegetation, which may be affected by runoff water drainage from authorized routes is the principle concern addressed here.
- Continued unauthorized cross country travel by motor vehicles will cause adverse effects to soil productivity from destruction of vegetative cover, soil compaction due to motorized use, alteration of drainage patterns, and increases in erosion risk to soil productivity.
- Erosion risk is influenced by soil type (inherent soil erosivity), topography, precipitation (amount and type), presence of geo-debris slide features, and the type, amount, and season of use which can cause rutting and a subsequent loss of water control.
- Erosion from motor vehicle use of native-surface routes is increased or often caused by wet season use and/or higher levels of traffic and is reduced by maintenance of road drainage features (waterbars, ditches). The erosion is caused by concentrated road water runoff.
- The unauthorized routes receive no maintenance and the lack of erosion and water control poses a high risk of impact to soil resources.
- User-created motorized trails were not constructed to NFTS standards. These trails are not maintained and are assumed to be higher risk routes in terms of erosion and water quality risks.
- This analysis assumes that around 75 percent of the hydrologic footprint of the unauthorized or closed NFTS routes closed to cross country travel would recover vegetative soil cover and have a reduced risk of erosion within 20 to 30 years. These assumptions are based on the personal observations and experiences of the watershed and vegetation management staff on the TNF.
- The spatial boundary for the effects analysis is the forest boundary. Within the forest boundary, erosion potential has been analyzed at multiple scales.

Data Sources

- Route-specific data collected in the field using the established protocol: OHV green-yellow-red inventories which are documented in Appendix A (Site Specific Road, Trail and Open Area Information).
- GIS analyses of erosion risk, route miles, etc.
- Recent Tahoe National Forest project NEPA documents.
- Air and ground photos, personal knowledge, and anecdotal information documenting the time required for passive restoration of routes closed to motor vehicle traffic (recovery time may vary based on precipitation, elevation, aspect, and other factors).

Soil Resources Indicators

- Acres open to cross country motor vehicle travel by soil erosion hazard rating.
- Miles of unauthorized routes open for motor vehicle travel by R-5 soil erosion hazard (R-5 EHR) rating.
- Miles of closed ML 1 roads receiving motorized use by R-5 EHR rating.
- Miles passively recovered due to vegetative recovery over long-term by soil erosion hazard rating
- Cumulative effects – loss of long-term soil productivity – Equivalent Roaded Areas from cumulative watershed effects analysis are used to track the transportation footprint and to assess the cumulative effects to long-term soil productivity. Cumulative effects on soil productivity include:
  - Cumulative effects from unauthorized use (No Action).
  - Cumulative effects in unauthorized areas that are expected to recover after a cross-country closure is implemented.
  - Cumulative effects in areas that are not expected to recover passively after a cross-country closure is implemented.
  - Cumulative effects from implementation of the particular travel system for each alternative.

Soil Resource Methodology by Action

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

Considerations: Cross country motor vehicle travel has led to the proliferation of compacted soils outside of the designated Tahoe NFTS. The major effects of cross country motor vehicle travel on soil resources include the loss of vegetative cover, increasing levels of soil compaction, soil displacement, surface soil loss, and loss of soil productivity. Prohibiting cross country motor vehicle travel would end motorized use on routes and areas beyond the authorized NFTS. In the short term, the unauthorized and closed NFTS routes and areas disturbed by motor-vehicle use would not change much because removal of vegetation, compaction of soils, and alteration of drainage patterns require time to heal without active restoration. Passive vegetative recovery of most previously disturbed areas is estimated to take place over a 20 to 30 year period. It is also assumed that around 75 percent of the routes would recover and have a

reduced risk of erosion within that 20 to 30 year period. These assumptions are based on the personal observations and experiences of the watershed staff of the TNF.

Cross country travel has resulted in approximately 869 miles of unauthorized routes and another 830 miles of closed NFTS routes that are still receiving some use on the TNF. As discussed below in the inventory results section, some routes are stable and others need maintenance/mitigation. Site specific erosion risks for these routes are displayed in Appendix A and Appendix L.

Short-term timeframe: 1 year.

Long-term timeframe: The period used for long-term effects analysis is 20 to 30 years. This is a reasonable timeframe to think about and predict the expected vegetative recovery (and reduction in erosion) for areas disturbed by unauthorized use.

Spatial boundary: Tahoe National Forest boundary.

Indicator(s): (1) Acres of prohibition of cross country travel by alternative; (2) Miles of unauthorized routes and R-5 EHR ratings on the TNF; (3) Miles of native surface roads and motorized trails open for motorized use in each of R-5 EHR ratings.

Methodology: GIS analyses of acres of FS lands open for cross country travel by alternative, miles of unauthorized routes, and R-5 EHR ratings.

Rationale: General guidelines in the National Soil Management Handbook and Region 5 Soil Management Handbook Supplement.

Direct Effects: Prohibiting cross country motor vehicle travel would end motorized traffic in areas beyond the NFTS. Generally for the existing unauthorized and closed NFTS routes and use areas, the direct effects to soil productivity have already occurred. The direct effects during construction of a NFTS facility or by unauthorized motor vehicle traffic were: loss of soil cover, physical displacement of soil; loss of soil depth; and loss in soil hydrologic function due to compaction.

Indirect Effects from unauthorized use: The indirect effects of the prohibition of cross county motorized vehicle travel would be gradual reductions in soil erosion and increases in soil productivity as recovery occurs and further disturbances decrease in the long-term. The net effect in the long-term would be vegetative recovery, a decrease in compaction and erosion, and a restoration of soil hydrologic function within unauthorized route treads. Recovery rates would be variable. Once closed to public use, the degree to which site productivity on unauthorized routes recover depends on current condition of the route, location on the landscape, location on the Forest and the effectiveness of enforcing the closure. Seldom used routes and some user created routes would likely recover within the cumulative effects analysis timeframe of 20 to 30 years. More long-standing routes or routes that experience moderate to high use would take longer to recover, with site productivity approaching natural range at the end of the cumulative effects analysis timeframe. Actively eroding routes would experience limited recovery (less erosion, higher productivity) in 20 to 30 years without active restoration.

2) Direct/indirect effects of additions to the NFTS

Considerations: The characteristics of roads and motorized trails are important in defining the affected environment for soil and for analyzing the effects of the proposed actions. Some roads and motorized

trails are a lower risk to soil resources than others. Lower-risk roads and motorized trails tend to be more stable and generally have less concentration of water runoff and surface soil loss and a lower potential for soil erosion adjacent to the route and sediment production and transport. Native surface motorized roads and trails generally have a higher risk of concentrating road runoff and surface erosion and increased erosion adjacent to the route than surfaced routes and are considered higher risk routes.

The effects of adding routes to the NFTS are focuses on presently unauthorized routes that would be added to the system routes. This is a change from unauthorized and unmaintained to NFTS status which included maintaining routes for resource protection.

Short-term timeframe: 1 year.

Long-term timeframe: The period used for long-term effects analysis is 20 to 30 years. This is a reasonable timeframe to think about and predict the expected vegetative recovery (and reduction in erosion) for areas disturbed by unauthorized use. This is also the same recovery period used for the Cumulative Watershed Effects analysis in this document.

Spatial boundary: Forest boundary.

Indicator(s): (1) Miles of unauthorized routes added to the NFTS by R-5 EHR rating; (2) Miles of native surface, roads and motorized trails by R-5 EHR rating.

Methodology: (1) erosion potential for the soils on the TNF was modeled using GIS, R-5 EHR rating, and the Ecosystem Management Decision Support model and analyzed at a range of watershed scales; (2) GIS analysis of existing unauthorized routes and the R-5 EHR rating.

Rationale: Analysis guidelines in the National Soil Management Handbook and Region 5 Soil Management Handbook Supplement.

Direct Effects: Additions to the system would have minimal effects to soil resources, because these motorized trails are already part of the existing disturbance footprint and would be managed according to TNF trail and resource standards. Generally for the existing unauthorized and closed NFTS routes, the direct effects to soil productivity have already occurred. The direct effects were: loss of soil cover, physical displacement of soil during construction of a NFTS facility or caused by unauthorized motor vehicle traffic; loss of soil productivity from the displacement and loss of soil depth; and loss in soil hydrologic function due to increased compaction and loss of soil.

Indirect Effects: The indirect effects of adding the proposed routes to the NFTS would be similar to current effects. The primary difference would be that as designated trails these routes would be managed according to TNF trail and resource standards which would decrease any current negative effects caused by those routes.

3) Direct/Indirect effects of establishing motorized “Open Areas”

Considerations: The proposed establishment of “Open Areas” are in areas not dedicated to growing vegetation and have been used by motor vehicles for years. The soil quality standards of long-term soil productivity do not apply to areas not dedicated to growing vegetation. The potential erosion effects of establishing “Open Areas” are covered in the Hydrology Section of this chapter. Proposed “Open Areas” will not be covered in the effects analysis for soils.

Rationale: Analysis guidelines in the National Soil Management Handbook and Region 5 Soil Management Handbook Supplement.

4) Direct/indirect effects of changes to the existing NFTS - this includes changing the vehicle class and/or season of use and reopening Maintenance Level 1 Roads

Considerations: Changing the class of vehicle allowed to use a particular NFTS road could change the impacts to soil and watershed resources due to the change in road surface. Therefore, these roads are considered to have an increased risk of erosion even though they already have "hardened" surfaces that lack vegetation. It is likely that direct impacts to soil and watershed resources occurred when the road was constructed and many of these routes are stable. Impacts may still be occurring if the road is collecting and concentrating overland flow of water and increasing erosion rates. These indirect and cumulative impacts would continue regardless of the type of vehicle using the route. When the maintenance level of a particular route changes (the maintenance level does not always change when class of vehicle changes), the risk of erosion can increase. However, all roads would be maintained to TNF standards for resource protection no matter what maintenance level.

Native surface roads and motorized trails are most susceptible to damage by motor vehicles when wet. The condition of native surface roads and motorized trailscan quickly decline during winter or wet weather use due to rutting. Wet season use of native surface roads and motorized trails often leaves ruts which channel water and increase the erosive power of that water, this can lead to increased erosion both on the trail and adjacent to the trail. Many of the impacts found during field surveys were caused by wet season use of routes.

Implementing seasonal closures in Alternatives 4, 5, and 6 would reduce rutting and subsequent channeling of surface water runoff. Seasonal closures would decrease the potential effects of motorized vehicle use on native surface roads and motorized trails by decreasing erosion and sedimentation.

Short-term timeframe: 1 year.

Long-term timeframe: The period used for long-term effects analysis is 20 to 30 years. This is a reasonable timeframe to think about and predict the expected vegetative recovery (and reduction in erosion) for areas disturbed by unauthorized use. This is also the same recovery period used for the Cumulative Watershed Effects analysis in this document.

Spatial boundary: Forest boundary.

Indicator(s): (1) Miles of unauthorized routes displayed by miles by R-5 EHR rating; (2) Miles of native surface roads and motorized trails open for motor vehicle use displayed by R-5 EHR rating; (3) miles of native surface roads and motorized trails subject to seasonal use restrictions.

Methodology: (1) erosion potential for the soils on the TNF was modeled using GIS, R-5 EHR rating, and the Ecosystem Management Decision Support model; (2) GIS analysis of existing unauthorized routes.

Rationale: Analysis guidelines in the National Soil Management Handbook and Region 5 Soil Management Handbook Supplement.

Direct Effects: The direct effects of changing class of vehicle would be small, because these are existing routes. The direct effects of changing the season of use in Alternatives 4, 5, and 6 would be to

decrease the mechanical erosion caused by motor vehicles during the part of the wet season when soils are most susceptible to damage. Reopening Maintenance Level 1 roads would increase compaction on the tread of the road.

Indirect Effects: The indirect effects of changing class of vehicle would include a rougher road surface which could increase the potential for channelized water movement along the route. The main indirect effects of changing the season of use would be a decrease in rutting, channelized water movement along the route, and decreased erosion potential during the seasonal closure. Maintenance Level 1 roads were previously engineered NFTS routes that were put into "storage" until needed for Forest management. 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 impacts to soil resources.

5) Forest Plan Amendment

Considerations: The Tahoe National Forest Land and Resource Management Plan (LRMP) would be amended to remove the November 1 to May 1 seasonal closure from the Sugar Pine area (Management Area 84 Humbug Sailor) on key winter deer range to improve motorized recreation opportunities. This would result in 10.5 miles of routes that is currently closed to motorized use during the wet season. This action would result in motorized vehicle use during the winter months when roads and trails are subject to damage due to wet season use. In some alternatives the deer winter range seasonal restrictions are replaced by wet weather seasonal restrictions. Alternatives 2, 5, and 6 would remove that closure and make the routes in the management area subject to wet season use; however, the wet weather seasonal closure proposed in Alternatives 5 and 6 would replace the current closure with one that is 2 months shorter.

Short-term timeframe: 1 year.

Long-term timeframe: The period used for long-term effects analysis is 20-30 years. This is a reasonable timeframe to think about and predict the expected vegetative recovery (and reduction in erosion) for areas disturbed by unauthorized use.

Spatial boundary: Management Area 84 Humbug Sailor – 20,238 acres gross (17,554 acres Forest Service lands).

Indicator(s): Number of Amendments

Methodology: GIS analysis

Rationale: Analysis guidelines in the National Soil Management Handbook and Region 5 Soil Management Handbook Supplement.

Direct and Indirect Effects: Native surface roads and motorized trails are most susceptible to damage by motor vehicles when wet. The condition of native surface roads and motorized trails can quickly decline during winter or wet weather use due to rutting. Wet season use of native surface roads and motorized trails often leaves ruts which channel water and increase the erosive power of that water, this can lead to increased erosion both on the trail and adjacent to the trail. Many of the impacts found during field surveys were caused by wet season use of routes.

6) Cumulative Effects

Considerations: The cumulative effects analysis presented here is for the whole geographic area of the Tahoe National Forest. Short-term effects take place within 1-5 years. Long-term effects take 20-30 years. They represent the additive, incremental effects of past, present, and reasonably foreseeable future activities, actions, and decisions on the soil resource. The current condition of the roads and trails, the number of private roads, and the soil damage at primitive campsites are all a reflection of past and current management activities. Management actions affect traffic, user-created motorized routes, maintenance, the effectiveness of closures, and recovery of closed routes. Cumulatively, these actions influence tread wear and soil erosion.

Soil cumulative effects parallel the hydrology cumulative effects. The common ground is the Equivalent Roaded Acre (ERA) concept. All ground disturbances in the watershed are 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 to 30 years. This is a reasonable timeframe to think about and predict the expected vegetative recovery (and reduction in erosion) for areas disturbed by unauthorized use.

Spatial boundary: Forest boundary. In the DEIS, the cumulative effects analysis was compiled at the HUC7 scale. Comments received on the DEIS said that this analysis was too complex and confusing. Upon further review of the DEIS data, the decision was made to use HUC6 watersheds for the SDEIS analysis. This decreases the number of watersheds by around 80 percent, does not change the results of the analysis, and makes the analysis more understandable. This scale is large enough to encompass the effects of management activities, but not so large as to mask the effects of the proposed actions.

Indicator(s): Equivalent Roaded Acres from Hydrology analysis.

Methodology: Utilize observations and understanding of short-term effects to soil productivity to estimate long-term expected cumulative effects on soil productivity.

Rationale: Analysis guidelines in the National Soil Management Handbook and Region 5 Soil Management Handbook Supplement.

Affected Environment: Soil Resources

Soils on the Tahoe National Forest

Soils on the Tahoe National Forest can be separated into 3 physiographic groups, oriented from west to east:

Dominantly Nearly Level to Very Steep Soils of the Westside

Soils in this group are well drained and somewhat excessively drained. They formed in material weathered from volcanic, metasedimentary, granitic, or ultra basic rock, as well as in glacial or alluvial deposits. Rock outcrops are numerous in many areas. Slopes are 2 to 75 percent.

These soils are on the lower slopes of the western Sierra Nevada, at elevations of 1,800 to 6,000 feet. The annual precipitation is 40 to 80 inches, and the frost-free growing season is 130 to 200 days.

Some of the major soil series in this zone are Hurlbut, Deadwood, Putt, Cohasset, Jocal, Holland, McCarthy, Crozier, and Ledmount. The soils in this zone make up about 33 percent of the survey area. Soils in this zone usually have more clay and are more susceptible to rutting and erosion, than those at higher elevations. Likewise, these soils are accessible to OHV use throughout the year because precipitation in this zone is mostly rain.

Dominantly Nearly Level to Very Steep Soils of High Elevation Mountainsides

The soils in this group are excessively drained to moderately well drained. They formed in material weathered from volcanic, metasedimentary, and granitic rock, as well as glacial or alluvial deposits. Rock outcrops are numerous in many areas. Glacial rock land also occurs throughout the area. Slopes range from 2 to 75 percent. These soils are along the crest of the Sierra Nevada, at elevations of 5,400 to 10,000 feet. The annual precipitation is 35 to 80 inches, and the frost-free season is 25 to 125 days. Some of the major soil series in this zone are Tallac, Smokey, Meiss, Bucking, Ledford, Fugawee, Waca, and Ahart. Areas of nearly level to very steep terrain are found in this zone. Rock outcrops are also mapped in this zone. The soils in this zone make up about 48 percent of the survey area. Soils are generally loamy to sandy, and have more rock fragments. Gully erosion is a hazard in this zone. Snow cover makes the season of use shorter, and wet season closures are less of an issue than in the soils of the lower Westside.

Dominantly Nearly Level to Very Steep Soils of the Eastside

The soils in this group are somewhat excessively drained to well drained. They form in material weathered from volcanic, rhyolitic, and granitic rock, and alluvial deposits. Rock outcrops are numerous in many areas. Slopes range from 2 to 75 percent. These soils are on the lower slopes of the eastern Sierra Nevada, and the Verdi ranges, at elevations of 4,800 to 6,500 feet. The annual precipitation is 15 to 40 inches, and the frost-free growing season is 20 to 75 days. Some of the major soil series in this zone are Euer, Martis, Aldi, Franktown, Kyburz, Trojan, and Portola. The soils in this zone make up about 19 percent of the survey area. Soils are generally loamy to sandy, and have more rock. These soils have some of the lowest erosion rates on the Tahoe National Forest (TNF).

Soil Erosion Risk Assessment

Many factors can influence the risk of erosion and potential impacts to watershed resources including: soil erosivity; stream density; and the type and density of roads on the landscape. The presence of highly erosive soils/landscapes or a high density of native-surfaced, motorized routes does not mean that there would be negative effects to soil resources. But the presence of both high erosion risks and a high density

of motorized routes indicates that there could be a higher risk of accelerated erosion and sediment production due to motorized roads and trails.

The inherent risk of erosion of the soils within the TNF was assessed using two methods: the soil erosion hazard rating found in TNF Soil Resource Inventory and the Ecosystem Management Decision Support Model (EMDS).

The soil resource inventory erosion hazard ratings were mapped at a large scale. Table 3.02-8 shows the erosion hazard ratings associated with the higher risk routes in the NFTS, the unauthorized routes, and higher risk routes on private land. Seventy-five percent of the currently existing routes within the boundary of the TNF are on high erosion hazard rated (EHR) soils. Eighteen percent are on moderate EHR soils and six percent are on very high EHR soils. Routes with moderate EHR tend to be on ridge-tops and valley bottoms where topography is generally flatter. Therefore the risk of erosion is lower than on the steeper slopes found on the majority of the TNF.

Table 3.02-8. Native surface road and trails (higher risk routes) by Erosion Hazard Rating[1]

	Erosion Hazard Rating	**Alt 1**
National Forest Transportation System (miles)	Very High	96
	High	1,331
	Moderate	337
	N/A	11
Unauthorized Routes and ML 1 Routes receiving unauthorized use (miles)	Very High	111
	High	1272
	Moderate	290
	N/A	21
Private Roads (miles)	Very High	80
	High	1,293
	Moderate	415
	N/A	27
Total (miles)	**Very High**	**287**
	High	**3,896**
	Moderate	**1,042**
	N/A	**59**

[1] Other system routes are not inculded in this total. N/A includes areas such as rock outcroppings.

Using the soil erosion risk ratings found in the Soil Resource Inventory (See Table 3.02-8), 82 percent of the Forest has a high to very high erosion hazard. The inherent risk of erosion of the soils within the TNF was refined using the Ecosystem Management Decision Support Model (EMDS). The parameters used in the EMDS model to assess soil erosion risk were 1) presence of geo-debris slides, 2) soil erodibility, 3) slope, and 4) precipitation. The EMDS model compared the K factor, percent slope, precipitation, and presence of geodebris slides of each route segment (~300 meters) to all other road and motorized trail segments on the TNF. The result is a relative erosion risk value assigned between 0 (highest risk) and 1 (lowest risk) for each 300 meter segment of every road and motorized trail (See

Appendix L). The EMDS scores for the length of roads and motorized trails in each HUC6 watershed were averaged to define the potential erosion risks on the watersheds on the TNF. The modeled erosion is generally higher on much of the west slope of the TNF. This is due to the steeply sloping topography of many of the watersheds, the potential presence of geo-debris slides, higher precipitation values, and finer-textured, more erosive soils. The modeled risk is lower on the east-side of the TNF due to coarser textured soils and less steep slopes.

The EMDS risk assessment is internally referenced to the soils on the TNF. This means that the lowest EMDS erosion risk score modeled using TNF data was defined as the highest potential erosion risk possible on the TNF and the highest EMDS score was defined as the lowest potential erosion risk possible on the TNF. This information was used to prioritize field surveys. In general, modeled risk of erosion was higher than actual amount of resource damage found during field inventories. The GIS analysis predicted more water crossings than were found during field inventories. This is partially due to the fact the ephemeral stream GIS coverage used in this analysis has not been fully field verified across the entire TNF. Geo-debris slides also tend to be over-estimated in the model. Routes were usually higher on the landscape than the feature that was modeled – route was above scoured channel or debris slide was not active. To adjust the model would require field verification and remapping of the ephemeral stream layer and more accurate mapping of location and level of activity of debris slide features across the Forest. The model was not adjusted in this project. Until adjusted the modeled risk is still useful as general a risk assessment because it still assesses the relative potential risk of soil erosion in a road and motorized trail-related disturbed environment on the TNF.

Existing Cross Country Travel

Currently cross country travel occurs on 717,900 acres on the TNF. Cross country travel is prohibited on 86,500 acres due to existing closures. In most years there are site specific issues that occur due to cross country travel somewhere on the Forest. The effects of these disturbances are usually dealt with by Ranger District recreation and watershed staff.

Cross country travel has resulted in 868.7 miles of motorized trails unauthorized for motorized use on the TNF and another 829.6 miles of closed NFTS roads that are still receiving some motorized use. As discussed below in the inventory results section, some routes are stable and others need maintenance/mitigation (For route-specific resource information see Appendix A, Site Specific Road, Trail and Open Area Information).

Field Survey Green, Yellow, Red (GYR) Motorized Trail Condition Ratings

Field surveys were completed for approximately 100 miles of authorized and unauthorized motorized trails using the Green-Yellow-Red (GYR) OHV Trail Condition Rating protocol. This data is summarized by route in Appendix A, Site Specific Road, Trail and Open Area Information. Stream crossings were evaluated using the GYR protocol and R-5 Best Management Practices Evaluation Protocol (BMPEP) (USDA Forest Service, 2000). The GYR protocol uses factors, such as water control, erosion off-trail, tread wear, tread width, and crossing data to rate route conditions. Motorized trails were broken into

segments in the field based on site conditions. The GYR Trail condition rating form was used to rate each motorized trail segment. A motorized trail segment was defined as a portion of trail that has similar resource impacts. The Green condition class means that erosion and runoff water control on the trail surface is functioning properly. The Yellow condition class means erosion and runoff water control on the trail surface is presently functioning but needs maintenance soon or it could deteriorate and become red condition class. The Red condition class means erosion and runoff water control on the trail surface is not functioning, is causing watershed impacts and should be given highest priority for maintenance and repair. The R-5 BMPEP protocol looks at erosion on route, sediment movement on route and off, route/stream crossings, etc. Many of these trails show impacts caused by wet season use (e.g., rutting, widening of routes around wet spots, channelized water movement, etc.).

Table 3.02-9 shows that approximately 85 percent of the inventoried routes are in Green condition class; 4 percent are in the Yellow condition class; 1 percent are in the in Red condition class; and 11 percent are overgrown and have begun recovery. Additional erosion and runoff water control is still needed on a portion of the routes, especially the route segments in the Yellow and Red condition classes.

Table 3.02-9. Percent of Inventoried Routes by Route Condition Class

Inventoried Routes	Green Condition Class	Yellow Condition Class	Red Condition Class	Overgrown Route
Percent In Condition Class	85%	4%	1%	11%

Note: numbers may not add up to 100% due to rounding.

Existing Seasonal Closures

The condition of native surface roads and motorized trails can quickly decline during winter or wet weather use due to rutting. Rutting is the process where soils are displaced and deform to the shape of the tire tracks that make their way through saturated soils. Rutting makes the route more susceptible to damage in the spring as the area begins to dry out. Rutting can occur if traffic enters the area before the soils have sufficient drying time. To some extent wet season damage can be influenced by soil type, but all soil types are susceptible damage due to wet season use. Native surface roads and motorized trails are most susceptible to damage by motor vehicles when wet. Currently there are approximately 3,400 miles of NFTS native surface roads and motorized trails that are open year round. There are 231 miles of roads and motorized trails closed seasonally. The areas that are seasonally closed for wildlife also function to reduce wet season damage to routes, soils, and watershed resources.

Environmental Consequences: Soil Resources

The primary changes considered in this analysis are the prohibition of cross country travel, changes in miles of motorized use on existing roads and trails, and changes in class of vehicle or season of use. Continued cross country motorized vehicle travel can increase the area of soil disturbance and loss of productivity. Some of the motorized trails unauthorized for motorized use, being considered for addition to the NFTS, are native surface trails that currently exist on the ground. The hydrologic footprint of these

trails already exists. The routes where negative effects on soil resources are most likely to occur are: native surface NFTS roads and motorized trails, motorized trails unauthorized for motorized use and non-private roads (with native surface) within the TNF boundary.

Direct and Indirect Effects to Soil Resources

Direct impacts to soils that result from this project are limited. There are no new ground disturbing activities proposed with this project. The roads and trails being evaluated in this analysis already exist on the ground, but may require upgrading to NFTS standards as well as periodic maintenance. They are generally compacted and lack vegetative cover. Runoff from the surface is collected and discharged as potentially erosive flows at points below the route. Some are eroded or causing erosion, others are stable and are not causing any negative resource impacts. From the standpoint of soil productivity and growing vegetation, these routes are already non-productive. Therefore, on these roads and trails the potential effects on soil resources are related to controlling runoff water to prevent concentrated water flow and subsequent erosion and sediment production and movement and protecting soils downslope from the routes from runoff and gully erosion. It should be noted that most roads and motorized trails on the TNF have some site specific risk to soil and water resources. Many of these risks have been or can be mitigated.

All alternatives would have indirect effects on soil and watershed resources, but they vary by alternative. Route designation would indirectly affect soil erosion and subsequent sediment delivery to streams to the extent that activities resulting from designation or closure (1) affect the amount of *traffic and season of use* on routes; (2) designate routes in areas with highly erosive soils; (3) affect levels of *maintenance*; and (4) affect the potential for *recovery* and restoration.

Route Recovery

None of the proposed alternatives includes decommissioning or restoration for motorized trails not designated for motorized use. Based on observations of the TNF watershed and vegetation management staff, approximately 75 percent of the routes should recover passively over the 20 to 30 years after motorized use stops.

The degree of recovery will be dependent upon many factors. Without adequate drainage, some trails could continue to erode even if they could be effectively closed. Other motorized trails not designated for motorized use would most likely start to recover due to ingrowth of shrubs and other plants from the edges and slowly close in to some extent. Some would be used by non-motorized users (mountain bikes, equestrian, and hikers) and would probably remain on the ground in some form. If use of the route ceases, in the short term (five years or less), some native vegetation may establish on routes that have little soil compaction. It is likely that routes with moderate soil compaction (within the wheel tracks) would take between 5 and 20 years to vegetatively recover (develop native forb or shrub cover). The most severely disturbed sites are not likely to recover without some type of active restoration. The disposition of motorized trails unauthorized for motorized use that are not added to the system would be dealt with in future NEPA documents.

Projected Effects on Soils on the Tahoe National Forest

Projected Soil Erosion Risk Assessment Based on Erosion Hazard Ratings from the Tahoe National Forest Soil Resource Inventory

Maps of currently authorized and unauthorized routes were overlaid on the soil resource inventory map in GIS. The miles of routes were summarized by erosion hazard rating and by alternative. Table 3.02-10 shows the miles of higher risk routes (native surface, motorized routes) by erosion hazard and alternative. It also shows the change from the existing condition if any of the action alternatives are implemented.

Table 3.02-10. Native surface road and motorized trails (high risk routes) by Erosion Hazard Rating

	Erosion Hazard Rating	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
National Forest Transportation System (miles)	Very High	96	125	96	96	135	99	97
	High	1,331	1,682	1,331	1,356	1,759	1,498	1,364
	Moderate	337	413	337	341	439	372	343
	N/A[1]	11	15	11	12	15	13	13
Unauthorized Routes (miles)	Very High	111	0	0	0	0	0	0
	High	1272	0	0	0	0	0	0
	Moderate	290	0	0	0	0	0	0
	N/A[1]	21	0	0	0	0	0	0
Private Roads (miles)	Very High	80	80	80	80	80	80	80
	High	1,293	1,293	1,293	1,293	1,293	1,293	1,293
	Moderate	415	415	415	415	415	415	415
	N/A[1]	27	27	27	27	27	27	27
Total (miles)	**Very High**	**287**	**205**	**176**	**176**	**215**	**179**	**177**
	High	**3,896**	**2,975**	**2,624**	**2,649**	**3,054**	**2,791**	**2,657**
	Moderate	**1,042**	**828**	**752**	**759**	**854**	**787**	**758**
	N/A[1]	**59**	**42**	**38**	**39**	**42**	**40**	**40**
Change from Current (percent remaining)	Very High		71%	61%	61%	75%	62%	62%
	High		76%	67%	68%	78%	72%	68%
	Moderate		79%	72%	73%	82%	76%	73%
	N/A[1]		81%	64%	55%	71%	68%	68%

[1] Includes areas such as rock outcroppings

Environmental Consequences by Alternative

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

Alternative 1 – No action

- **Prohibition of cross country motor vehicle travel:** Cross country travel would continue in Alternative 1 on 717,900 acres on the TNF. Cross country travel would continue to be prohibited on 86,500 acres. It is likely that cross county travel would result in an increase in the motorized footprint on the TNF. Cross country motor vehicle travel would continue on 868.7 miles of motorized trails unauthorized for motorized use on the TNF and another 829.6 miles of closed NFTS roads that are still receiving some motorized use. This could impact soil resources by increasing erosion which would decrease long-term soil productivity.
- **Additions to the NFTS.** There are no additions of unauthorized roads or trails under this alternative.
- **Changes to the existing NFTS.** There are no changes to vehicle class and/or season of use to the NFTS under this alternative. No Maintenance Level (ML) 1 roads are reopened with this alternative. However, cross country motorized use is allowed, so the net effect would be that use of some ML 1 routes would occur.
- **Forest Plan Amendment:** There are no changes to the Forest Plan with this alternative.
- **Cumulative Effects**
  - There would be 717,900 acres open to cross country motor vehicle travel.
  - There are approximately 868.7 miles of motorized trails unauthorized for motorized use on the TNF and another 829.6 miles of closed NFTS roads that are still receiving some motorized use
  - There are 5,293.8 miles of native surface roads and motorized trails on the TNF (EHRs are displayed in Table 3.02-10.).
  - The Equivalent Roaded Acres (ERAs) in acres associated with the current motorized footprint are 16,030.0.

Alternative 2 – Increased Motorized Recreation and Access Opportunities

- **Prohibition of cross country motor vehicle travel:** Cross country motor vehicle travel would be prohibited on 833,392 acres which would reduce the mileage available for motorized use by 809.1 miles of unauthorized routes and 829.6 miles of ML 1 roads currently receiving unauthorized use. This would prohibit the proliferation of new routes and prohibit motorized use on all unauthorized routes not added to the NFTS. In the long-term (20 years) this could reduce erosion associated with motorized use on the TNF.
- **Additions to the NFTS.** Adding 5.0 miles of unauthorized roads and 54.6 miles of unauthorized trails to the NFTS would have minimal effects to soil resources. These are pre-existing routes so the loss of productivity has already occurred. These route additions would be subject to FS standards.

- **Changes to the existing NFTS.**
  - **Change Vehicle Classes through Mixed Use**: Approving mixed use on 241.5 miles would not affect soil resources.
  - **Change Vehicle Classes through Maintenance Levels (ML):** Changing vehicle class on 157.2 miles, to allow licensed operators of non-highway legal vehicles to operate on NFS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2, would have minimal effects to soil resources. These are pre-existing routes so the loss of productivity has already occurred. As designated routes within the NFTS these routes would be subject to FS standards.
  - **Changes in Seasonal Restrictions:** Seasonal restrictions for deer winter range would be lifted on 10.5 miles of roads resulting from the Forest Plan Amendment to Management Area 84 (Humbug-Sailor) which would slightly increase the risk of wet season damage to these roads and adjacent soils.
  - **Reopening Maintenance Level 1 Roads**: No ML 1 roads would be opened to motorized use.
- **Forest Plan Amendment:** The Tahoe National Forest Land and Resource Management Plan (LRMP) would be amended to remove the November 1 to May 1 seasonal closure in the Sugar Pine area (Management Area 84 Humbug Sailor) on key winter deer range to improve motorized recreation opportunities. The Forest Plan Amendment has the same as effects as Seasonal Restrictions above.
- **Cumulative Effects:** The short-term effects of Alternative 2 would be minimal. The long-term cumulative effects of Alternative 2 would decrease the NFTS soil hydrologic footprint and effects to long-term soil productivity.
  - There would be approximately 2,700 acres of cross country motor vehicle travel in established "Open Areas."
  - There would be 59.6 miles of unauthorized routes added to NFTS.
  - There would be 3,812.3 miles of native surface roads and motorized trails on the TNF.
  - The ERAs associated with the NFTS would be 13,253.7.

Alternative 3 – Cross country Travel Prohibition Only – No Changes to the Existing National Forest Transportation System

- **Prohibition of cross country motor vehicle travel:** Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization on 836,000 acres which would reduce the mileage available for motorized use by 868.7 miles of unauthorized routes and 829.6 miles of ML1 roads currently receiving unauthorized use. This would stop the proliferation of new routes and prohibit motorized use on all unauthorized routes not added to the NFTS. This could reduce erosion associated with motorized use on the TNF.
- **Additions to the NFTS.** No unauthorized routes would be added to the NFTS as roads or motorized trails under this alternative

- **Changes to the existing NFTS - this includes changing the vehicle class and/or season of use and reopening Maintenance Level 1 Roads.** No Changes to the NFTS would be made in this alternative.
- **Forest Plan Amendment** No amendments would be made to the Forest Plan.
- **Cumulative Effects:** The short-term effects of Alternative 3 would be minimal. The long-term cumulative effects of Alternative 3 would decrease the NFTS soil hydrologic footprint and effects to long-term soil productivity.
  - There would be 0 acres of cross country motor vehicle.
  - There would be 0 miles of unauthorized routes added to NFTS.
  - There would be 3,595.6 miles of native surface roads and motorized trails on the TNF.
  - The ERAs associated with the NFTS would be 13,180.

Alternative 4 – Increased Resource Protection

- **Prohibition of cross country motor vehicle travel:** Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization on 836,000 acres which would reduce the mileage available for motorized use by 842.4 miles of unauthorized routes and 829.5 miles of ML 1 roads currently receiving unauthorized use. This would stop the proliferation of new routes and prohibit motorized use on all unauthorized routes not added to the NFTS. This could reduce erosion associated with motorized use on the TNF.
- **Additions to the NFTS.** Adding 3.7 miles of roads and 22.6 miles of trails to the NFTS would have minimal effects to soil resources. These are pre-existing routes so the loss of productivity has already occurred. These route additions would be subject to FS standards.
- **Changes to the existing NFTS.**
  - **Change Vehicle Classes through Mixed Use**: No changes would be made to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through approval of mixed use.
  - **Change Vehicle Classes through Maintenance Levels:** Changing vehicle class on 3.4 miles, to allow operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2, would have minimal effects to soil resources. These are pre-existing routes so the loss of productivity has already occurred. As designated routes within the NFTS these routes would be subject to FS standards.
  - **Changes in Seasonal Restrictions:** Wet weather seasonal closures from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails would be added to minimize erosion and protect water quality. A total of 1,312.1 total miles would have changes in seasonal restrictions. Seasonal restrictions would decrease the risk of increased erosion associated with wet season route damage due to motorized use.

  - **Reopening Maintenance Level 1 Roads**: One ML 1 road (0.1 miles) would be reopened to motorized use. Reopening 0.1 miles of ML 1 road would not affect long-term soil productivity. Closed NFTS routes that are proposed to be opened are roads that were engineered to control drainage and erosion. They are expected to receive maintenance when opened.
- **Forest Plan Amendment**: No amendments would be made to the Forest Plan.
- **Cumulative Effects:** The short-term cumulative effects of Alternative 4 would be minimal. The long-term cumulative effects of Alternative 4 would decrease the NFTS soil hydrologic footprint and effects to long-term soil productivity.
  - There would be 0 acres of cross country motor vehicle travel.
  - There would be 26.3 miles of unauthorized routes added to NFTS.
  - There would be 3,625.3 miles of native surface roads and motorized trails on the TNF.
  - The ERAs associated with the NFTS would be 13,353.7.

Alternative 5 – Increased Motorized Recreation Access plus Reopening Maintenance Level 1 and Temporary Roads

- **Prohibition of cross country motor vehicle travel:** Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization on 836,000 acres which would reduce the mileage available for motorized use by 788.3 miles of unauthorized routes and 736.2 miles of ML 1 roads currently receiving unauthorized use. This would stop the proliferation of new routes and prohibit motorized use on all unauthorized routes not added to the NFTS. This could reduce erosion associated with motorized use on the TNF.
- **Additions to the NFTS.** Adding 5.0 miles of roads and 75.4 miles of trails to the NFTS would have minimal effects to soil resources. These are pre-existing routes so the loss of productivity has already occurred. These route additions would be subject to FS standards.
- **Changes to the existing NFTS.**
  - **Change Vehicle Classes through Mixed Use**: Changing vehicle class on 241.5 miles to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through approval of mixed use would not affect soil resources.
  - **Change Vehicle Classes through Maintenance Levels:** Changing vehicle class on 157.2 miles, to allow operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2, would have minimal effects to soil resources. These are pre-existing routes so the loss of productivity has already occurred. As designated routes within the NFTS these routes would be subject to FS standards.
  - **Changes in Seasonal Restrictions:** Wet weather seasonal closures from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails would be added to minimize erosion and protect water quality. A total of 1,396.7 total miles would have changes in seasonal restrictions.
  - **Reopening Maintenance Level 1 Roads**: 113 ML 1 roads (93.4 miles) would be reopened to motorized use. Reopening ML 1 roads would have a small effect on long-term soil productivity

where the routes are reopened. Closed NFTS routes that are proposed to be opened are roads that were engineered to control drainage and erosion. They are expected to receive maintenance when opened.

- **Forest Plan Amendment**: The Tahoe National Forest Land and Resource Management Plan (LRMP) would be amended to remove the November 1 to May 1 seasonal closure in the Sugar Pine area (Management Area 84 Humbug Sailor) on key winter deer range to improve motorized recreation opportunities. The Forest Plan Amendment has the same as effects as Seasonal Restrictions above.
- **Cumulative Effects**: The short-term cumulative effects of Alternative 5 would be minimal. The long-term cumulative effects of Alternative 5 would decrease the NFTS soil hydrologic footprint and effects to long-term soil productivity.
  - There would be 0 acres of cross country motor vehicle travel.
  - There would be 80.4 miles of unauthorized routes added to NFTS.
  - There would be 3,926.5 miles of native surface roads and motorized trails on the TNF.
  - The ERAs associated with the NFTS would be 13,446.

Alternative 6 – Preferred Alternative Motorized Access and Resource Protection

- **Prohibition of cross country motor vehicle travel:** Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization on 835,800 acres which would reduce the mileage available for motorized use by 807.3 miles of unauthorized routes and 818.2 miles of ML 1 roads currently receiving unauthorized use. This would stop the proliferation of new routes and prohibit motorized use on all unauthorized routes not added to the NFTS. This could reduce erosion associated with motorized use on the TNF.
- **Additions to the NFTS.** Adding 13.1 miles of roads and 48.3 miles of trails to the NFTS would have minimal effects to soil resources. These are pre-existing routes so the loss of productivity has already occurred. These route additions would be subject to FS standards.
- **Changes to the existing NFTS.**
  - **Change Vehicle Classes through Mixed Use**: Changing vehicle class on 130.8 miles to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through approval of mixed use would not affect soil resources.
  - **Change Vehicle Classes through Maintenance Levels:** Changing vehicle class on 122.0 miles, to allow operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2, would have minimal effects to soil resources. These are pre-existing routes so the loss of productivity has already occurred. As designated routes within the NFTS these routes would be subject to FS standards.
  - **Changes in Seasonal Restrictions:** Wet weather seasonal closures from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails would be added to minimize erosion and protect water

quality. In addition, over the snow travel would be permitted on 3.6 miles of the Fordyce Jeep trail when 15 inches of snow is present on the ground, which prevents soil disturbance. A total of 1,396.7 total miles would have changes in seasonal restrictions.

  - **Reopening Maintenance Level 1 Roads**: Thirteen ML 1 roads (11.4 miles) would be reopened to motorized use. Reopening 11.4 miles of ML 1 roads would have a small affect on long-term soil productivity where the routes are reopened. Closed NFTS routes that are proposed to be opened are roads that were engineered to control drainage and erosion. They are expected to receive maintenance when opened.

- **Forest Plan Amendment**: The Tahoe National Forest Land and Resource Management Plan (LRMP) would be amended to remove the November 1 to May 1 seasonal closure in the Sugar Pine area (Management Area 84 Humbug Sailor) on key winter deer range to improve motorized recreation opportunities. The Forest Plan Amendment has the same as effects as Seasonal Restrictions above.
- **Cumulative Effects**: The short-term cumulative effects of Alternative 6 would be minimal. The long-term cumulative effects of Alternative 6 would decrease the NFTS soil hydrologic footprint and effects to long –term soil productivity.
  - There would be 244 acres of cross country motor vehicle travel in established “Open Areas”
  - There would be 61.4 miles of unauthorized routes added to NFTS.
  - There would be 3,790.3 miles of native surface roads and motorized trails on the TNF.
  - The ERAs associated with the NFTS would be 13,276.

Alternative 7 – Proposed Action as Identified in Notice of Intent (NOI)

- **Prohibition of cross country motor vehicle travel:** Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization on 836,000 acres which would reduce the mileage available for motorized use by 832.0 miles of unauthorized routes and 828.5 miles of ML1 roads currently receiving unauthorized use. This would stop the proliferation of new routes and prohibit motorized use on all unauthorized routes not added to the NFTS. This could reduce erosion associated with motorized use on the TNF.
- **Additions to the NFTS.** Adding 36.7 miles of trails to the NFTS would have minimal effects to soil resources. These are pre-existing routes, so the loss of productivity has already occurred. These route additions would be subject to FS standards.
- **Changes to the existing NFTS.**
  - **Change Vehicle Classes through Mixed Use**: No changes would be made to allow licensed operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through approval of mixed use.
  - **Change Vehicle Classes through Maintenance Levels:** Changing vehicle class on 3.4 miles, to allow operators of non-highway legal vehicles to operate on NFTS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2, would have minimal

effects to soil resources. These are pre-existing routes so the loss of productivity has already occurred. As designated routes within the NFTS these routes would be subject to FS standards.

- **Changes in Seasonal Restrictions:** No changes in seasonal restrictions would be made.
- **Reopening Maintenance Level 1 Roads**: Two ML 1 roads (1.1 miles) would be reopened to motorized use. Route opening may have a minor effect on soil erosion but would be less in relation to construction of new routes. Closed NFTS routes that are proposed to be opened are roads that were engineered to control drainage and erosion. They are expected to receive maintenance when opened.

- **Forest Plan Amendment**: No amendments would be made to the Forest Plan.
- **Cumulative Effects**: The short-term cumulative effects of Alternative 7 would be minimal. The long-term cumulative effects of Alternative 7 would decrease the NFTS soil hydrologic footprint and effects to long-term soil productivity.
  - There would be 0 acres of cross country motor vehicle travel.
  - There would be 36.7 miles of unauthorized routes added to NFTS.
  - There would be 3,636.7 miles of native surface roads and motorized trails on the TNF.
  - The ERAs associated with the NFTS would be 13,220.

Summary of Effects Analysis across All Alternatives

Table 3.02-11. Comparison of Effects to the Soil Resource

Indicators – Soil Resource	Rankings of Alternatives for Each Indicator[1]						
	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Prohibition on Cross County Travel	1	2	4	4	4	3	4
Miles of unauthorized routes displayed by miles -relative ranking	1	NA	NA	NA	NA	NA	NA
Miles of NFTS native surface roads and motorized trails	1	3	7	6	2	4	5
Miles of native surface roads and motorized trails displayed by miles in each of the R-5 EHR ratings – VH, H, M	1	3	7	6	2	4	5
Seasonal Restrictions miles of routes	2	1	2	5	7	6	2
Cumulative effects on soil productivity from unauthorized use (ERAs)	1	4	7	6	2	3	5
Total for Soil Resource	**1.2**	**2.4**	**5.4**	**5.4**	**3.4**	**4.0**	**4.2**

[1] A score of 7 indicates the alternative has the least impact for the soil resource related to the indicator; A score of 1 indicates the alternative has the most impact for the soil resource related to the indicator.

Using the metrics from Table 3.02-11, Alternative 1 would have the highest potential impacts to soil resources, followed in order by Alternative 2, Alternative 5, Alternative 6, Alternative 7, Alternative 4, and Alternative 3.

Hydrology

Introduction

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

Meadows and aquatic species are included in the analysis of hydrologically sensitive areas in this section and in Terrestrial and Aquatic Species (Chapter 3.03), Plant Communities (Chapter 3.06), and Appendix R (Riparian Conservation Objectives Analysis)

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

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

- **Clean Water Act of 1948 (as amended in 1972 and 1987)** establishes as federal policy the control of point and non-point pollution and assigns the States the primary responsibility for control of water pollution. Compliance with the Clean Water Act by national forests in California is achieved under state law (see below).
- **Non-point source pollution on national forests is managed through the Regional Water Quality Management Plan (USDA Forest Service, Pacific Southwest Region, 2000)**, which relies on implementation of prescribed Best Management Practices (BMPs). The Water Quality Management Plan includes one BMP for OHV use (4-7) and 28 BMPs related to road construction and maintenance (2-1 to 2-28) (See Appendix F, Watershed Analysis). All NFTS roads and trails open to motorized use are required to comply with these BMPs. Of particular relevance for motor vehicle travel management, BMP 4-7 requires each forest to: (1) identify areas or routes where OHV use could cause degradation of water quality, (2) identify appropriate mitigation and controls, and (3) restrict OHV use to designated routes. This BMP further requires forests to take immediate corrective actions if considerable adverse effects are occurring or are likely to occur.
- **The California Water Code** consists of a comprehensive body of law that incorporates all state laws related to water, including water rights, water developments, and water quality. The laws related to water quality (sections 13000 to 13485) apply to waters on the national forests and are directed at protecting the beneficial uses of water. Of particular relevance for the proposed action is section 13369, which deals with nonpoint-source pollution and best management practices.
- **The Porter-Cologne Water-Quality Act**, as amended in 2006, is included in the California Water Code. This act provides for the protection of water quality by the State Water Resources Control

Board and the Regional Water Quality Control Boards, which are authorized by the U.S. Environmental Protection Agency to enforce the Clean Water Act in California.

- **The Sierra Nevada Forest Plan Amendment (SNFPA)**. The Record of Decision (ROD) for the 2004 SNFPA includes standards and guidelines (S&Gs) that apply to the 10 Sierran 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 implement 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.

Water Quality Protection (TNF LRMP, pg. V-35). *Use Best Management Practices (BMPs) to meet water quality objectives and maintain and improve the quality of surface water on the Forest.* Best Management Practices (BMPs) are implemented as mitigation measures specified in Appendix A (Road Cards) for any motorized trail to be added to the National Forest Transportation or any lands to be established as “Open Areas.” These mitigation measures will meet water quality objectives and maintain and improve the quality of surface water on the Forest.

Effects Analysis Methodology

This is a site specific project, for which there is two levels of analysis. First, there is site-specific analysis of the individual routes proposed for addition to the NFTS. This detailed analysis is by route and is included in an Appendix A (Site Specific Road, Trail and Open Area Information) and the project record.

Second, there is the analysis of each alternative as a whole, which is informed by the site-specific route analysis noted above and other information. The discussion of the direct, indirect, and cumulative effects of each alternative is in a summary form. For ease of documentation and understanding, the effects of the alternatives are described separately for five 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 five discreet actions common to all action alternatives are: (1) The prohibition of cross country motor vehicle travel; (2) The addition of facilities (unauthorized roads and trails) to the NFTS, including

identifying seasons of use and vehicle class; (3) The establishment of Motorized "Open Areas"; (4) Changes to the existing NFTS (which includes: change in Class of Vehicles resulting from approval of mixed use, change in Class of Vehicle resulting from changes in maintenance levels, change in Season of Use, and reopening ML 1 roads to motorized use); and (5) Amendments to the Forest Plan. This discussion is the focus of this Effects Analysis Methodology section.

The Effects Analysis Methodology section describes the methodology used for the effects analysis in Chapter 3, not the site-specific analysis of each route. It addresses impacts relevant to the hydrology resource, hydrology resource-specific assumptions, hydrology resource indicators to be measured, including justification as to why they were chosen, sources of information used to support the analysis, timeframes (short term and long term), and spatial boundary of the effects analysis.

The Effects Analysis Methodology focuses on the assumptions, methodology, and indicators for addressing the direct and indirect effects of each of the five actions and the cumulative effects of implementing the alternative as a whole. The conclusions of the analysis in the Environmental Consequences section present the direct and indirect effects of implementing the alternative as a whole addressing the effects of each of the five proposed actions. Then, the cumulative effects of implementing each alternative (the direct and indirect effects of this action in combination with the effects of past, present, and reasonably foreseeable future actions) are displayed.

The cumulative effects analysis considers all roads and motorized trails including private on the TNF. This analysis focuses on native surface (dirt) roads and motorized trails for direct and indirect effects analysis.

Impacts relevant to water resources include

- Modification of surface-water runoff timing and magnitude owing to interception of surface and subsurface runoff by routes during rainfall and snowmelt.
- Increased erosion of route surfaces, hillslopes, and channels, with consequent increases in fluvial loads of sediment and sediment-related pollutants such as nutrients, heavy metals, and pesticides.
- New NFTS roads and trails that traverse hydrologic features such as streams and wet meadows and cross riparian conservation areas and other designated riparian buffers that are protected from disturbance by forest LRMPs and SNFPA Standards and Guidelines.

Assumptions specific to the water resources analysis

- Adverse effects of route use by motor vehicles include long-term damage to soil and water resources owing to soil compaction, alteration of drainage patterns, and destruction of vegetation.
- Without active restoration, these effects would persist for periods of years to decades (20-30 years) following prohibition of public motor vehicle use in the Tahoe National Forest.
- Sediment production from motor vehicle use of native-surface NFTS routes is increased by higher levels of traffic and is reduced by maintenance of road drainage features (culverts, waterbars, and ditches).

- Spatial boundary for the effects analysis is the forest boundary. Within the forest boundary, specific areas that are analyzed include hydrologically sensitive areas, inventoried unauthorized routes, and NFTS routes for which changes in season of use or vehicle class are proposed. Cumulative watershed effects are analyzed for HUC 6 watersheds.
- Hydrologically sensitive areas include all designated riparian protection areas, such as riparian conservation areas. All areas of perennial and seasonal standing or running surface water and areas of perennially or seasonally saturated soil are included. Examples of hydrologically sensitive areas include streams, lakes, reservoirs, fens, wet meadows, marshes, and unstable hill slopes. Hydrologically sensitive areas will be referred to as RCAs in this document.

Data Sources

- Route-specific data collected in the field using established protocols for road erosion inventories or OHV green-yellow-red inventories.
- GIS analyses of route miles and stream crossings in hydrologically sensitive areas.
- Hydrologic data collected by the forest or other agencies, such as United States Geographical Survey (USGS), Environmental Protection Agency (EPA), and California Department of Fish and Game (CDF&G), on streamflow, sediment loads, and stream biota and habitat.
- Air and ground photos and anecdotal information documenting the time required for passive restoration of routes closed to motor vehicle traffic (recovery time may vary based on precipitation, elevation, aspect, and other factors (See Soil Resources).

Water Resources Indicators

- Miles of unauthorized routes in RCAs.
- Sum of routes proposed for addition to the NFTS in RCAs on the forest.
- Acres of “Open Areas” in RCAs.
- Numbers of locations where routes divert or have potential to divert streamflow. (All stream crossings were assumed to have potential to divert streamflow.)
- Miles of ML 1 routes receiving unauthorized motorized use in RCAs.
- Sum of route miles with documented erosional features.
- Miles of routes with proposed changes in vehicle class and/or season of use in RCAs.
- Landscape Erosion Risk (HUC6 watershed) - Density of native surface roads and motorized trails and EMDS erosion risks class.
- Route-related Equivalent Road Areas (ERAs) in acres (cumulative effects).

Water Resources Methodology by Action:

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

Considerations: The major effects of cross country motor vehicle travel and route proliferation on water resources include increased peak flows and sediment loads due to compacted and unvegetated route surfaces and detachment of sediment by vehicles. The effect of the prohibition of cross country motor

vehicle travel would be to end traffic on routes and areas beyond the authorized NFTS. In the short term, the unauthorized routes and areas disturbed by motor-vehicle use would not change much because removal of vegetation, compaction of soils, and alteration of drainage patterns require time to heal without active restoration. Elimination of traffic on unauthorized routes and areas would reduce erosion, but the routes would still intercept and concentrate surface flows and produce sediment. In the long term, some or all unauthorized routes and areas would probably revegetate and regain some of their hydrologic and geomorphic functions, although use of these routes by non-motorized vehicle traffic could delay or prevent recovery

Short-term timeframe: 1 year.

Long-term timeframe: The period used for long-term effects analysis is 20 to 30 years. This is a reasonable timeframe to think about and predict the expected vegetative recovery (and reduction in erosion) for areas disturbed by unauthorized use. The personal observations of the watershed staff (20-30 years experience on the TNF) support this recovery period. This is also the same recovery period used for the Cumulative Soil Effects analysis in this document.

Spatial boundary: Major River Basins and Sub-basins and The Forest Boundary.

Indicator(s): Miles of unauthorized routes in RCAs.

Methodology: GIS analysis of existing unauthorized routes in Riparian Conservation Areas (RCAs). Compare no-action to action alternatives, and compare all alternatives to regulatory framework.

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

In a study of cross country ATV impacts, Foltz and Meadows (2007) looked at the degree of disturbance based on leaf litter and vegetation cover, trail width (both tread and displaced material) and ATV rut depth. Tests showed that 40 to 120 passes of an ATV along a cross country route could result in what they called “high” disturbance (i.e., >60 percent loss of ground cover, trail width of greater than 72 inches, and ruts exceeding 6 inches in depth). The study concludes that ATV traffic adversely affects natural resources, and that all of the vehicles tested contributed to those effects regardless of the type of ATV or tire type.

Taylor (2001) reviewed studies that document impacts of motor vehicle use on erosion, water resources, and riparian and aquatic habitats, including studies in Texas that found statistically significant effects from motor vehicle use on benthic macro invertebrates, water quality in pools, and disturbed versus non-disturbed riffles.

Chin and others (2004) conducted a study on the effects of ATVs on stream dynamics that evaluated the amount of pool filling by fine sediment (i.e., the reduction of pool volume and depth) as compared to control watersheds where ATV use was not occurring. They found that the watersheds impacted by ATV use showed a reduction of mean pool volume by as much as 50 percent.

Impacts to stream channels, riparian areas, and water quality are possible where motorized use occurs in RCAs. The RCA widths in the SNFPA (USDA-FS 2004), which are used for the analysis of this project, were prescribed to protect both physical and biological components of the riparian system, including sediment and nutrient delivery, large woody debris recruitment, and habitat occupancy and use

by various species. (Outside of RCAs, disturbances that result from motor vehicle use would be less likely to affect water and sediment reaching streams, meadows, or other hydrologically sensitive areas.)

Comments: The short-term effects would be small and unquantifiable reductions in traffic-related sediment and related pollutants. Long-and short-term effects would essentially be the same for all action alternatives. The effects of the action alternatives would differ from the effects of the no-action alternative because the elimination of traffic from the unauthorized routes would reduce sediment detachment by motor vehicle use. The long-term effects would be smaller (less adverse) than short-term effects. Effects for the action alternatives would be smaller (less adverse) than the No Action Alternative, as measured by miles and area, because under the No Action Alternative, route proliferation and use of unauthorized routes would continue.

2&3) Direct/Indirect effects of additions to the NFTS and establishing motorized "Open Areas"

Considerations: Roads can directly affect physical channel dynamics when they encroach on floodplains or restrict channel migration. Roads can also affect meadows and wetlands directly by encroachment, and indirectly by altering surface and subsurface flow paths. Alteration of the hydrologic flow paths can indirectly affect meadow and wetland function, with the effects extending far beyond the area road itself. The effects can include erosion and/or lowering of the water table. Effects such as these would only be possible if routes are located within RCAs.

Stream crossings in particular have the potential to deliver increased runoff and sediment from the road, destabilize stream banks, and affect channel function. Schnackenberg and MacDonald (1998) found that fine sediment in stream channels in Colorado was more strongly correlated with the number of road crossings than with the Equivalent Clearcut Area (similar to the Equivalent Roaded Acres used in this analysis, but indexed to the effects of clearcuts rather than to roads) in the watershed.

The potential for water to run down roads or trails is termed "diversion potential". When this occurs, streamflow diversions can be a major cause of road-related erosion (Best and others 1995; Furniss and others 1997).

Short-term timeframe: 1 year.

Long-term timeframe: The period used for long-term effects analysis is 20 to 30 years. This is a reasonable timeframe to think about and predict the expected vegetative recovery (and reduction in erosion) for areas disturbed by unauthorized use.

Spatial boundary: The Forest Boundary.

Indicator(s): (1) miles of unauthorized routes added to NFTS in RCAs; (2) miles of ML 1 roads reopened in RCAs; (3) acres of motorized "Open Areas" in RCAs; (4) numbers of locations where routes divert or have potential to divert streamflow; (5) sum of route miles with documented erosional features.

Methodology: GIS analysis of routes and "Open Areas" in RCAs and stream crossings (assume all crossings have potential to divert streamflow). Compare no-action to action alternatives, and compare all alternatives to regulatory framework. Field road erosion inventories follow established protocol using Green-Yellow-Red OHV monitoring.

Rationale: Published studies (see Reference section) have documented that streamflow diversions are a major cause of road-related erosion. Many published studies have documented that roads are a major disturbance in managed watersheds (Trombulak and Frissell 2000; Switalski and others 2004). Studies have consistently shown that roads produce more sediment than other forest management practices (Robichaud and others 2006). Unsurfaced roads and trails (such as the routes being analyzed for addition to the NFTS) contribute much more sediment than surfaced roads. For example, Coe's study (2006) on the Eldorado National Forest found that native surface roads produced 10 to 25 times more sediment than rocked roads. Surface erosion was also dependent on soil type, road surface type, road grade, cross slope, age of the road, traffic volumes, and the effectiveness and spacing of drainage structures. In the South Fork Platte River, Welsh and others (2006) found that the mean sediment production from motor vehicle trails was five times higher than the mean from unpaved road segments.

When roads concentrate surface flow and deliver it to streams via surface flow paths, they are termed "hydrologically connected", and they functionally increase the drainage density (Wemple and others 1996). Surface runoff can be delivered directly into streams via stream crossings or gullies formed at culvert outlets. In general, the greatest impacts from the transportation network come from the portions that are hydrologically connected. Roads and trails whose runoff drains onto hillsides where water infiltrates without reaching streams have fewer impacts on hydrology and water quality. In a study of forest road segments on the Eldorado National Forest, Coe (2006) found that 25 percent of the road segments surveyed was hydrologically connected. A study in the Kings River Experimental Watershed (KREW) area in DNK analysis unit found that 13 percent of the road length in the study area was hydrologically connected (Korte and MacDonald 2005). Robichaud and others (2006) note that studies in the western US have found between 23 and 75 percent hydrologic connectivity of roads.

Roads concentrate overland flow and generate more runoff than undisturbed areas, and hydrologically connected roads deliver that runoff to streams more quickly and efficiently than undisturbed areas. Studies of the effects of roads on streamflows have had varied results, including that roads increased peak flows, decreased peak flows, and had no detectable effect (Gucinski and others 2001). Several studies (Bowling and Lettenmaier 1997, Ziegler and others 2007) have attributed the majority of the increases in streamflows on roads intercepting subsurface flow at cutbanks. Since very few of the unauthorized routes have cut and fill construction, interception of subsurface flow is likely to be less prevalent on these routes than on roads. However, the unauthorized routes still concentrate surface flow, and may be more likely to deliver it via hydrologically connected segments than authorized roads are due to the lack of maintenance they receive. Jones and Grant (1996) found that roads shifted the timing of peak flows to be slightly earlier, and also increased the peak flows slightly, though the increase was not statistically significant due to the variability of the events. There is more agreement that roads do not appear to affect annual water yield (Gucinski and others 2001).

4) Direct/Indirect effects of changes to the existing NFTS (this includes changing the vehicle class, season of use, and reopening Maintenance Level 1 roads)

Considerations: Changing the class of vehicle on already established routes would not increase the impacts to watershed resources. These are already existing routes; therefore there would be no additional

ground disturbance. These routes would still have to meet standards and guidelines for resource protection.

Reopening ML 1 roads would have a small increase.

Traffic on native surface roads generally results in elevated sediment production, particularly if it occurs during the wet season. Road erosion rates increase with increased traffic, and if traffic is removed, the sediment concentration in road runoff decreases over time (Robichaud and others 2006). Ziegler and others (2001) found that motorcycle passes during rainfall simulation caused elevated sediment production; they also cite another study that found a more marked result from truck traffic. They attribute the increased sediment production to the amount of loose material on the road surface that is available for transport, because the spike in sediment transport gets smaller with each successive vehicle pass; however, they note that if the new routes had become incised by flowing water, the erosion would have been more persistent.

For example, Forsyth and others (2006) found that high traffic levels on a gravel road during wet weather created ruts that increased erosion. Even in coarse-grained soils that do not develop rutting as a result of wet-weather use, more subtle surface deformation occurs that eventually renders the design shape of the road (crowning, drainage dips, etc) ineffective, and leads to increased road surface erosion.

Short-term timeframe: 1 year.

Long-term timeframe: The period used for long-term effects analysis is 20 years. This is a reasonable timeframe to think about and predict the expected vegetative recovery (and reduction in erosion) for areas disturbed by unauthorized use.

Spatial boundary: The Forest Boundary.

Indicator(s): (1) miles of NFTS routes with proposed changes in vehicle class, season of use, and reopening of ML 1 roads in RCAs; (2) sum of route miles with documented erosional features; (3) numbers of locations where routes divert or have potential to divert streamflow (all stream crossings are assumed to have potential to divert streamflow).

Methodology: Field road erosion inventories follow established protocol using Green-Yellow-Red OHV monitoring. Compare no-action to action alternatives, and compare all alternatives to regulatory framework.

Rationale: Published studies (see Reference section) have documented that streamflow diversions are a major cause of road-related erosion.

5) Amendment to Forest Plan

The effects from the Forest Plan Amendment are covered under the changes to seasonal restriction in element 4.

6) Cumulative Effects

Considerations: The cumulative effects to erosion/sediment risks were analyzed using the EMDS erosion risk values averaged at the HUC6 scale (See the Soil Resources Section and Appendices F, Watershed Analysis and L , Soils Analysis). This cumulative effects analysis compares the HUC6 route related

erosion risk and the native surface, motorized route density to assess the effects of proposed changes in route density related to sub-basin erosion risk.

The Equivalent Road Acre (ERA) model was developed as a way to evaluate the accumulation of impacts from different activities through time. There are limitations to the ERA model, including: ERAs are only an indicator, and cannot be used to estimate quantitative changes in stream channel conditions; the higher risk associated with near-stream disturbance (as opposed to disturbance far from any stream channel) is not factored into the analysis; and the method does not account for site-specific BMPs (i.e., all roads are weighted the same, regardless of their management and condition). Changes to the existing NFTS are minor and not expected to have a perceptible contribution to cumulative effects. The detailed assessment found in Appendix A (Site Specific Road, Trail and Open Area Information) details for more specific information of the area, including the position of the disturbances relative to the drainage network and whether mitigations are in place to be factored into the final determination of the risk for CWEs.

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 30 years. This is a reasonable timeframe to think about and predict the expected vegetative recovery (and reduction in erosion) for areas disturbed by unauthorized use.

Spatial boundary In the DEIS analysis, this information was compiled at the HUC7 scale. Comments received on the DEIS said that this analysis was too complex and confusing. Upon further review of the data, the decision was made to use HUC6 watersheds for the SDEIS analysis. This decreases the number of watersheds by around 80 percent, does not change the results of the analysis, and makes the analysis more understandable. This scale is large enough to encompass the effects of management activities, but not so large as to mask the effects of the proposed actions. In the SDEIS the CWE results are reported at the sub-basin, basin, and Forest scale.

Because HUC6 watersheds range from 10,000 to 40,000 acres in size, density (e.g., miles of road & trails/acre of HUC6 or number of crossings/acre of HUC6) is a more meaningful measurement of route risks than simply number of miles. Therefore, road/trail density is used in this analysis as well as the miles of roads and trails and the number of crossings. For a more site specific scale, see Appendix A, Site Specific Road, Trail and Open Area Information, for trail-specific erosion mitigation measures.

Indicator(s): Equivalent Roaded Areas in acres.

Methodology: Standard ERA model per Regional policy, focusing on road and trail related ERAs and assuming unauthorized routes without traffic would passively recover within the timeframe. The method allows a quantitative assessment of past, present, and reasonably foreseeable effects for all USFS land-use activities, and the differences between alternatives can be compared to the existing route related ERAs.

Rationale: See considerations discussed under methodology.

Comments: See the Soils Methodology section for assumption regarding passive recovery of unauthorized routes that are not brought into the NFTS.

Affected Environment: Hydrology

Existing Water Supply

The TNF contains portions of headwaters of the American, Bear, Feather, Truckee and Yuba Rivers. The American, Bear and Yuba Rivers flow westward from the crest of the Sierra Nevada to the Sacramento River in the City of Sacramento. The headwaters of the Middle Fork Feather River are in the Sierra Valley area. The river is formed by the confluence of several streams draining the surrounding mountains and then flows west to join the Sacramento River near Marysville. The American, Bear, Feather, and Yuba rivers and their tributaries provide water for domestic, agricultural, environmental and industrial uses as well as power production. The Truckee River Basin covers an area from Lake Tahoe in California to Pyramid Lake, located approximately 50 air miles away in Nevada. Approximately 760 square miles (almost 25 percent of the basin), lie within California. Most of the precipitation and water storage occur within the California part of the Truckee River Basin. The Truckee River, from south of Bear Creek confluence to the area near the California border near Floriston, is within the TNF boundary. The Truckee River provides the majority of the municipal water supply for the Reno-Sparks area.

The Wild and Scenic status of rivers on the TNF can be found in Section 3.09, Inventoried Roadless Areas and Special Areas.

Most of the watersheds on the Tahoe are highly regulated systems. The American, Yuba, and Bear River systems are due to complete FERC re-licensing by 2013. Truckee River operates under the Truckee River Operating Agreement. The Sierra Valley is an adjudicated basin. This project is not likely to impact existing water supply to any measurable extent.

Existing Water Quality

Compared to other parts of California and the United States, the Sierra Nevada overall has relatively low sediment yields (Kattelmann, 1996). General estimates show that the Sierra Nevada has the lowest sediment yield in California (generally less than 100 m^3/km^2/year). Sediment transport measurements in a variety of streams in the eastern Sierra Nevada were generally less than 10 m^3/km^2/year. A Soil Conservation Service report classified sediment yield below 150 m^3/km^2/year as “low” with respect to nationwide rates (Kattelmann, 1996). Table 3.02-12 shows some annual sediment yield data for watersheds on the Tahoe National Forest. These figures show that the Truckee River system has lower sediment yields than the rivers on the west side of the Forest. The American, Yuba and Feather River systems appear to have similar sediment yields.

Table 3.02-12. Sediment yields from reservoir surveys, suspended sediment records, and other estimates (Kattelmann, 1996)

Watershed	**Annual Sediment Yield** (m^3/km^2)
American – Ralston	80
American – Auburn Dam Site	130
American – Folsom	250
Bear – Combie	360
Feather – Oroville	90 100 120
Truckee – Upper Truckee Squaw Creek Trout Creek	21 12, 93 12
Yuba – Nonmining Mining North Yuba – Bullards Bar	160 3,300 130

Water Quality Management

According to the California Water Plan Update (CA DWR 1998) the TNF is encompassed by three major hydrologic regions. One region is on the Westside of the Sierra Nevada crest (the Sacramento River); the North and South Lahontan regions are on the eastern side. The Central Valley Regional Water Quality Control Board oversees and sets the standards for the Feather, Yuba, Bear and American River systems. The Lahontan Regional Water Quality Control Board oversees and sets the standards for the Truckee River. The Forest Service has a memorandum of understanding with the State that names the Forest Service as a "Designated Management Agency" that will prescribe and implement a water quality control program to protect the waters of the state to meet state and federal regulations as well as the standards set in the Central Valley Water Quality Control Board Basin Plan as amended for commercial silvicultural practices by Resolution R5-2006-0026 (2006).

The TNF generally produces surface water of excellent quality, suitable for almost any use. Contaminant levels in most waters are lower than amounts specified in the States of California and Nevada stream quality standards (Kattelmann 1996). Most runoff would be suitable as drinking water except for the risk of bacteria and pathogens, such as *Giardia lamblia*, *Campylobacter* ssp., and *Cryptosporidium* ssp. In the backcountry, inadequate disposal of human waste and pathogens carried by mammals have caused sufficient contamination to make drinking untreated water risky. Low-level release of nutrients from human activities along wilderness lakes may have stimulated increased plant growth on some lake bottoms (Kattelmann 1996) reducing clarity and causing shifts in aquatic communities as well as reducing the aesthetics of natural lake conditions. Generally, very little water from National Forests in the Sierra Nevada region is heavily polluted or contaminated by chemicals, bacteria, or parasites at concentrations above background levels (Kattelmann 1996). Most waters satisfy the fishable and swimmable objectives of the Clean Water Act (1987).

Water quality in forested areas can be impacted by many activities. Most pollutants come from non-point sources, i.e. from diffuse sources not concentrated into pipes, drains, flumes, or ditches (Clean Water Act, 1987). Examples include erosion from roads and parking areas. Sediment at levels above natural rates of erosion is the most common non-point source pollutant in forested ecosystems. Roads can pollute groundwater as well as surface water. Forest roads potentially add more sediment to streams than any other forest operation. Research has shown that 90 percent of the sediment that ends up in our nation's waters from forested lands is associated with improperly designed and maintained roads. Water quality in lakes, streams, springs, and wetlands can be protected by proper road location and construction and adequate maintenance. A few rural communities and abandoned mining sites within national forests constitute point sources of pollution.

There are six water bodies on the TNF that are listed as impaired on the EPA's 303(d) List. These are the Truckee River (sediment); Stampede Lake (pesticides of unknown origin), Donner Lake (PCBs), Kanaka Creek (arsenic), Squaw Creek (sedimentation/siltation) and Humbug Creek (lead, sediment, etc.). Table 3.02-13 displays the 303(d) listed water bodies and the reason for listing.

Table 3.02-13. Impaired Water Bodies on the TNF Listed on the EPA 303(d) List

Water Body Name	Pollutant/Stressor	Source	Area Affected
Humbug Creek	Copper, Mercury, Zinc, Sedimentation/Siltation	Resource extraction abandoned mines	9 miles
Kanaka Creek	Arsenic	Resource extraction abandoned mines	1 mile
Donner Lake	Priority Organics	Source Unknown	960 acres
Stampede Reservoir (recommended for delisting)	Pesticide (lindane)	Source Unknown	3,444 acres
Squaw Creek	Sedimentation/Siltation	Construction/Land development, Other Urban Runoff, Hydro modification, Drainage/Filling of Wetlands, Highway Maintenance And Runoff, Natural Sources, Recreational Activities, Nonpoint Source	8 miles
Truckee River	Sedimentation/Siltation	Source Unknown	106 miles

The Truckee River, Squaw Creek, and Humbug Creek (Middle Yuba River) are currently listed on the Impaired Water body list (303(d)) for sediment. The Lahontan Regional Water Quality Control Board recently developed a Total Maximum Daily Load (TMDL) for sediment. Effects of this project on these watersheds are discussed under Environmental Consequences in the cumulative effects section.

Existing Routes in Riparian Conservation Areas

The most serious impacts of roads and motorized trails occur where they are in close proximity to streams or wetlands (see Appendix A [Site Specific Road, Trail and Open Area Information] and Appendix I [Riparian Conservation Objectives]). Native surface roads and motorized trails within RCAs have the potential to impact water resources including water quality. Table 3.02-14 shows the miles and density of native surface roads and motorized trails by major river basin. There are currently 1054.1 miles of native

surface roads and motorized trails within RCAs. So current density of native surface roads and motorized trails in RCAs on the TNF is 2.6 miles per square mile. The highest number of miles in RCAs is found in the Yuba River Basin and the lowest number of miles in RCAs is in the Feather Basin. The highest density of native surface roads and motorized trails is found in the Truckee and Feather River basins and the lowest in the American River and Bear River basins.

Table 3.02-14. Miles and density of native surface roads and motorized trails in RCAs by major river basin and the number and density of native surface road and motorized trail perennial and intermittent stream crossings by major river basin

River Basin	Miles of Native Surface Roads and Motorized Trails in RCAs (Density mi/sq mi)	Number of Native Surface Road and Motorized Trail Stream Crossings (Density # crossings/ sq mi RCA)
Middle Truckee River	*170.2 (5.1)*	*213 (6.3)*
Little Truckee River	*136.1 (2.9)*	*281 (4.6)*
Subtotal Truckee	**306.4 (3.8)**	**494 (6.1)**
Feather	**114.9 (3.8)**	**358 (12.0)**
North Yuba	*207.8 (2.4)*	*485 (5.6)*
Middle Yuba	*85.9 (2.4)*	*288 (7.2)*
South Yuba	*140.0 (2.2)*	*322 (5.1)*
Subtotal Yuba	**433.7 (2.3)**	**1095 (5.8)**
Bear	**16.6 (1.6)**	**59 (8.1)**
Middle Fork American	*83.9 (1.6)*	*157 (3.3)*
North Fork American	*79.4 (1.7)*	*239 (4.6)*
Subtotal American	**163.3 (1.6)**	**396 (4.0)**
Tahoe National Forest	**1054.1 (2.6)**	**2408 (5.9)**

Existing Native Surface Road and Motorized Trail Stream Crossings

Stream crossings have direct effects on the channel and local sediment regime. The basic problem comes down to disturbing the stream bed, banks, floodplain, and terraces of the stream. Streamflow diversions at road and motorized trail-stream crossings can result in significant erosion of road surfaces and hillslopes (for example, Best, 1995). Because the crossing is coincident with the channel, there is little opportunity to buffer any impacts of the crossing. Also, ditches near the crossing drain directly into the stream, often contributing sediment to the stream. Although any stream crossing can have some impact on the channel, careful engineering, construction, and maintenance can limit the severity of the impacts.

All road-stream crossings were assumed to have the potential to divert streamflow. Table 3.02-14 shows the number and density of native surface roads and motorized trail stream crossings by major river basin. Currently there are 2,408 native surface road and motorized trail perennial and intermittent stream crossings on the TNF. Crossing density on the TNF is 5.9 crossings per square mile. Crossing density is highest in the Feather River basin and lowest in the American River basin.

Documented Erosional Features

Field surveys were completed for approximately 100 miles of authorized and unauthorized motorized routes. See the Soil Resources section for full discussion of field surveys. See Appendix A (Site Specific Road, Trail and Open Area Information) for route specific erosion impacts. Projecting the percent erosion found during field surveys, an estimated 250 miles of routes could have erosional features.

Existing Landscape Erosion/Sedimentation Risk

Many factors can influence the risk of erosion and potential impacts to watershed resources including: soil erosion/sedimentation potential; stream density; and the type and density of roads on the landscape. The presence of highly erosive soils/landscapes or a high density of native-surfaced, motorized routes does not mean that there would be negative effects to soil resources. But the presence of both high erosion risk and a high density of motorized routes indicate that there could be a higher risk of accelerated erosion and sediment production due to motorized roads and trails.

The inherent risk of erosion of the soils and subsequent sediment movement within the TNF was assessed using two methods: the R-5 soil erosion hazard rating found in TNF Soil Resource Inventory and the Ecosystem Management Decision Support Model (EMDS). The R-5 EHR ratings indicate that 82 percent of the soils on the TNF have a high to very high erosion risk (Table 3.02-8). The EMDS model was used to refine the potential soil erosion risk analysis (See the Soil Resources section and Appendix L). The EMDS erosion risk scores were averaged by HUC6 watershed to assess the motorized route related erosion risk at the landscape scale. This scale is large enough to encompass the effects of management activities, but not so large as to mask the effects of the proposed actions. The EMDS landscape erosion risk score were divided into quartiles to compare the relative erosion potential of individual watersheds. The Truckee River landscape erosion scores were the only average score in the bottom 25 percent, therefore the Truckee River Basin has the lowest potential erosion risks on the TNF. Whereas the North Yuba River, which is much steeper, has more geodebris slides, and more erosive soils, has the highest potential erosion risks on the TNF, see Figure 3.02-2 and Table 3.02-15.

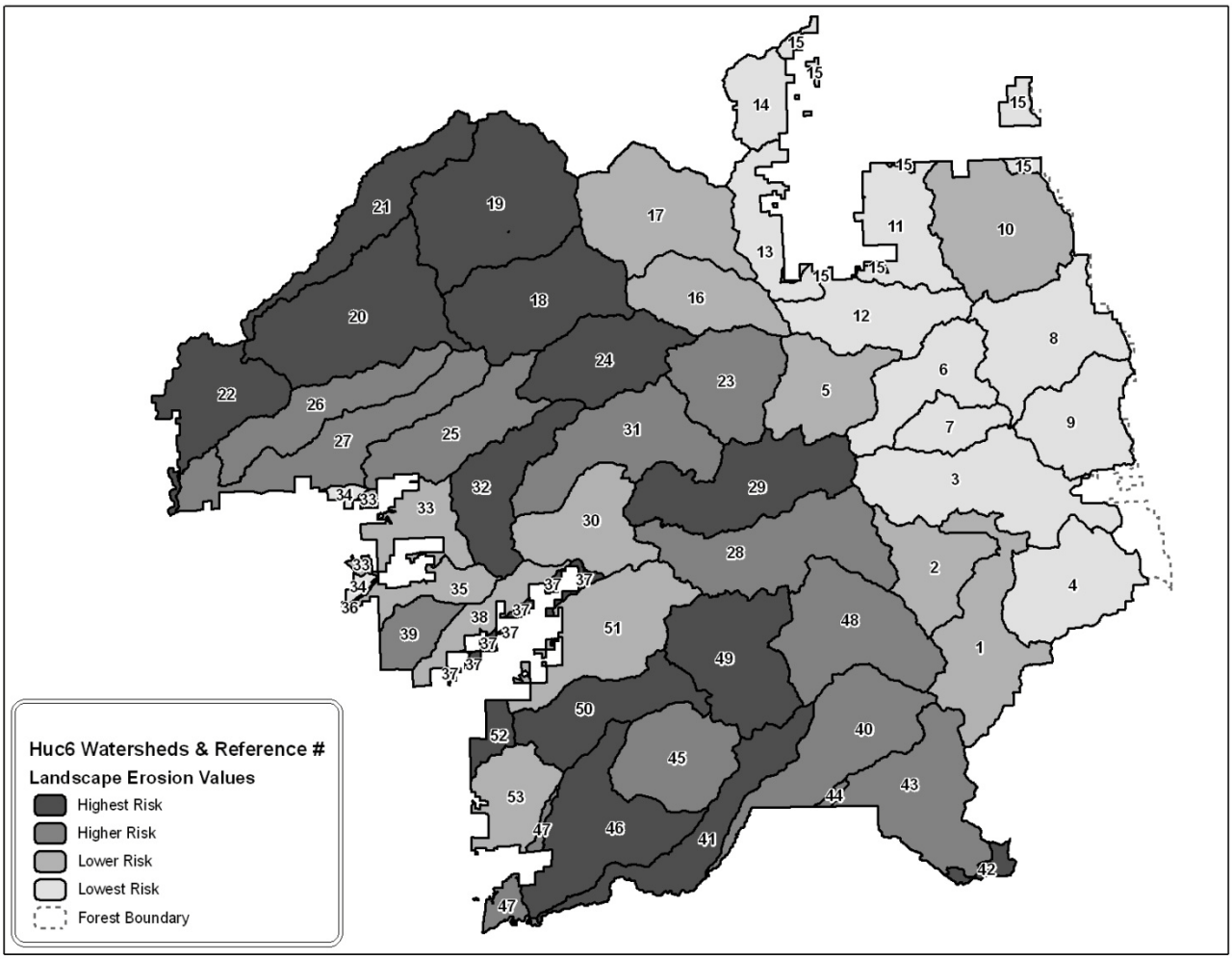

Figure 3.02-2. EMDS Landscape erosion values by HUC6.

Table 3.02-15. EMDS Erosion Risk rating and density of native surface roads and motorized trails by major river basin

River Basin	EMDS Potential Erosion Risk Class	Density of Native Surface Roads and Motorized Trails (miles/sq. mi.)
Middle Truckee River	*0.58 (0-25%)*	*4.4*
Little Truckee River	*0.65 (0-25%)*	*2.9*
Subtotal Truckee	**0.61 (0-25%)**	**3.7**
Feather	**0.62 (0-25%)**	**2.6**
North Yuba	*0.40 (75-100%)*	*2.5*
Middle Yuba	*0.44 (50-75%)*	*2.8*
South Yuba	*0.48 (25-50%)*	*2.7*
Subtotal Yuba	**0.44 (50-75%)**	**2.7**
Bear	**0.44 (50-75%)**	**3.7**
Middle Fork American	*0.45 (50-75%)*	*2.5*
North Fork American	*0.42 (50-75%)*	*2.0*
Subtotal American	**0.43 (50-75%)**	**2.2**
Tahoe National Forest	**0.48 (25-50%)**	**2.8**

This analysis focuses native surface (dirt) roads and motorized trails. Not incorporated in the focused analysis were surfaced roads, non-motorized trails, over-snow routes, and county and state roads because these routes tend to have a lower erosion potential. Because HUC6 watersheds range from 10,000 to 40,000 acres in size, density (e.g., miles of road & trails/acre of HUC6 or number of crossings/acre of HUC6) is a more meaningful measurement of route risks than simply the number of miles. Therefore, road/trail density is used in this analysis as well as the miles of roads and trails and the number of crossings. For a more site specific scale, see Appendix A, Site Specific Road, Trail and Open Area Information, for trail-specific erosion mitigation measures.

The existing native surface road and motorized trail density of HUC6 watersheds was divided into the following density classes based on quartiles (25 percent of watershed in each density class): 0.8 to 2.3 mi/sq.mi., 2.3 to 2.8 mi/sq.mi., 2.8 to 3.5 mi/sq.mi., and 3.5 to 6.5 mi/sq.mi. For example, the Middle Truckee River basin currently has a density of 4.4 mi/sq mi, which is in the highest density class found on the TNF. This analysis was done so that proposed changes in route density could be compared to the existing condition.

Table 3.02-15 shows the average EMDS Erosion Risk rating and the existing native surface road and motorized trail density by major river basin. The potential erosion risks in the Truckee and Feather River basins are the lowest on the TNF. The Truckee River and the Bear River basins have existing density of native surface road and motorized trails of 3.7 miles per square mile (the highest on the TNF). Erosion risk in the Middle Truckee River basin is in the lowest erosion risk class (The basins with erosion risk values in the 0-25 percent of the scores on the TNF). The Bear River basin is in the higher potential EMDS Erosion Risk quartile (50-75% Class). The potential erosion risk is higher in the Bear River basin than in the Truckee River basin; therefore more erosion related impacts due to motor vehicle use would be

expected in the Bear River than the Truckee River. The Yuba River and American River basins have similar erosion risks (higher EMDS Erosion Risk class), with the South Yuba having a slightly lower EMDS Erosion Risk than the rest of the Yuba River basin. The existing density of native surface roads and motorized trails in the Yuba River basin averages 2.7 miles/ square mile. The Middle Yuba has the highest density (2.8 mi/sq mi) and the North Yuba has the lowest (2.5 mi/sq mi). The American River basin is in the higher EMDS Erosion Risk quartile. Native surface road and motorized trail density averages 2.2 mi/sq mi. The Middle Fork American River basin has a density of 2.5 mi/sq mi and the North Fork American River basin has a density of 2.0 mi/sq mi.

Existing Equivalent Road Acres

The cumulative effects of this project on watershed resources (CWE) are analyzed at several scales (Forest, HUC6 Watershed, and RCA (See Riparian Conservation Objectives in Appendix I). The Forest-wide CWE analysis run for a recent Forest-wide fire planning exercise and project specific NEPA documents were used to identify HUC 7 watersheds that are at or over Threshold of Concern (TOC). Table 3.02-16 displays the number of watersheds and acres that are currently over the Threshold of Concern.

Table 3.02-16. Watersheds and acres that are currently over the Threshold of Concern

Threshold of Concern	Number of Watersheds	Acres
Over 100% Threshold of Concern	3	10,600
Under 100% Threshold of Concern	221	809,800

There are three HUC7 watersheds identified as being over TOC. These watersheds are Trout Creek, Alder Creek, and Upper Cold Stream. The majority of the ERA disturbance in the Trout Creek and Alder Creek watersheds is due to the Tahoe Donner Subdivision on private land. Upper Cold Stream has proposed projects that would take the watershed to TOC.

Environmental Consequences: Hydrology

Cross country motorized vehicle travel increases the amount of native surface routes on the TNF. The motorized trails being considered for addition to the NFTS are native surface wheel tracks that currently exist on the ground, so the hydrologic footprint of the routes already exists. The primary change considered in this analysis are the prohibition of cross country travel, changes in miles of motorized use on existing native surface roads and motorized trails and changes in class of vehicle or season of use on the existing NFTS. Therefore, the effects of route designation on soil and watershed resources focus on native surface roads and motorized trails within the FS boundary. These are the roads and motorized trails where effects on soil and watershed resources are most likely to occur. Surfaced roads are not included because generally mechanical soil loss by erosion and subsequent sediment production is very low on them.

Permitting motor vehicle use only on designated routes would reduce the extent of impacts off of the NFTS. While impacts on designated routes may be more severe than those that occur from more dispersed use, they can be effectively managed and mitigated. Restricting cross country travel would minimize the number of stream crossings and riparian impacts, and limit them to known areas that can be monitored and maintained.

Direct and Indirect Effects to Watershed Resources

Direct impacts to watersheds and stream courses that result from this project are limited. There are no new ground disturbing activities proposed with this project. The routes being evaluated in this analysis already exist on the ground, but may require upgrading to NFTS standards as well as periodic maintenance. They are compacted and generally lack vegetation. Runoff from the surface is collected and discharged as potentially erosive flows at points below the road or motorized trail. Some are eroded or causing erosion, others are stable and are not causing any negative resource impacts. From the standpoint of watershed resources, most adverse impacts associated with these roads and motorized trails have already occurred. Therefore, on these routes the potential effects on watershed resources are related to sustaining road or trail function and protecting water quality. It should be noted that most roads and motorized trails on the TNF have some site specific risk to water resources. Many of these risks can be mitigated.

Road and trail closures may result in less erosion to the extent that recurrent disturbance of the soil surface by OHV traffic is the primary cause of erosion. In many situations, however, erosion and subsequent sediment delivery to water bodies is the result of a combination of factors that include motorized use, as well as, season of use, a lack of drainage, inadequate maintenance, and poor trail design or location. If non-motorized trail users continue to use the routes some erosion and sediment transport could continue to occur.

The primary concern or effect of this project on the watershed resource is the potential for soil erosion and subsequent effects of sediment transport and deposition. Subsequent sediment deposition can damage terrestrial plants and aquatic organisms. High levels of sediment deposition can also reduce the utility of facilities for water storage and diversion and hydroelectric production. Activities in and near stream channels have the greatest potential for altering sediment delivery and storage as well as channel form. Because this document covers existing wheel tracks, the impacts to hydrologic function and buffering capacity have already taken place.

The erosion that may occur on the trail or road surface is a concern regarding loss or degradation of the facility. Erosion and sediment generated by the trail or road surface may be a concern to water quality if there is the potential for its delivery to a drainage feature.

All alternatives would have direct and indirect effects on watershed resources that vary by alternative. Route designation would affect soil erosion and subsequent sediment delivery to streams to the extent that activities resulting from designation or prohibition of use (1) affect the amount of *traffic* on routes; (2) affect the season of use (3) add motorized trails to the NFTS with highly erosive soils; (3) affect types of *maintenance*; and (4) affect the potential for *recovery* and restoration.

Route Recovery: See Soils section above

Projected Effects on Watershed Resources on the TNF

Projected Water Supply (direct, indirect, cumulative)

None of the action alternatives would increase impacts to water supplies, because this project only designates the class of vehicles and season of use on existing routes and does not propose to construct any new routes.

Projected Water Quality

There are six water bodies on the TNF that are listed as impaired on the EPA's 303(d) List. Table 3.02-17 displays the 303(d) listed water bodies, the reason for listing and any potential impacts which may contribute to the reasons for their listing.

Humbug Creek is listed as a 303(d) Impaired Water Body by EPA due to copper, mercury, zinc, sedimentation and siltation. While the source of the copper, mercury and zinc contamination is unknown, it is generally felt to be generated by abandoned mines. There is no change under any of the alternatives to the number of abandoned mines potentially contributing to this contamination.

The water body is also listed for sedimentation and siltation. Native surface roads and trails and their season of use can contribute to sedimentation and siltation. Virtually all of the native surface roads in this watershed are privately owned. None of the alternatives change the amount of private roads or their season of use. The Forest Service has jurisdiction of less than one mile of unauthorized routes in this watershed. All of the action alternatives except Alternative 5 prohibit use of this route by motorized vehicles. In Alternative 5 this motorized trail is added to the NFTS, however seasonal restrictions prohibit use of this motorized trail during the wet time of the year thereby reducing the potential for sedimentation and siltation.

Cross country travel by motorized vehicles can also have an impact of sedimentation and siltation. Cross country travel is prohibited in all of the action alternatives.

Kanaka Creek is listed as a 303(d) Impaired Water Body by EPA due to arsenic. While the source of the arsenic contamination is unknown, it is generally felt to be due the number of abandoned mines in the area and the type of rock formations. None of the alternatives change the number of abandoned mines nor alter the rock formations.

Donner Lake is listed as a 303(d) Impaired Water Body by EPA due to priority organics (PCB). While the source of the priority organics contamination is unknown, it is generally felt to be due to historic activity associated with the transportation utility corridor running through the watershed. None of the alternatives change the activities associated with the transportation utility corridor.

Table 3.02-17. 303(d) listed water bodies, the reason for listing and potential impacts

Impaired Water Body	Pollutant/Stressor	Indicator of Potential Impact	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Humbug Creek	Copper, Mercury, Zinc, Sedimentation & Siltation	National Forest System Native Surface Roads and Trails Open Year Round (Miles)	<1	0	0	0	0	0	0
		National Forest System Native Surface Roads and Trails Open Seasonally (Miles)	0	0	0	0	<1	0	0
		Private Ownership Native Surface Roads and Trails Open Year Round (Miles)	4	4	4	4	4	4	4
		Cross Country Travel	Continues	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
		Abandoned Mines	No Change	No Change	No Change	No Change	No Change	No Change	No Change
Kanaka Creek	Arsenic	Mining, Rock Formations	No Change	No Change	No Change	No Change	No Change	No Change	No Change
Donner Lake	Priority Organics	Transportation Utility Corridor Activity	No Change	No Change	No Change	No Change	No Change	No Change	No Change
Stampede Reservoir	Pesticide (lindane)	Pesticide Applications	No Change	No Change	No Change	No Change	No Change	No Change	No Change
Squaw Creek	Sediment & Siltation	National Forest System Native Surface Roads and Trails Open Year Round (Miles)	<1	0	0	0	0	0	0
		National Forest System Native Surface Roads and Trails Open Seasonally (Miles)	0	0	0	0	<1	0	0
		Private Ownership Native Surface Roads and Trails Open Year Round (Miles)	40	40	40	40	40	40	40
		Cross Country Travel	Continues	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
Truckee River	Sediment & Siltation	National Forest System Native Surface Roads and Trails Open Year Round (Miles)	0	0	0	0	0	0	0
		National Forest System Native Surface Roads and Trails Open Seasonally (Miles)	685	494	434	0	0	0	451
		Private Ownership Native Surface Roads and Trails Open Year Round (Miles)	628	628	628	628	628	628	628
		OHV Open Areas (Number)	4	4	1	1	4	4	4
		Cross Country Travel	Continues	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited

Stampede Reservoir is listed as a 303(d) Impaired Water Body by EPA due to pesticides (lindane). While the source of the pesticide contamination is unknown, it is generally felt to be due historic pesticide applications in the area. None of the alternatives change the activities associated with pesticide applications in the area.

Squaw Creek is listed as a 303(d) Impaired Water Body by EPA due to sedimentation and siltation.

Native surface roads and trails and their season of use can contribute to sedimentation and siltation. Virtually all of the native surface roads in this watershed are privately owned. None of the alternatives change the amount of private roads or their season of use. The Forest Service has jurisdiction of less than one mile of unauthorized routes in this watershed. All of the action alternatives except Alternative 5 prohibit use of this trail by motorized vehicles**.** In Alternative 5 this unauthorized route is added to the NFTS, however seasonal restrictions prohibit use of this route during the wet time of the year thereby reducing the potential for sedimentation and siltation.

Cross country travel by motorized vehicles can also have an impact of sedimentation and siltation. Cross country travel is prohibited in all of the action alternatives.

The **Truckee River** is listed as a 303(d) Impaired Water Body by EPA due to sedimentation and siltation.

Native surface roads and trails and their season of use can contribute to sedimentation and siltation. Approximately half (628 miles) of the native surface roads in this watershed are privately owned. None of the alternatives change the amount of private roads or their season of use. The Forest Service has jurisdiction of 685 miles of native surface roads and motorized trails within this watershed. All of the action alternatives reduce the number of native surface roads and motorized trails available for use by motorized vehicles by approximately 100 miles (15%). In addition all action alternatives include seasonal restrictions which prohibit use of these roads during the wet time of the year thereby reducing the potential for sedimentation and siltation.

There are also 4 OHV “Open Areas” within this watershed. The Prosser Pits OHV Open Area is already established as an “Open Area.” Any sedimentation being generated by this area would continue under all alternatives. Boca, Prosser and Stampede Reservoirs are currently managed to allow access to the shoreline below the high water line by motor vehicles when the soils are dry. Speeds are generally slow and since this access is allowed on dry soils only, any additional sediment generated by vehicles accessing the shoreline is minimal. Some fugitive dust could be created by the vehicles on the dry soils and possible drift into the reservoir, but the amount is also felt to be minimal. These reservoirs are established as “Open Areas” for shoreline access by motorized vehicles in Alternative 2 for a total of 2,589. In Alternative 6, 244 acres of the most stable, highly used areas are proposed as “Open Areas.” In Alternative 6 the class of vehicles allowed in these “Open Areas” is restricted to highway legal vehicles only which further mitigate the potential for sedimentation. The use of these dry lake beds by motorized vehicles is prohibited in Alternatives 3, 4, 5, and 7. Use is not prohibited at these reservoirs in Alternative 1.

Cross country travel by motorized vehicles can also have an impact of sedimentation and siltation. Cross country travel is prohibited in all of the action alternatives.

Stream crossings and native surface roads and motorized trails within close proximity to streams are the areas of highest potential sediment delivery to the stream channel. Figure 3.02-3 shows the density of native surface road and motorized trail perennial and intermittent stream crossings by alternative. Figure 3.02-4 shows the native surface road and motorized trail density in RCAs by alternative. All action alternatives would decrease the density of native surface roads and motorized trails within RCAs and native surface road and motorized trail stream crossings.

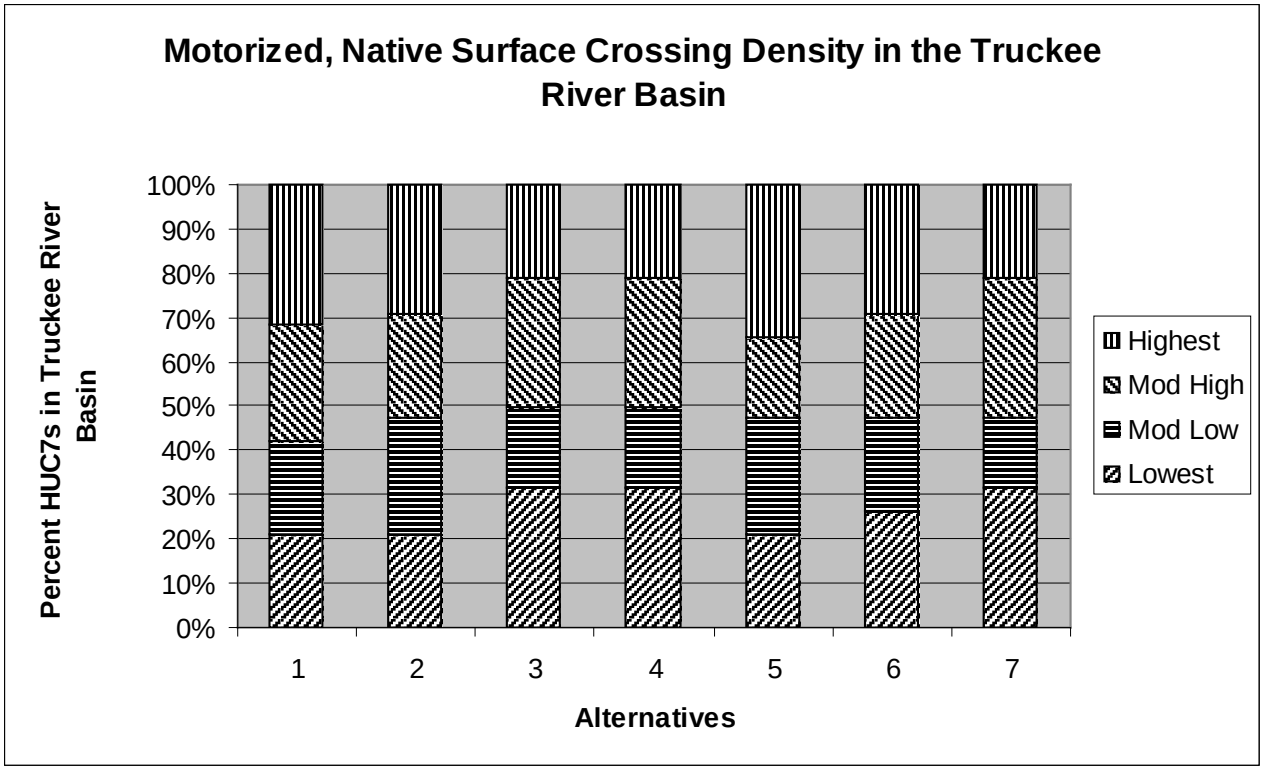

Figure 3.02-3. Native surface road and motorized trail crossing density in the Truckee River Basin (within the TNF boundary) by Alternative

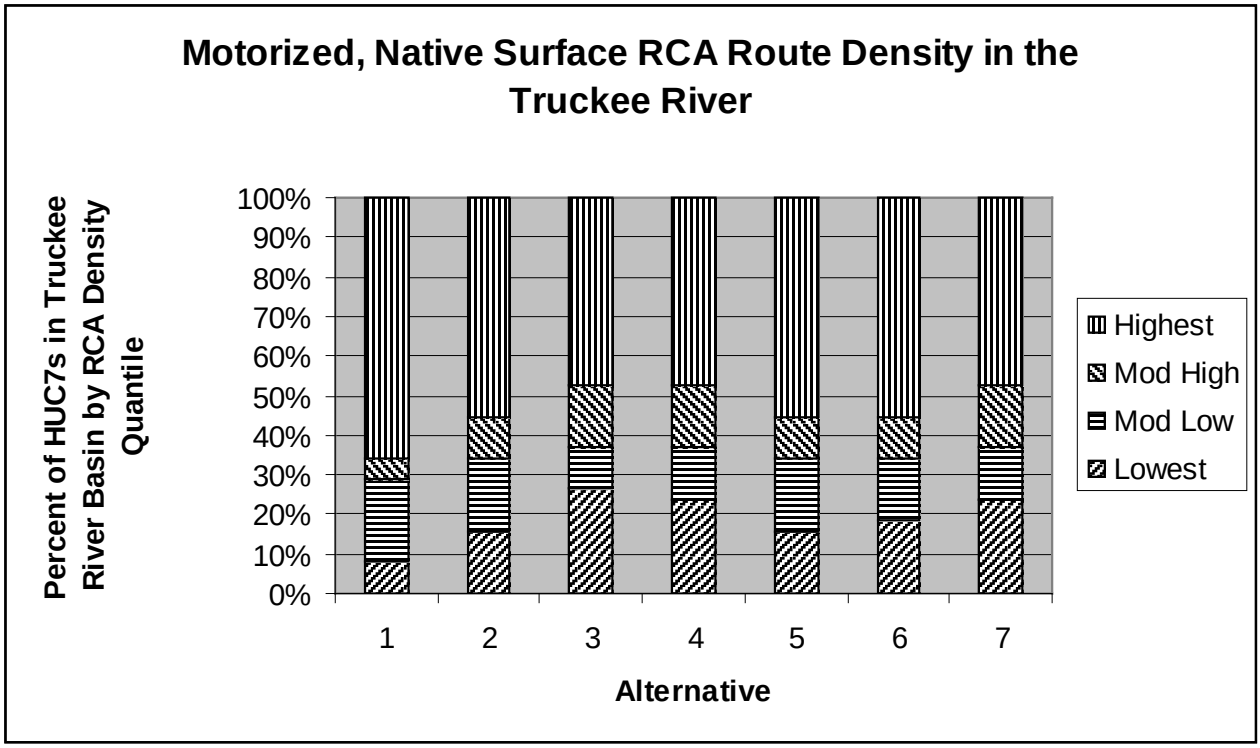

Figure 3.02-4. Native surface road and motorized trail density in RCAs in the Truckee River Basin (within the TNF boundary) by Alternative

Proposed Routes in Riparian Conservation Areas

Table 3.02-18 shows the miles and density of native surface roads and motorized trails in RCAs by major river basin and alternative. These figures include 394.6 miles of private roads within RCAs on private land. Action alternatives would decrease the number of existing crossings by 20 to 31 percent. The largest decrease is Alternative 3 and the smallest is Alternative 5.

Table 3.02-18. Miles and density of native surface roads and motorized trails in RCAs by alternative (Density mi per square mile of RCA)

River Basin	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Middle Truckee River	170.2 (5.1)	144.3 (4.3)	141.3 (4.2)	141.3 (4.2)	144.4 (4.3)	143.9 (4.3)	141.3 (4.2)
Little Truckee River	136.1 (2.9)	95.1 (2.0)	83.2 (1.8)	85.5 (1.8)	97.1 (2.0)	82.4 (1.7)	85.9 (1.8)
Subtotal Truckee River	**306.4 (3.8)**	**239.4 (3.0)**	**224.5 (2.8)**	**226.8 (2.8)**	**241.6 (3.0)**	**236.3 (2.9)**	**227.2 (2.8)**
Feather River	**114.9 (3.8)**	**78.9 (2.6)**	**62.5 (2.1)**	**62.5 (2.1)**	**78.9 (2.6)**	**70.7 (2.4)**	**62.5 (2.1)**
North Yuba River	*207.8 (2.4)*	*155.3 (1.8)*	*126.9 (1.5)*	*127.1 (1.5)*	*169.4 (1.9)*	*135.8 (1.6)*	*127.4 (1.5)*
Middle Yuba River	*85.9 (2.4)*	*64.8 (1.6)*	*59.3 (1.5)*	*59.8 (1.5)*	*65.0 (1.6)*	*62.6 (1.6)*	*59.3 (1.5)*
South Yuba River	*140.0 (2.2)*	*123.5 (1.9)*	*107.8 (1.7)*	*110.7 (1.8)*	*123.6 (2.0)*	*114.6 (1.8)*	*111.0 (1.8)*
Subtotal Yuba River	**433.7 (2.3)**	**343.6 (1.8)**	**294.0 (1.5)**	**297.6 (1.6)**	**358.0 (1.9)**	**313.0 (1.6)**	**297.8 (1.6)**
Bear River	**16.6 (2.3)**	**13.7 (1.8)**	**10.8 (1.5)**	**11.6 (1.6)**	**14.0 (1.9)**	**11.7 (1.6)**	**11.6 (1.6)**
North Fork American River	*83.9 (1.6)*	*68.8 (1.4)*	*63.4 (1.3)*	*63.6 (1.3)*	*69.6 (1.5)*	*66.3 (1.4)*	*63.6 (1.3)*
Middle Fork American River	*79.4 (1.7)*	*66.2 (1.3)*	*53.1 (1.0)*	*53.1 (1.0)*	*67.2 (1.3)*	*55.7 (1.1)*	*53.8 (1.0)*
Subtotal American River	**163.3 (1.6)**	**135.0 (1.4)**	**116.4 (1.2)**	**116.7 (1.2)**	**136.9 (1.4)**	**121.9 (1.2)**	**117.4 (1.2)**
TNF Total	**1054.1 (2.6)**	**828.7 (2.0)**	**726.2 (1.8)**	**733.3 (1.8)**	**847.4 (2.1)**	**771.8 (1.9)**	**734.6 (1.8)**
Percent Reduction by Alternative		**21%**	**31%**	**30%**	**20%**	**27%**	**30%**

Proposed Native Surface Road and Motorized Trail Stream Crossings

There are currently 2,408 native surface road and motorized trail perennial and intermittent stream crossings on the TNF (Table 3.02-19). Crossing density is 5.9 crossings per square mile averaged over the TNF. This includes 714 stream crossings on private land. All of the Action alternatives would decrease the number of crossings by 21 to 35 percent. The largest decrease is Alternative 3 and the smallest is Alternative 5.

Table 3.02-19. Number and density of native surface road and motorized trail stream crossings by alternative (Density, number of crossings per square mile of RCA)

River Basin	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Middle Truckee River	213 (6.3)	186 (5.5)	183 (5.4)	183 (5.4)	187 (5.6)	189 (5.6)	183 (5.4)
Little Truckee River	281 (5.1)	217 (4.6)	183 (3.9)	187 (3.9)	218 (4.6)	205 (4.3)	189 (4.0)
Subtotal Truckee River	**494 (6.1)**	**403 (5.0)**	**366 (4.5)**	**370 (4.6)**	**405 (5.0)**	**394 (4.9)**	**372 (4.6)**
Feather River	**358 (12.0)**	**236 (7.9)**	**192 (6.4)**	**192 (6.4)**	**236 (7.9)**	**218 (7.3)**	**192 (6.4)**
North Yuba River	485 (5.6)	351 (4.0)	256 (2.9)	259 (3.0)	396 (4.6)	280 (3.2)	259 (3.0)
Middle Yuba River	288 (7.2)	226 (5.7)	208 (5.2)	209 (5.3)	226 (5.7)	221 (5.6)	208 (5.2)
South Yuba River	322 (5.1)	262 (4.2)	223 (3.5)	229 (3.6)	262 (4.2)	237 (3.8)	228 (3.6)
Subtotal Yuba	**1095 (5.8)**	**839 (4.4)**	**687 (3.6)**	**696 (3.7)**	**884 (4.7)**	**738 (3.9)**	**695 (3.7)**
Bear River	**59 (8.1)**	**47 (6.4)**	**38 (5.2)**	**41 (5.6)**	**47 (6.4)**	**41 (5.6)**	**41 (5.6)**
North Fork American River	157 (3.3)	127 (2.6)	117 (2.4)	118 (2.5)	127 (2.7)	125 (2.6)	118 (2.5)
Middle Fork American River	239 (4.6)	195 (3.8)	154 (3.0)	156 (3.0)	199 (3.8)	159 (3.1)	155 (3.0)
Subtotal American	**396 (4.0)**	**322 (3.2)**	**271 (2.7)**	**272 (2.7)**	**326 (3.3)**	**284 (2.8)**	**273 (2.7)**
TNF Total	**2408 (5.9)**	**1851 (4.5)**	**1558 (3.8)**	**1576 (3.9)**	**1902 (4.7)**	**1679 (4.1)**	**1577 (3.9)**
Percent Reduction by Alternative		23%	34%	35%	21%	30%	35%

Proposed Routes with Documented Erosional Features

Field surveys measured the amount of existing erosional features. Table 3.02-20 shows the existing erosional features found by alternative. Alternative 1 uses an estimate of the miles of erosion based on the percentage of erosion found during surveys times the miles of unauthorized routes and ML 1 routes receiving unauthorized use.

Table 3.02-20. Erosional features (miles) on proposed routes by alternative.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Tahoe National Forest	250	54.1	0	19.1	54.1	41.7	38.4

Proposed Native Surface Road and Motorized Trail Route Density – Erosion/Sedimentation Risk

All action alternatives would lower densities of native surface roads and motorized trails on the Tahoe National Forest 21 to 32 percent. Table 3.02-21 shows the density of native surface roads and motorized trails by major river basin by alternative. The No Action Alternative (Alternative 1) has the highest densities of native surface roads and motorized trails used by motorized vehicles. Alternatives 3, 4 and 7 would have the lowest route density (1.9 mi/sq/mi) of motorized use on native surface roads and motorized trails. Alternative 6 densities would be slightly higher than Alternatives 3, 4 and 7. Of the action alternatives, Alternatives 2 and 5 would result in the highest route densities (2.2 mi/sq.mi). Alternative 6 would result in a density of 2.0 mi/sq.mi.

Table 3.02-21. Density of "Higher Risk Routes" by major river basin by alterative (mi./sq. mi.)

River Basin	EMDS Erosion Risk (risk quartile (0-25%, 25-50%, 50-75%, 75-100%))	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Middle Truckee River	0.58 (Lowest)	4.4	3.9	3.8	3.8	3.9	3.9	3.8
Little Truckee River	0.65 (Lowest)	2.9	2.2	1.9	1.9	2.2	2.1	1.9
Subtotal Truckee River	**0.61 (Lowest)**	**3.7**	**3.1**	**2.9**	**2.9**	**3.1**	**3.0**	**2.9**
Feather River	**0.62 (Lowest)**	**2.6**	**1.7**	**1.5**	**1.5**	**1.7**	**1.6**	**1.5**
North Yuba River	*0.40 (Highest)*	*2.5*	*1.8*	*1.4*	*1.5*	*2.0*	*1.5*	*1.5*
Middle Yuba River	*0.44 (Higher)*	*2.8*	*2.2*	*2.1*	*2.1*	*2.2*	*2.1*	*2.1*
South Yuba River	*0.48 (Lower)*	*2.7*	*2.2*	*2.0*	*2.0*	*2.3*	*2.1*	*2.0*
Subtotal Yuba	**0.44 (Higher)**	**2.7**	**2.1**	**1.8**	**1.8**	**2.2**	**1.9**	**1.8**
Bear River	**0.44 (Higher)**	**3.7**	**3.1**	**2.7**	**2.8**	**3.1**	**2.9**	**2.8**
North Fork American River	*0.45 (Higher)*	*2.5*	*1.8*	*1.6*	*1.6*	*1.9*	*1.7*	*1.6*
Middle Fork American River	*0.42 (Higher)*	*2.0*	*1.6*	*1.5*	*1.5*	*1.6*	*1.6*	*1.5*
Subtotal American	**0.43 (Higher)**	**2.2**	**1.7**	**1.5**	**1.5**	**1.7**	**1.6**	**1.5**
TNF Total	**0.48 (Lower)**	**2.8**	**2.2**	**1.9**	**1.9**	**2.2**	**2.0**	**1.9**
	% reduction		**21%**	**32%**	**32%**	**21%**	**29%**	**32%**

Existing native surface road and motorized trail route densities were divided into quartiles (25% in each density class) to track proposed changes in route density. So the HUC6 watersheds with the lowest 25 percent EMDS erosion risk scores represent the watersheds on the TNF with the lowest risk of motorized routes related erosion. Table 3.02-21 shows that forest-wide there is a decrease in native surface road and motorized trail density of 21 to 32 percent from implementing any of the Action Alternatives. On the eastside of the Tahoe, where erosion risks are the lowest on the Forest, native surface road and motorized trail density would decrease by 16 to 22 percent in the Truckee River basin and 35 to 42 percent in the Feather River basin (Sierra Valley). On the Westside of the Forest, where erosion risks are the highest, there would be a decrease of 18 to 33 percent in the Yuba River basin, 16 to 27 percent in the Bear River basin, and 22 to 31 percent in the American River basin. The North Yuba River sub-basin has the highest erosion risk on the Forest. Native surface road and motorized trail density would decrease by 20 to 40 percent in the Action alternatives.

Figure 3.02-5 and Table 3.02-22 show the percent of the HUC6 watersheds on the TNF by Alternative and native surface road and motorized trail density class. Currently 25 percent of the HUC6 watersheds on the TNF have a native surface road and motorized trail density of 3.5 to 6.5 miles per square mile. All of the action alternatives would decrease the HUC6 watersheds in this density class by 12 to 17 percent. There would be an increase in the HUC6 watersheds within the lowest existing density class (0.8-2.3) of 21 to 44 percent with implementation of the action alternatives.

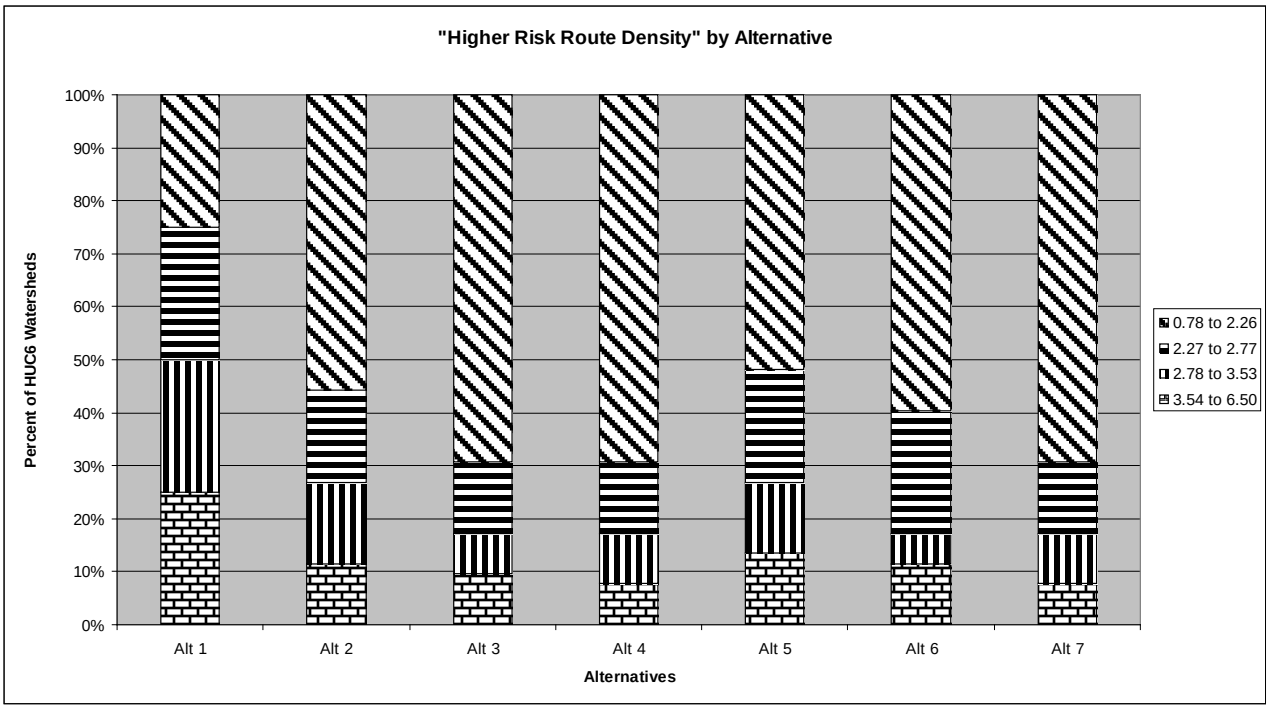

Figure 3.02-5. Native surface roads and motorized trails by alternative and density class

Table 3.02-22. Native surface roads and native trails by Alternative and Density Class

Existing Density Class	% of HUC6 watersheds by high risk route density class by Alt						
	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
3.5 to 6.5	25%	12%	10%	8%	13%	12%	8%
2.8 to 3.5	25%	15%	8%	10%	13%	6%	10%
2.3 to 2.8	25%	17%	13%	13%	21%	23%	13%
0.8 to 2.3	25%	56%	69%	69%	52%	60%	69%

Equivalent Road Acres Analysis

All action alternatives decrease the ERAs associated with roads and trails on the TNF including long-term recovery of undesignated routes (see Table 3.02-23).

Table 3.02-23. Equivalent Road Acres associated with roads and trails due to cumulative effects of all proposed actions (ERA percents of watershed)

River Basin	Basin Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Middle Truckee River	118,238	2,417.6 2.05%	2,241.0 1.90%	2,239.0 1.89%	2,240.8 1.90%	2,242.4 1.90%	2,245.3 1,90%	2,240.5 1.90%
Little Truckee River	109,1558	1,329.1 1.22%	1,182.6 0.99%	1,066.3 0.98%	1,074.2 0.98%	1,095.1 1.00%	1,087.1 1.00%	1,072.8 0.98%
Subtotal Truckee River	**227,393**	**3,746.7 1.65%**	**3,423.6 1.46%**	**3,305.3 1.45%**	**3,315.0 1.46%**	**3,337.5 1,47%**	**3,332.4 1.47%**	**3,313.3 1.46%**
Feather River	**249,750**	2,726.7 1.09%	2,067.2 0,83%	2,063.1 0.83%	2,064.2 0.83%	2,078.8 0,83%	2,072.7 0.83%	2,060.6 0.83%
North Yuba River	229,995	2,469.8 1.07%	1,923.5 0.84%	1,902.5 0.83%	1,906.0 0.83%	2,043.3 0.89%	1,922.4 0.84%	1,913.0 0.83%
Middle Yuba River	126,370	1,757.9 1.39%	1,530.8 1.21%	1,528.6 1.21%	1,529.9 1.21%	1,536.4 1.22%	1,533.3 1.21%	1,529.4 1.21%
South Yuba River	174,566	2,123.7 1.22%	1,798.6 1.03%	1,781.1 1.02%	1,785.2 1.02%	1,806.8 1.04%	1,799.7 1.03%	1,789.5 1.03%
Subtotal Yuba River	**530,932**	**6,351.4 1.20%**	**5,252.9 0.99%**	**5,212.3 0.98%**	**5,221.2 0.98%**	**5,386.4 1.02%**	**5,255.4 0.99%**	**5,231.9 0.99%**
Bear River	**23,310**	343.7 1.48%	290.0 1.24%	288.4 1.24%	290.0 1.24%	293.2 1.26%	290.6 1.25%	290.0 1.24%
Middle Fork American River	153,368	1,570.2 1.02%	1,241.6 0.81%	1,238.6 0.81%	1,239.5 0.81%	1,264.9 0.83%	1,245.9 0.81%	1,240.2 0.81%
North Fork American River	140,869	1,165.8 0.83%	958.0 0.68%	952.1 0.68%	955.6 0.68%	965.2 0.69%	958.6 0.68%	957.2 0.68%
Subtotal American River	**294,237**	**2,726.0 0.93%**	**2,199.7 0.75%**	**2,190.7 0.75%**	**2,195.1 0.75%**	**2,230.1 0.76%**	**2,204.5 0.75%**	**2,197.4 0.75%**
Total TNF	**1,325,623**	**16,030.1 1.21%**	**13,353.7 1.00%**	**13,179.5 0.99%**	**13,205.9 1.00%**	**13,446.3 1.01%**	**13,275.9 1.00**	**13,219.6 1.00%**

Environmental Consequences by Alternative

Alternative 1 – No action

- **Prohibition of Cross Country Motor Vehicle Travel:** Cross country travel would not be prohibited in Alternative 1 on 717,900 acres. Cross country travel is currently prohibited on 86,500 acres. It is likely that cross-county travel would result in an increase in the motorized footprint on the TNF. Cross country travel would continue on approximately 1,081miles of native surface, motorized unauthorized routes and ML 1 routes receiving unauthorized use (207 miles in RCAs). This could impact hydrology resources by increasing erosion, sediment production and delivery to streams which could decrease water quality.
- **Additions to the NFTS.** There are no additions of routes to the NFTS under this alternative.
- **Establishment of motorized "Open Areas".** There are no establishments of "Open Areas" under this alternative.
- **Changes to the existing NFTS.** There are no changes to vehicle class and/or season of use to the NFTS under this alternative. No Maintenance Level (ML) 1 Roads are reopened with this

alternative; however, cross country motorized use is allowed, so the net effect would be that use of some ML 1 route would probably occur.

- **Forest Plan Amendment**: There are no changes to the Forest Plan with this alternative.
- **Cumulative Effects**
  - There are 2,649 acres of "Open Areas" in RCAs (Greenhorn Area – 60 acres; Boca, Prosser, and Stampede Reservoir access – 2,589 acres)
  - There is a total of 1,080.5 miles of native surface roads and motorized trails in RCAs on the TNF.
  - There are 2,462 perennial and intermittent crossings on the TNF.
  - There is an estimated 250 miles of routes on the Forest with erosional features (Based on percent of erosional features found during route surveys for this project).
  - The ERAs associated with the NFTS are 16,030.

Alternative 2 – Increased Motorized Recreation and Access Opportunities

- **Prohibition of Cross Country Motor Vehicle Travel:** Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization. This would prohibit the proliferation of new routes and prohibit motorized use on all unauthorized and closed system routes not added to the NFTS. This could reduce erosion and subsequent sediment delivery to waterbodies associated with motorized use on the TNF.
- **Additions to the NFTS.** Adding 2.6 miles of roads in RCAs and 9.7 miles of trails in RCAs to the NFTS would have minimal effects to hydrology resources. These are pre-existing routes so no new soil compaction/disturbance would be created. These route additions would be subject to FS standards.
- **Establishment of motorized "Open Areas"** Four "Open Areas" totaling 2,649 acres would be established in the Bear River basin (Greenhorn Area at 60 acres) and the Truckee River basin (Prosser, Boca and Stampede Reservoirs at 2,589 acres). These areas are currently being used as "Open Areas" even though they are not established "Open Areas". Localized effects to hydrology resources in these areas have been reported especially during wet season use.
- **Changes to the existing NFTS.**
  - **Change Vehicle Classes through Mixed Use**: Approving mixed use on 241.5 miles would not affect hydrology resources.
  - **Change Vehicle Classes through Maintenance Levels:** Changing vehicle class on 34.3 miles of routes in RCAs to allow licensed operators of non-highway legal vehicles to operate on NFS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2 would have minimal effects to watershed resources. These are pre-existing "routes." As NFTS routes, these routes would be subject to FS standards.
  - **Changes in Seasonal Restrictions:** Seasonal restrictions for deer winter range would be lifted on 1.6 miles of roads in RCAs resulting from the Forest Plan Amendment to Management Area

84 (Humbug-Sailor) which would slightly increase the risk of wet season damage to these roads and adjacent watersheds.

  - **Reopening Maintenance Level 1 Roads**: No ML 1 roads would be opened to motorized use.
- **Forest Plan Amendment**: There would be the same effects as the Seasonal Restrictions above.
- **Cumulative Effects:** The short-term cumulative effects of Alternative 2 would be minimal. The long-term cumulative effects of Alternative 2 would decrease the NFTS hydrologic footprint and effects to watershed resources.
  - There would be 2,649 acres of "Open Areas" in RCAs (Greenhorn Area; Boca, Prosser, and Stampede Reservoir access).
  - There would be a total of 772 miles of native surface roads and motorized trails in RCAs on the TNF (density =0.7 mi./sq.mi.).
  - There would be 1,689 perennial and intermittent crossings.
  - There are 54.1 miles of routes on the Forest proposed for addition to the NFTS with documented erosional features. These erosion features would be mitigated prior to opening for motorized use.
  - The ERAs associated with the NFTS would be 13,254.

Alternative 3 – Cross country Travel Prohibition Only – No Changes to the Existing National Forest Transportation System

- **Prohibition of Cross Country Motor Vehicle Travel:** Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization. This would prohibit the proliferation of new routes and prohibit motorized use on all unauthorized and closed system routes not added to the NFTS. This could reduce erosion and subsequent sediment delivery to waterbodies associated with motorized use on the TNF.
- **Additions to the NFTS.** No unauthorized routes would be added to the NFTS as roads or motorized trails under this alternative
- **Establishment of motorized "Open Areas"** No additional motorized "Open Areas" would be established under this alternative.
- **Changes to the existing NFTS - this includes changing the vehicle class and/or season of use and reopening ML 1 Roads.** No Changes to the NFTS would be made in this alternative.
- **Forest Plan Amendment**: No amendments would be made to the Forest Plan.
- **Cumulative Effects:** The short-term cumulative effects of Alternative 3 would be minimal. The long-term cumulative effects of Alternative 3 would decrease the NFTS hydrologic footprint and effects to watershed resources.
  - There are 0.0 miles of unauthorized native surface roads and motorized trails in RCAs proposed for addition to NFTS.
  - There would be 0 acres of "Open Areas" in RCAs (Greenhorn Area; Boca, Prosser, and Stampede Reservoir access).

- There would be a total of 725.8 miles of native surface roads and motorized trails in RCAs on the TNF (density = 0.7 mi./sq.mi.).
- There would be 1,558 perennial and intermittent crossings.
- There are 0.0 miles of routes on the Forest proposed for addition to the NFTS with documented erosional features.
- The ERAs associated with the NFTS would be 13,180.

Alternative 4 – Increased Resource Protection

- **Prohibition of Cross Country Motor Vehicle Travel:** Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside established motorized use areas would be prohibited, except as allowed by permit or other authorization. This would prohibit the proliferation of new routes and prohibit motorized use on all unauthorized and closed system routes not added to the NFTS. This could reduce erosion and subsequent sediment delivery to waterbodies associated with motorized use on the TNF.
- **Additions to the NFTS.** Adding 1.7 miles of roads in RCAs and 3.7 miles of trails in RCAs to the NFTS would have minimal effects to hydrology resources. These are pre-existing routes so no new soil compaction/disturbance would be created. These route additions would be subject to FS standards.
- **Establishment of motorized "Open Areas"** No additional motorized "Open Areas" would be established under this alternative.
- **Changes to the existing NFTS.**
  - **Change Vehicle Classes through Mixed Use**: No changes would be made to allow licensed operators of non-highway legal vehicles to operate on NFS roads where such use is currently prohibited through approval of mixed use.
  - **Change Vehicle Classes through Maintenance Levels:** Changing vehicle class on 2.0 miles or routes in RCAs to allow operators of non-highway legal vehicles to operate on NFS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2 would have minimal effects to hydrology resources. These are pre-existing "routes." As NFTS routes, these routes would be subject to FS standards.
  - **Changes in Seasonal Restrictions:** Wet weather seasonal closures from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails would be added to minimize erosion and protect water quality. A total of 245.8 total miles in RCAs would have changes in seasonal restrictions. Seasonal restrictions would decrease the risk of increased erosion and sediment deliver to water bodies associated with wet season route damage due to motorized use.
  - **Reopening Maintenance Level 1 Roads**: Reopening 0.1 miles on one ML 1 road in RCAs to motorized use would not affect long-term hydrology resources. 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.

- **Forest Plan Amendment**: No amendments would be made to the Forest Plan.
- **Cumulative Effects:** The short-term cumulative effects of Alternative 4 would be minimal. The long-term cumulative effects of Alternative 4 would decrease the NFTS hydrologic footprint and effects to watershed resources.
  - There would be 0 acres of "Open Areas" in RCAs (Greenhorn Area; Boca, Prosser, and Stampede Reservoir access).
  - There would be a total of 733.3 miles of native surface roads and motorized trails in RCAs on the TNF (density =0.7 mi./sq.mi.).
  - There would be 1,576 perennial and intermittent crossings on the TNF.
  - There are 19.1 miles of routes on the Forest proposed for addition to the NFTS with documented erosional features. These erosion features would be mitigated prior to opening for motorized use.
  - The ERAs associated with the NFTS would be 13,206.

Alternative 5 – Increased Motorized Recreation Access plus Reopening Maintenance Level 1 and Temporary Roads

- **Prohibition of Cross Country Motor Vehicle Travel:** Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside designated motorized use areas would be prohibited, except as allowed by permit or other authorization. This would prohibit the proliferation of new routes and prohibit motorized use on all unauthorized and closed system routes not added to the NFTS. This could reduce erosion and sediment delivery to waterbodies associated with motorized use on the TNF.
- **Additions to the NFTS.** Adding 2.6 miles of roads in RCAs and 13.7 miles of trails in RCAs to the NFTS would have minimal effects to soil resources. These are pre-existing routes so no new soil compaction/disturbance would be created. These route additions would be subject to FS standards.
- **Establishment of motorized "Open Areas"** No additional motorized "Open Areas" would be established under this alternative.
- **Changes to the existing NFTS.**
  - **Change Vehicle Classes through Mixed Use**: Changing vehicle class on 241.5 miles to allow licensed operators of non-highway legal vehicles to operate on NFS roads where such use is currently prohibited through approval of mixed use would not affect hydrology resources.
  - **Change Vehicle Classes through Maintenance Levels:** Changing vehicle class on 34.3 miles of roads in RCAs to allow operators of non-highway legal vehicles to operate on NFS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2 would have minimal effects to hydrology resources. These are pre-existing "routes." As NFTS routes, these routes would be subject to FS standards.

  - **Changes in Seasonal Restrictions:** Wet weather seasonal closures from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails would be added to minimize erosion and protect water quality. A total of 263.1miles of routes in RCAs would have changes in seasonal restrictions.
  - **Reopening Maintenance Level 1 Roads**: Reopening 14.8 miles on 113 ML 1 roads in RCAs to motorized use would have a small affect on hydrology resources where the routes are reopened. 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.
- **Forest Plan Amendment**: There would be the same effects as the Seasonal Restrictions above.
- **Cumulative Effects**: The short-term cumulative effects of Alternative 5 would be minimal. The long-term cumulative effects of Alternative 5 would decrease the NFTS hydrologic footprint and effects to watershed resources.
  - There would be 0 acres of "Open Areas" in RCAs (Greenhorn Area; Boca, Prosser, and Stampede Reservoir access).
  - There are 16.1 miles of unauthorized native surface roads and motorized trails routes in RCAs proposed for addition to NFTS.
  - There would be 50.1 miles of ML 1 roads in RCAs reopened.
  - There would be a total of 791 miles of native surface roads and motorized trails in RCAs on the TNF (density = 0.7 mi./sq.mi.).
  - There would be 1,740 perennial and intermittent crossings.
  - There are 54.1 miles of routes on the Forest proposed for addition to the NFTS with documented erosional features. These erosion features would be mitigated prior to opening for motorized use.
  - The ERAs associated with the NFTS would be 13,446.

Alternative 6 – Preferred Alternative Motorized Access and Resource Protection

- **Prohibition of Cross Country Motor Vehicle Travel:** Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside designated motorized use areas would be prohibited, except as allowed by permit or other authorization. This would prohibit the proliferation of new routes and prohibit motorized use on all unauthorized and closed system routes not added to the NFTS. This could reduce erosion and subsequent sediment delivery to waterbodies associated with motorized use on the TNF.
- **Additions to the NFTS.** Adding 7.0 miles of roads in RCAs and 9.0 miles of trails in RCAs to the NFTS would have minimal effects to hydrology resources. These are pre-existing routes so no new soil compaction/disturbance would be created. These route additions would be subject to FS standards.
- **Establish motorized "Open Areas"** Three areas totaling 244 acres (Boca, Prosser, and Stampede Reservoir access) would be established as motorized "Open Areas" under this alternative.

- **Changes to the existing NFTS.**
  - **Change Vehicle Classes through Mixed Use**: Changing vehicle class on 130.8 miles of roads in RCAs to allow licensed operators of non-highway legal vehicles to operate on NFS roads where such use is currently prohibited through approval of mixed use would not affect hydrology resources.
  - **Change Vehicle Classes through Maintenance Levels:** Changing vehicle class on 25.2 miles of roads in RCAs to allow operators of non-highway legal vehicles to operate on NFS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2 would have minimal effects to hydrology resources. These are pre-existing routes so the loss of productivity has already occurred. As NFTS routes, these routes would be subject to FS standards.
  - **Changes in Seasonal Restrictions:** Wet weather seasonal closures from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails would be added to minimize erosion and protect water quality. In addition, over the snow travel would be permitted on 3.6 miles of the Fordyce Jeep trail when 15 inches of snow is present on the ground. A total of 255.5 miles of routes in RCAs would have changes seasonal restrictions.
  - **Reopening Maintenance Level 1 Roads**: Reopening 2.2 miles of 13 ML 1 roads in RCAs to motorized use would have a small affect on hydrology resources where the routes are reopened. 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.
  - **Forest Plan Amendment**: There would be the same effects as the Seasonal Restrictions above.
- **Cumulative Effects**: The short-term cumulative effects of Alternative 6 would be minimal. The long-term cumulative effects of Alternative 6 would decrease the NFTS hydrologic footprint and effects to watershed resources.
  - There would be 244 acres of “Open Areas” in RCAs (Boca, Prosser, and Stampede Reservoir access).
  - There would be a total of 769.2 miles of native surface roads and motorized trails in RCAs on the TNF (density =0.7 mi./sq.mi.).
  - There would be 244 acres of “Open Areas” in RCAs (Boca, Prosser, and Stampede Reservoir access).
  - There would be 1,676 perennial and intermittent crossings.
  - There are 41.7 miles of routes on the Forest proposed for addition to the NFTS with documented erosional features. These erosion features would be mitigated prior to opening for motorized use.
  - The ERAs associated with the NFTS would be 13,276.

Alternative 7 – Proposed Action as Identified in Notice of Intent (NOI)

- **Prohibition of Cross Country Motor Vehicle Travel:** Public wheeled motor vehicle travel off designated NFTS roads, NFTS trails, and outside designated motorized use areas would be prohibited, except as allowed by permit or other authorization. This would prohibit the proliferation of new routes and prohibit motorized use on all unauthorized and closed system routes not added to the NFTS. This could reduce erosion and subsequent sediment delivery to waterbodies associated with motorized use on the TNF.
- **Additions to the NFTS.** Under this alternative, adding 6.8 miles unauthorized trails in RCAs to the NFTS would have minimal effects to hydrology resources. These are pre-existing routes so no new soil compaction/disturbance would be created. These routes would be subject to FS standards.
- **Establishment of motorized "Open Areas"** No additional motorized "Open Areas" would be established under this alternative.
- **Changes to the existing NFTS.**
  - **Change Vehicle Classes through Mixed Use**: No changes would be made to allow licensed operators of non-highway legal vehicles to operate on NFS roads where such use is currently prohibited through approval of mixed use.
  - **Change Vehicle Classes through Maintenance Levels:** Changing vehicle class on 2.0 miles of roads in RCAS to allow operators of non-highway legal vehicles to operate on NFS roads where such use is currently prohibited through the conversion of ML 3 roads to ML 2 would have minimal effects to hydrology resources. These are pre-existing "routes." As designated routes within the NFTS these routes would be subject to FS standards.
  - **Changes in Seasonal Restrictions:** No changes in seasonal restrictions would be made.
  - **Reopening Maintenance Level 1 Roads**: Reopening two ML 1 roads (0.1 miles in RCAs) to motorized use may have a minor effect on hydrology resources. 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.
- **Forest Plan Amendment**: No amendments would be made to the Forest Plan.
- **Cumulative Effects**: The short-term cumulative effects of Alternative 7 would be minimal. The long-term cumulative effects of Alternative 7 would decrease the NFTS hydrologic footprint and effects to watershed resources.
  - There would be 0 acres of "Open Areas" in RCAs (Greenhorn Area; Boca, Prosser, and Stampede Reservoir access).
  - There would be a total of 734.6 miles of native surface roads and motorized trails in RCAs on the TNF (density =0.7 mi./sq.mi.).
  - There would be 1,577 perennial and intermittent crossings on the TNF.
  - There are 38.4 miles of routes on the Forest proposed for addition to the NFTS with documented erosional features. These erosion features would be mitigated prior to opening for motorized use.

- The ERAs associated with the NFTS would be 13,220.

Summary of Effects to Hydrology Resources

Table 3.02-24 summarizes the effects analysis for hydrology resources by ranking each alternative regarding how well it provides for each of the indicators. This summary is not meant to convey that the indicators are equal in importance. The following rankings were used: A score of 7 indicates the alternative has the least impact for hydrology resources to the indicator. A score of 1 indicates the alternative has the most impact for hydrology resources related to the indicator.

Table 3.02-24. Comparison of Effects to Hydrology Resources

Indicators – Hydrology Resources	Rankings of Alternatives for Each Indicator[1]						
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of unauthorized routes in hydrologically sensitive areas (RCAs).	1	0	0	0	0	0	0
Native Surface Roads and Motorized Trails in RCAs Sum of the erosion potential in cubic yards or tons or route miles with existing erosional features on unauthorized routes and areas proposed for addition to the NFTS in hydrologically sensitive areas on the forest.	1	3	7	6	2	4	5
Numbers of locations where routes divert or have potential to divert streamflow. All Higher Risk Route crossings are assumed to have diversion potential.	1	3	7	6	2	4	5
Sum of route miles with documented erosional features.	1	2	7	6	2	5	6
Equivalent roaded areas in acres.	1	4	7	6	2	3	5
Prohibition on Cross County Travel	1	2	4	4	4	3	4
Seasonal Restrictions miles of routes	2	1	2	5	7	6	2
Native surface road and motorized trail density	1	3	5	6	2	4	6
Average for Water Resources	**1.0**	**2.0**	**7.0**	**6.0**	**3.0**	**4.0**	**5.0**

[1] A score of 7 indicates the alternative has the least impact for water resources related to the indicator; A score of 1 indicates the alternative has the most impact for water resources related to the indicator.

Using the metrics from Table 3.02-24, Alternative 1 would have the highest potential impacts to hydrology resources. All of the action alternatives would have a similar potential impact to hydrology resources. Included in Table 3.02-24 are the prohibition of cross country travel and the seasonal closures. Because these two proposed actions cover the most of the TNF, they would greatly outweigh the proposed additions and changes to the NFTS. Taking into account the magnitude of impacts of the proposed prohibition of cross country travel and the seasonal closures, the alternatives would be ranked from highest potential impact to lowest: Alternative 1, Alternative 2, Alternative 7, Alternative 3, Alternative 5, Alternative 6, and then Alternative 4.

Summary of Effects to Geologic, Soil and Hydrology Resources

This project defines where motorized vehicle traffic use is authorized on the Tahoe National Forest. Therefore, direct impacts to soils and adjacent watersheds and stream courses that result from this project are limited. There are no new ground disturbing activities proposed with this project. The roads, motorized trails and "Open Areas" being evaluated in this analysis already exist on the ground, but may require upgrading to NFTS standards as well as periodic maintenance. They are compacted and generally lack vegetation. Runoff from the surface is collected and discharged as potentially erosive flows at points below the road or motorized trail. Some are eroded or causing erosion, others are stable and are not causing any negative resource impacts. From the standpoint of soil productivity and growing vegetation, these roads, motorized trails and "Open Areas" are already non-productive. Therefore the potential effects on soil and watershed resources are related to sustaining road or trail function, protecting adjacent soils from runoff and gully erosion, protecting water quality, or restoring the routes to a productive state. Given that Alternative 1 (no action) the existing hydrologic footprint is the largest proposed, all action alternatives would reduce the footprint of motorized use.

It should be noted that although many roads and motorized trails on the TNF have some site specific risks to geology, soil and/or water resources, most of these risks can be mitigated. The field surveys performed for this assessment found site specific concerns to be mitigated, but with regular maintenance and control of wet season use the roads, motorized trails and "Open Areas" seem to be sustainable. All known erosional sites would be fully mitigated before shown on the MVUM, so that adverse effects of adding new routes would be minimized.

Conclusion

All of the action alternatives meet existing standards and guidelines, laws, and policies. Prohibition of cross country travel and wet season closures are the two most important potential actions proposed in this project. Prohibiting cross country travel would limit the expansion of the road and trail related disturbance footprint. Equally as important in limiting the negative effects of motorized travel on geologic, soil and hydrology resources, is the wet season closure. The positive effects of these two actions would far outweigh the proposed additions of motorized trails to the NFTS or the changes in vehicle class. The order of potential cumulative effect of the alternatives, from highest potential to lowest potential, would be Alternative 1, Alternative 2, Alternative 7, Alternative 3, Alternative 5, Alternative 6, and then Alternative 4.

Chapter 3.03

Terrestrial & Aquatic Species

3.03. Terrestrial and Aquatic Species

Introduction

Management of wildlife 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 should be designed to maintain or improve habitat for Management Indicator Species to the degree consistent with multiple-use objectives established in each Forest Land and Resource Management Plan (LRMP). Management decisions related to public motorized travel can affect wildlife by increasing human-caused mortality, causing changes in behavior due to disturbance, and habitat modification (Gaines et al. 2003, Trombulak and Frissell 2000, USDA Forest Service 1998). 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 public use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to public motorized travel on NFS lands must consider effects and wildlife and their habitat.

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

Management 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.
- **Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act**: The bald eagle was listed by the USDI Fish and Wildlife Service as a federally endangered species under the Endangered Species Act in 1978, reclassified to Threatened status in 1995, and delisted in 2007. Even though they are delisted, bald eagles are still protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. These Acts require some

measures to prevent bald eagle "take" resulting from human activities. Following delisting, the bald eagle was placed on the Region 5 Regional Forester's Sensitive Species List (USDA Forest Service 1999). In the sections below, this document and the Biological Evaluation for the Tahoe NF Motorized Travel Management Project, which is incorporated by reference, analyzes and discloses effects of the alternatives.

- **Migratory Landbird Conservation on the Tahoe National Forest:** Within the National Forests, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales and ensuring that bird conservation is addressed when planning for land management activities.

  As part of the Travel Management process, the Tahoe National Forest has conducted an assessment of existing roads and trails within Forest boundaries. Any new construction, reconstruction and maintenance of system roads or trails will be conducted under a separate NEPA analysis and decision. Because current travel management efforts are directed at identifying which existing unauthorized routes will be formally added to the NFTS while prohibiting cross country travel, and because there is no expectation of new construction or development, no changes in the distribution or abundance of habitats available to migratory birds are anticipated. Changes in authorization are not anticipated to contribute to measurable increases in use levels, but the prohibition of cross country travel is expected to result in less use across the landscape. Therefore habitat functionality and levels of disturbance related to use are expected to remain similar to or less than pre-decisional levels.
- **Forest Service Manual and Handbooks (FSM/H 2670)**: Forest Service Sensitive (FSS) species are animal and 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 and 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 standards and guidelines applicable to motorized travel management and terrestrial biota, which will be considered during the analysis process:
  - **Wetland and Meadow Habitat** (Management Standard & Guideline 70): Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.
  - **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 (Management Standard & Guideline 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 (Management Standard & Guidelines 87 and 89).

- **Riparian Habitat**:
  - Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) 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 (Management Standard & Guideline 92).
  - As part of project-level analysis, conduct peer reviews for projects that proposed ground-disturbing activities in more than 25 percent of the RCA or more than 15 percent of a CAR (Management Standard & Guideline 94).
  - 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 (RCO#2, Management Standard & Guideline 100).
  - 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 (RCO#2, Management Standard & Guideline 101).
  - 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 (RCO#2, Standard and Guideline 102).
  - 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 (RCO#3, Management Standard and Guideline 116).

- **Management Indicator Species(MIS) (1982 Planning Rule) (36 CFR 219):** Management indicator species are animal species identified in the 2007 Sierra Nevada Forest MIS Amendment Record of Decision, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CRF 219). Guidance regarding

management indicator species (MIS) set forth in the Tahoe NF LRMP as amended by the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (USDA Forest Service 2007a) directs Forest Service resource managers to *(1)* at the project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and *(2)* at the bioregional scale, monitor populations and/or habitat trends of MIS. Although, the 2007 SNF MIS Amendment exempted the Tahoe NF Motorized Travel Management Project from adopting the newly amended MIS list, the ROD provides the deciding officer the discretion to elect to apply the new project-level analysis requirements. The Tahoe NF Forest Supervisor has elected to apply the new project-level analysis requirements to this project. Therefore, in the sections below, this document and the Tahoe NF Travel Management Project-Level MIS report, which is hereby incorporated by reference, evaluates and discloses the impacts of the alternatives on the habitat of the twelve (12) Management Indicator Species (MIS) identified in the Tahoe NF LRMP (USDA 1990) as amended by the 2007 SNF MIS Amendment ROD.

- **Tahoe NF Land and Resource Management Plan (Tahoe LRMP):** The Record of Decision (ROD) for the 1990 Tahoe LRMP identified the following standards and guidelines applicable to motorized travel management and terrestrial biota, which will be considered during the analysis process:
- **Deer Habitat Management (Management standard and guideline)**: Limit vehicle access on key deer winter ranges when deer are present. Also limit vehicle access in key summer range habitats during periods of migration and fawning. Retain or establish roadside screening along open roads in areas important for migration, fawning, or concentrated seasonal use.
- **Meadow Edge Habitat (Management standard and guideline)**: Locate roads away from meadow edges where alternative routes are available.

Additional species-specific standards and guidelines are identified below under species effects analysis.

Background on Effects to Terrestrial and Aquatic Habitat

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

The broad general impacts of motorized roads and trails to wildlife and aquatic species are described below (Trombulak and Frissell 2000):

- Increased terrestrial and aquatic species mortality from collision with vehicles
- Modification of animal behavior
- Alteration of the terrestrial and aquatic habitat
- Increased alteration and use of habitats by humans

These general impacts are included in the analysis procedure discussed in the Effects Analysis Methodology section. The causal factors are classified in that section as Disturbance, Habitat Modification, and Mortality.

Mortality from Collisions with Vehicles

Animal mortality or injury from collision with vehicles is well documented in the literature. Trombulak and Frissell (2000) reported animal mortality from vehicle collisions included a wide array of wildlife including deer, wolves, bear, hawks, owls, songbirds, snakes, lizards, and amphibians. Road associated mortally generally increases as traffic volume and speed increases. For large mammals, unpaved forest roads pose less of a concern of mortality or injury from vehicle related collisions. However, amphibians may be especially vulnerable to road collision mortality because their life history involves movement between wetland and upland habitats, and amphibians are inconspicuous and sometimes slow-moving (Trombulak and Frissell 2000). Raptors may also be vulnerable to collisions from forest roads and trails because of their foraging behavior (Loos and Kerlinger 1993); however, the most reports of raptor mortality are in association with highways.

Road and trail corridors may act as habitat sinks for wildlife that are attracted to corridors (Jalkotzy et al. 1997). Direct mortality of animals from vehicle collisions has been documented primarily in relation to paved roads and highways. Little scientific information is available about vehicle collisions on forest roads or motorized trails, though some mortality from use of forest roads and motorized trails is to be expected depending on the type of trail and the amount of use a trail receives.

Indirect mortality along roads and trails is associated with human access. Wildlife populations of hunted and trapped species are subject to increased mortality due to better access by humans. Interior-forest birds breeding adjacent to roads and trails may receive higher nest predation by a variety of bird and mammal predators and some songbird species have shown to have increased brown-headed cowbird parasitism rates.

Modification of Animal Behavior

A road or trail may modify the behavior of animals positively or negatively. Behavior modifications include changes or shifts in home range, changes in movement patterns, loss of reproductive success, flight or escape response, and changes in physiological condition. Some wildlife species are more sensitive to well-traveled roads as opposed to motorized roads and trails that are only used by high clearance 4-wheel drive, motorcycle and all-terrain vehicles (ATVs). Other wildlife is more sensitive to

the latter. In general, all roads and trails, depending on the type of vehicle and the amount of use, have some type of positive or negative impact of wildlife.

The most common interaction identified in literature between motorized roads and trails and wildlife species were displacement and avoidance, which altered habitat use (Kasworm and Manley 1990, Mace et al. 1996 *In:* Gaines et al. 2003). Wildlife often avoids habitats in the vicinity of roads because of repeated disturbances along the corridor (Jalkotzy, et al. 1997). Studies indicated both black bears and grizzly bears shifted their home ranges away from areas of high road density to areas of lower road densities (Brody & Pelton 1989, McLellan & Shackelton 1988). Road avoidance may vary seasonally. Both grizzly and black bears tended to avoid roads less in the spring than in the fall. Elk also avoided roads less in the spring and more in the fall.

Roads may affect the reproductive success of some species. Bald eagles in Oregon and Illinois showed declines in nesting productivity the closer the proximity to roads. Bald eagle nests were preferentially selected away from roads (Trombulak and Frissell 2000).

Havlick (2002) documented numerous studies that show wildlife, including birds, reptiles, and large ungulates, respond to disturbance with accelerated heart rate and metabolic function, and suffer from increased levels of stress. These factors can lead to displacement, mortality, and reproductive failure. Wildlife was also reported to avoid areas with high levels of disturbance.

The impacts of motorized vehicles to terrestrial wildlife can include disturbance from noise generated by OHVs. Determining the effects of noise on wildlife is complicated because responses vary between species. The variation in responses is based upon the type of noise and its duration, frequency, the magnitude, location, the species life history characteristics, habitat type, season, activity at time of exposure, and whether other environmental stresses are occurring coincident to exposure of noise (Busnel 1978 *In*: Radle 1999, Steidl and Powell 2006). Effects of noise can cause physiological responses in wildlife including increased heart rate and altering metabolism and hormone balance. Behavioral responses can include head raising, body shifting, short distance movements, flapping of wings (birds), and escape behavior. Together these effects potentially can lead to bodily injury, energy loss, decrease in food intake, habitat avoidance and abandonment, and reproductive loss. The vast majority of studies conducted on wildlife effects from road and trail-associated noise has been done for bird species.

Many studies have reported interactions between roads and ungulates, particularly elk and deer. Some of the studies are contradictory. Rost and Bailey (1979) reported that elk and mule deer avoided roads within a 200 meter distance. Thomas et al. (1979) indicated that roads open to vehicular traffic will adversely affect the use of an area by elk and, to a lesser extent, by deer.

Alteration of Terrestrial and Aquatic Wildlife Habitat

Forest roads and trails change the biological and physical conditions on and adjacent to them, creating edge effects with influences beyond the extent of the road prism (Trombulak and Frissell 2000). Trombulak and Frissell (2000) describe eight physical characteristics that are altered by roads: soil density, temperature, soil water content, light, dust, surface-water flow, pattern of run-off, and sedimentation.

Long term use of roads causes soil compaction that lasts long after road use is discontinued. Increases in soil density on decommissioned roads can persist for decades.

Potential Effects of Habitat Alteration to Aquatic Species Habitats: Trombulak and Frissell (2000) report that surface temperature of a road increases as water vapor transport decreases. Heat stored on the road surface is released in the atmosphere at night, creating heat islands around roads. Small birds and snakes are attracted to warm roads and increase their risk of mortality from vehicle collision.

Road crossings may fragment stream habitat by acting as barriers to movement of fish and amphibians. Long term barriers can prohibit migration and create isolation in aquatic species, and ultimately reduce distribution and productivity of a population. Stream crossings may also degrade stream and riparian habitat depending on the location of the crossing and the type of substrate.

Roads can change the hydrology of slopes and stream channel characteristics which result in changes to surface-water habitats that may be detrimental to aquatic dependent species. Roads in floodplains may redirect water, sediment and nutrients, causing degradation to wetland and riparian habitats. Roads may alter surface or subsurface flow and can destroy and create wetland habitats. Erosion through channel down cutting, gully formation or head cuts may result when high concentration of runoff on hillslopes is caused by changes in routing of shallow groundwater and surface flow. These processes can be detrimental to aquatic species far downstream for a long period of time. In addition, chronic effects from fine sediment transported from unpaved roads to streams, lakes, and wetlands, increases turbidity, reducing productivity and survival or growth of fishes.

Bury (1980) reported that motorized vehicles crossing creeks pose some risk of gas and oil leaks into the creek. Oil and gas have been shown to have negative effects to the growth and survival in several frog species (Pollet and Bendell-Young 2000; Irwin et al. 1999, Lefcorte et al. 1997).

Potential Effects of Habitat Alteration to Terrestrial Wildlife Habitats: Forest roads and trails can both enhance and decrease habitat for wildlife (Jalkotzy et al. 1997). The road or trail creates edge habitat for species that are habitat generalists, particularly for some mammal species (e.g., coyote and deer mice) and some songbird species. Ravens are more common along roads since carrion is more available along these corridors. For habitat specialists, such as interior dwelling species that require intact, undisturbed patches of habitat such as the American marten and the spotted owl, roads can fragment habitat. Roads and trails can also fragment or disrupt habitat indirectly by introducing exotic or noxious weeds. In addition roads can increase pollutants like dust and vehicle emissions that can contaminate roadside vegetation which wildlife feed upon.

Increased Alteration and Use of Habitats by Humans

Several studies have indicated that high road densities result in adverse impacts on certain wildlife species. Impacts from high densities include excessive harvest including legal and illegal, disturbance/harassment from noise, and habitat alteration. Brocke et al. (1988) reported that high road densities can elicit a variety of negative impacts of certain wildlife species. These effects include human disturbance. In Adirondack counties, the black bear population density index (based on the number of

legal kill) showed a ten-fold decrease when road density increased by ten times. Other studies were cited as showing similar sensitivity to road density for other large predators and ungulates.

Wildlife Effects Analysis Methodology

The Tahoe National Forest (NF) is one of ten national forests within the Sierra Nevada bioregion. The varied landscapes of the Sierra Nevada support a rich diversity of plant and animal species, some of which are found only in the Sierra Nevada. Species vary greatly in abundance and distribution, from very abundant and widespread to extremely rare and locally distributed, and all combinations in between. More than 550 vertebrate species have been identified in the Sierra Nevada bioregion, including approximately 30 amphibian, 35 reptile, 130 mammal, 270 bird, and 95 fish species (SNFPA 2001, Appendix R).

This assessment consists of 4 steps: (1) identify wildlife species (and species groups) that allow for an informed analysis of alternative effects; (2) identify road and trail associated factors for each group; (3) develop and apply assessment processes and GIS models to evaluate the influence of road and trail associated factors on each group; and (4) analyze the effects of the proposed alternatives based on the model outputs and analyses.

Step 1. Identify wildlife species and groups

Existing information and knowledge about the distribution of the terrestrial and aquatic species on the Tahoe NF were used to develop the list of species and to develop species groups. Federally listed species, Forest Service Sensitive Species, Management Indicator Species, and other species were selected and placed into species groups based on the potential for these species or their habitats to be affected by motorized vehicle use on the Tahoe NF. Local knowledge and sources included corporate databases including distribution of special status species, vegetation maps, etc., which were used to develop species or habitat groups. Table 3.03-1 provides a list of all the special status species described by status, habitat indicator, and distribution on the Tahoe NF.

Table 3.03-1. List of Tahoe NF Special Status Species by Habitat Indicator and Distribution[1]

Species	Federally Listed	Forest Service Sensitive	Management Indicator Species	Other Species of Concern	Indicator Habitat or Ecosystem Component	Distribution on Tahoe NF
American Marten		X	X		Late-seral closed canopy coniferous forests	Forest-wide
Aquatic macro - invertebrates			X		Riverine and lacustrine habitats	Forest-wide
Bald Eagle		X			Mature conifer forest near large bodies of water	Nests near or adjacent to specific reservoirs on theTahoe NF
Band-tailed Pigeon				X	Oak-associated Hardwood and Hardwood/conifer	Forest-wide
Black Bear				X	Early- and late-seral stages within all forest types	Forest-wide
Sooty (Blue) Grouse			X		Late-seral open canopy coniferous forests	Forest-wide

Species	Federally Listed	Forest Service Sensitive	Management Indicator Species	Other Species of Concern	Indicator Habitat or Ecosystem Component	Distribution on Tahoe NF
California Floater (mollusk)		X			In fairly large streams and lakes, in relatively slow currents on soft substrates (mud-sand)	Not known to occur on the TNF, historically documented in Donner Lake adjacent to the Tahoe NF.
California Red-legged Frog	X				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	Suitable habitat on west side of TNF below 4,000 ft;. no known occupied habitat on TNF; 3 known populations on private land adjacent to TNF.
California Spotted Owl		X	X		Mature and late-seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir), tree size 4 & 5 (canopy closures M and D), and tree size 6	Forest-wide
California Wolverine		X			Various habitat types used, coniferous forests, subalpine and alpine areas above 8,000 ft.	Verified detections on the eastside of the Tahoe NF.
Coniferous forest birds				X	Coniferous forests, all seral stages, all canopy closures	Forest-wide
Foothill Yellow-legged Frog		X			Shallow, slow flowing water of rocky streams and rivers in a variety of habitats including riparian, mixed conifer, and wet meadow types below 6000 feet elevation on the west slope of the Sierra Nevada	Below 6000 feet elevation on the west slope of the Tahoe NF
Fox Sparrow			X		Shrubland (west-slope chapparral types)	Westside of the Tahoe NF on the Yuba River Ranger District and American River Ranger District.
Great Gray Owl		X			Mature and late-seral conifer forest adjacent to meadows	One recent confirmed sighting on TNF, but breeding has not been verified. Recent sightings on private land.
Greater Sandhill Crane		X			Wet meadow, shallow lacustrine, and fresh emergent wetland habitat	Only known breeding at Kyburz Flat and Carman Valley on Sierraville RD Reported on pvt land in Sardine Valley.

Species	Federally Listed	Forest Service Sensitive	Management Indicator Species	Other Species of Concern	Indicator Habitat or Ecosystem Component	Distribution on Tahoe NF
Great Basin Ramshorn Snail		X			Lakes and larger, slow streams in and around the northern Great Basin; suitable habitat on TNF within slow segments of the Truckee and Little Truckee Rivers and tributaries	No verified locations on TNF; historically found in the Truckee River downstream of Lake Tahoe, on the LTBMU
Hairy Woodpecker			X		Medium and large snags in green forest	Forest-wide
Hardhead (fish)		X			Great Valley and Foothill belts, and in larger west-slope streams into the Yellow pine belt	No verified locations on TNF; historic report on Sierraville RD
Lahontan Cutthroat Trout	X				Historically and currently occupied streams and lakes	Limited distribution on Sierraville and Truckee ranger districts
Lahontan Lake Tui Chub (Fish)		X			Lakes and reservoirs, known only from Pyramid Lake and Lake Tahoe.	Possible population in Stampede, Boca and Prosser Reservoirs on the Tahoe National Forest.
Mountain Quail			X		Early- and mid-seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, eastside pine, tree sizes 1, 2, and 3, all canlopy closures	Forest-wide
Mountain Yellow-legged Frog		X			Low gradient (up to 4%) perennial streams and lakes above 4500 feet elevation	Locations above 4,500 ft. on the TNF, has disappeared from many historic locations on the Tahoe NF
Mule Deer			X		Uses a variety of habitats Forest-wide including mid, early, and late-seral forests; meadows; riparian areas; and shrublands MIS indicator habitat - Oak-associated Hardwood & Hardwood/conifer	Indicator habitat occurs on the westside of the Tahoe NF. Deer populations occur forest-wide.
Northern Flying Squirrel			X		Late-seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir), tree size 5 (canopy closures M and D), and tree size 6	Forest-wide
Northern Goshawk		X			Mature and late-seral moderate to closed canopy, coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, east side pine, and lodgepole), tree size 4 & 5 (canopy closures M and D), and tree size 6	Forest-wide

Species	Federally Listed	Forest Service Sensitive	Management Indicator Species	Other Species of Concern	Indicator Habitat or Ecosystem Component	Distribution on Tahoe NF
Northwestern Pond Turtle		X			Ponds, marshes, rivers, and streams with rocky or muddy bottom and aquatic vegetation/ nest sites consist of sandy to very hard soil types, and can be as much as 325 feet from water (Zeiner et al. 1988)	Yuba River drainage
Pacific Fisher (mammal)		X			Mature and Late-seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir), tree size 4 & 5 (canopy closures M and D), and tree size 6	Suitable habitat only, Tahoe NF falls within identified fisher distribution gap
Pacific Tree Frog			X		Wet Meadow	Forest-wide
Pallid Bat		X			Affinity for oak and mixed hardwood conifer, Roost sites can include buildings, mines, caves, and live oak trees and oak snags.	Primarily below 6,000 feet. Documented at SVRD at Carman Valley.
Sierra Nevada Red Fox		X			Mature subalpine conifer forest and riparian/montane meadow	Suitable habitat, no known or verified detections
Western Gray Squirrel				X	Oak hardwood and mixed oak/conifer forest	Strongly tied to wesdie oak and oak/conifer forests
Western Red Bat		X			Riparian habitat and hardwoods within riparian areas; roosts within tree foliage or shrubs, and often along edge habitat adjacent to streams or open fields (Bolster 1998)	Habitat is generally below 3,000 feet, however detected at Carman Valley on the Sierraville RD at 6,000 ft
Wild Turkey				X	Oak hardwood and mixed oak/conifer forest	Primairly westside of Tahoe NF in suitable habitat
Willow Flycatcher		X			Riparian shrub (willow) and wet meadow	Occurs at discreet willow/meadow habitat on SVRD, TKRD, and YRRD.
Yellow Warbler			X		Riparian	Forest-wide

[1] Valley elderberry longhorn beetle is not included since their habitat is not on the Tahoe NF and are not affected by this project.

The species assessment presented here is organized by **Species Groups** divided along major habitat associations (for example, riparian habitat) or life zones (for example, terrestrial or aquatic). Projected effects of motorized vehicle travel management on sets of species in these major groupings are described. In addition, individual species assessments are presented for federally listed species, Forest Service Sensitive Species, and Management Indicator Species, and other species of concern. More detailed information is also found in the Biological Evaluation and Project-Level Management Indicator Species project report, and Tahoe NF Management Indicator Species report, which are incorporated by reference.

The species group assessment considers 36 species, including the special status species listed in Table 3.03-2. These include aquatic macroinvertebrates, 5 amphibian species, 2 aquatic invertebrate species, 3 fish species, 1 reptile species, 15 bird species, and 9 mammal species. These species were divided into species groups (some species occurred in more than one group) as described in Table 3.03-2.

Species not included in these assessments include the Valley elderberry longhorn beetle since their habitat is not on the Tahoe NF. Assessment for the Valley elderberry longhorn beetle is in the Biological Evaluation and incorporated by reference.

Table 3.03-2. Species group and species represented within groups

Species group	Species
Wide-ranging carnivores	Black bear, wolverine, Sierra Nevada red fox
Ungulates	Mule deer
Oak and oak-conifer associated species	Band-tailed pigeon, mule deer, pallid bat, wild turkey, western gray squirrel
Shrubland (west-slope chaparral) associated species	Fox sparrow
Early- and mid-seral coniferous forest associated species	Mountain quail
Late-seral open canopied coniferous forest	Sooty (blue) grouse
Old forest conifer (late-seral) associated species	California spotted owl, northern goshawk, great gray owl, American marten, Pacific fisher, northern flying squirrel, forest coniferous birds (e.g., brown creeper)
Snag associated species	Hairy woodpecker, pallid bat
Aquatic and riparian associated species [including lacustrine (lakes) and riverine habitat (rivers, streams)]	Bald eagle, great gray owl, greater sandhill crane, willow flycatcher, yellow warbler, aquatic macroinvertebrates, California floater, Great Basin ramshorn snail, Lahontan cutthroat trout, Lahontan tui chub, hardhead, California red-legged frog, foothill yellow-legged frog, mountain yellow-legged frog, Pacific tree frog, northwestern pond turtle, Sierra Nevada red fox, Western red bat.

Step 2. Identify road and trail-associated factors

Several studies have identified a classification or conceptual model of responses of wildlife to road and trail-associated activities (Knight and Cole, and Liddle *in* Gaines, et al. 2003). The causal factors were grouped by impact to wildlife into habitat alteration, mortality (including legal harvesting), and disturbance. (1) **Habitat alteration** occurs when habitat is modified through creation of a path, presence of food, or removal of vegetation. (2) **Mortality** is human-induced where there is a direct and negative impact on the animal such as hunting, fishing, poaching or illegal take, collision with vehicles, and other incidental contact which results in impacts similar to those from hunting. (3) **Disturbance** is when an animal sees, hears, smells, or otherwise perceives the presence of a human but no contact is made and it may or may not alter its behavior.

Based on a review of literature and local knowledge of selected species on the Tahoe NF, these three broad response classifications were used for this assessment. Refer to Table 3.03-3.

Table 3.03-3 lists the road and trail-associated response classifications, response factors and **definitions, and affected species groups**

Response Classification[2]	Road and trail – associated factors[1]	Definition of response factors	Species group affected
Habitat alteration	**Habitat loss and fragmentation**	Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities	• Wide-ranging carnivores • Ungulates • Old forest coniferous species • Early- and mid-seral coniferous pecies • Aquatic-Riparian species
	Edge effects	Changes to habitat microclimate associated with the edge induced by roads or trails	• Old forest conifer species
	Snag or downed log reduction	Reduction in density of snags and down logs due to their removal near roads as facilitated by road access (e.g., fuelwood gathering)	• Wide-ranging carnivores • Old forest coniferous species • Snag dependent species
	Route for competitors and predators	A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise	• Wide-ranging species • Ungulates • Old forest coniferous species • Early- and mid-seral species • Aquatic-Riparian associated • Oak-Associated hardwood & hardwood/conifer species • Snag-dependent species • Shrubland associated species
Mortality	**Hunting and trapping (legal harvest)**	Mortality from hunting or trapping as facilitated by road and trail access	• Wide-ranging carnivores • Ungulates • Oak Associated Species • Early- and mid-seral coniferous forest
	Poaching	Increased illegal take of animals as facilitated by trails and roads	• Wide-ranging carnivores • Ungulates • Oak Associated species • Early- and mid-seral coniferous forest
	Collisions	Mortality or injury resulting from a motorized vehicle running over or colliding with an animal	• Wide-ranging carnivores • Ungulates • Old forest coniferous species • Aquatic-Riparian species
	Collection	Collection of live animals for use as pets (such as amphibians and reptiles) as facilitated by the physical characteristics of roads or trails or by road or trail access	• Old forest coniferous species • Aquatic-Riparian species

Response Classification[2]	Road and trail – associated factors[1]	Definition of response factors	Species group affected
Disturbance	**Disturbance at a specific site**	Displacement of individual animals from a specific location (e.g., such as a site that is being used for reproduction and rearing of young)	• Wide-ranging carnivores • Ungulates • Old forest coniferous species • Early- and mid-seral species • Aquatic-Riparian associated • Oak-associated hardwood & hardwood/conifer species • Snag-dependent species • Shrubland associated species
	Physiological response	Increase in heart rate or stress hormones when near a road or trail or network of roads or trails leading to a potential loss of fitness	• Wide-ranging carnivores • Ungulates • Old forest coniferous species • Early- and mid-seral species • Aquatic-Riparian associated • Oak-Associated hardwood & hardwood/conifer species • Snag-dependent species • Shrubland associated species

[1] Based in part on Wisdom et al. 2000 In: Gaines et al. 2003

[2] **Disturbance** occurs when an animal sees, hears, smells, or otherwise perceives the presence of a human but no contact is made and it may or may not alter its behavior. **Habitat modification** is when habitat is changed in some way. **Mortality** involves human actions in which there is direct and damaging contact with the animal.

Step 3. Processes and models

The assessment process to analyze the effects of motorized travel routes (road and trails) on the Tahoe NF was done in three general steps: (1) Road density was derived within specific wildlife habitats, (2) the effects of travel routes to species groups were assessed based on a similar process completed by Gaines et al. 2003, and (3) the relative environmental risk of roads and trails to habitats was determined. Gaines et al. (2003) used an assessment process that utilizes focal species and groups and GIS models to evaluate road and trail associated influences to species and their habitats.

Step 4. Analysis of effects

The information generated in step 3 was used to analyze the direct, indirect and cumulative effects of the proposed alternatives on wildlife species and groups. Three primary indicators were used to compare and measure project effects of each alternative: density of motorized routes, miles of routes, and Zone of Influence of motorized routes. In addition, for species, such as spotted owls, goshawk, and bald eagles, for which disturbance from motorized use has the potential to effect reproductive status, disturbance to a specific site was analyzed. These measures, described in the next section, are used for relative comparisons of the alternatives. The analysis indicators are focused on assessing the effects of 1) **Prohibiting cross country travel**, 2) **Additions (user created roads/trails and temporary roads) to the NFTS**, 3) **Establishment of Motorized "Open Areas,"** 4) **Changes to the NFTS** including, change in class of vehicles, and change in season of use, and reopening Maintenance Level 1 roads to motorized use, and 5) **Amendments to the Forest Plan**.

Description of Indicators Used to Measure Effects of the Alternatives

Indicators used to measure effects are presented in the environmental consequences section to compare and contrast the effects of the action alternatives. Measures were selected for project effects based on a thorough review of literature on the interaction between wildlife and motorized routes. Because there are limited data and studies for many species, assumptions and generalizations were made for some species where no data were available. Generally, the risk factors described in the section above (habitat alteration, mortality, and disturbance, Table 3.03-3) were considered as well as other factors known to be important.

Three primary indicators were used to compare and measure project effects of each alternative: density of motorized routes, miles of routes, and Zone of Influence of motorized routes. 1) **Density of motorized routes** has often been used as a surrogate to estimate habitat effectiveness or the direct, indirect, and cumulative effects of motorized routes on terrestrial wildlife habitat. The density of motorized routes provides a way to assess the cumulative impact of motorized routes for the alternatives. 2) **Miles of motorized routes** are used to measure disturbance potential to aquatic and terrestrial wildlife species and their habitats. 3) The **Zone of Influence** is the portion of a species (or species group's) key habitat that is influenced by motorized routes from disturbance, mortality risk or habitat alteration. These measures are used for relative comparisons of the alternatives. Additional analysis measures were required for a few species, especially if directed by policy or regulation; for example, some species require analysis of disturbance at a specific site.

Density of Motorized Routes: Route density thresholds for wildlife have not been established on the Tahoe NF, and thresholds for wildlife in the literature can vary by season and by geographic location. Therefore, route density "thresholds" will not be used to determine effects of the action alternatives, but rather route density is used for a relative comparison of the alternatives. Route density was determined at the scale of 7th field watershed, since this scale is sufficiently large to accurately estimate road densities. Route densities at a larger scale could potentially mask route density effects and therefore, underestimate effects to wildlife species. Route densities at any smaller scale may actually be amplified and therefore overestimate the effects to wildlife. Route density calculations for Alternative 1 include existing unauthorized routes because use of these routes can be assumed to continue as part of continued cross country travel. Route density includes all motorized routes, including existing NFTS system, non-NFS routes, etc. because route density must be calculated across an area (miles per square mile), and therefore serves as a cumulative effects analysis. For the preparation of the DEIS, motorized route densities were prepared for several species as well as a generalized analysis not specific to any species; all of these analyses determined that the relative relationships remained the same regardless of species, thus the generalized table is shown under the section Summary of Effects Common to All Species in Table 3.03-4.

Miles of Motorized Routes: Use of motorized routes has the potential to affect wildlife in a number of ways, such as behavioral changes, increased stress or changes in reproductive success.

Miles of motorized routes is used in addition to route density because many motorized routes are difficult to assess on the scale of the entire forest. Overall miles of motorized routes on the Tahoe NF are used to compare differences in disturbance potential of motorized use among alternatives.

In addition to overall miles of motorized routes across the entire forest, it is important to analyze the disturbance potential at specific sites for some species. The number of miles of motorized routes within a particular distance to a species reproductive site can be used to determine the potential disturbance to wildlife species. The distance from a site used to analyze disturbance potential varies by each species' disturbance threshold based upon literature review. Species-specific disturbance potential of motorized routes was compared for California spotted owl and the northern goshawk reproductive sites (nests or activity centers). In addition, the number of miles of motorized routes occurring within spotted owl Protected Activity Centers (PACs) and Home Range Core Areas (HRCAs) and goshawk Protected Activity Centers (PACs) were also compared by alternative.

Zone of Influence: Motorized routes have a Zone of Influence within which habitat effectiveness or suitability is reduced and wildlife population densities are lower (Trombulak and Frissell 2000, Gaines, et al. 2003). The effects to wildlife extend beyond the immediate road prism itself, into what can be referred to as a Zone of Influence adjacent to motorized roads and trails. The degree of effect of the various factors associated with roads and trails can be evaluated more effectively when considering the proportion of a given species habitat that occurs within this Zone of Influence of motorized routes. Wildlife species behaviors and habitats are modified within various distances from motorized routes. The distances of the Zone of Influence for individual species that are used in the analysis of effects are based upon the best available science in the literature. The Zone of Influence is a relative index of habitat effectiveness to compare alternatives.

For several species or species groups, several Zones of Influence were analyzed and the results presented in the DEIS. The results of these analyses indicated that insignificant differences were present among the scales (usually 60, 100 and 200 m). Any effects shown to be present at the smaller scales were contained at the largest scale, and the results gained from the smaller scales do not substantially inform the decision. Thus, in this document, the analysis reports only the largest Zone of Influence.

Assumptions for Wildlife Effects Analysis

1. All vehicle types result in approximately the same amount of disturbance effect to wildlife.
2. Disturbance effects were considered to be equal in all seasons because of the difficulty in parsing out effects for each season. Where seasonal ranges are identified, such as for mule deer, or for breeding habitat, this inherently considers a seasonal aspect.
3. Location of route is equal to disturbance effects from that route (e.g., assume all trails provide the same level of disturbance).
4. Habitat is already impacted in the short-term. In the long-term, habitat will remain the same on motorized routes added to the NFTS, but impacts will decrease to at least some degree on non-added trails with the prohibition of cross country motorized travel and subsequent passive restoration (see Soils section for further assumptions).
5. The focus of this analysis is on suitable habitat; suitable habitat is assumed occupied unless it has been surveyed to a standard that determines absence.
6. Noise generated from non-motorized associated disturbance impacts are limited to within 60 meters of motorized roads and trails.
7. The cumulative effects of past projects are incorporated within the existing vegetation and travel system maps.
8. Route densities for the action alternatives are calculated based on existing motorized system routes, private land routes, and proposed motorized route additions to the NFTS. The estimation of route densities for Alternative 1 (no action) includes all existing unauthorized routes, as well as existing motorized system routes, private land routes, and proposed route additions to the NFTS. It is assumed that unauthorized routes would continue to be used under continued cross country travel.
9. Continued cross country motorized travel under the No Action Alternative (Alternative 1) will lead to continued proliferation of motorized routes, which would have a high likelihood of increasing over time (see Chapter 3.07, Recreation and Scenic Values).
10. Although the type and amount of use along the different types of routes may result in different effects to wildlife species, all motorized routes are treated equally in this analysis because the relationship between effects and motorized route type and intensity of use is complex and not well understood. For example, the type of motorized road or trail likely varies in how roads and motorized trails contribute to disturbance and habitat fragmentation: high clearance roads generally receive less use than roads used by passenger vehicles, which would equate to less noise disturbance, and single track motorcycle trails would likely fragment habitat less than

would a passenger road due to the narrower width of the single track motorcycle routes that would result in removing less habitat. However, noise generated from motorcycles along trails may contribute to greater noise disturbance than would a 4x4 jeep. Since impacts to the wildlife species analyzed here are not well understood, impacts from all motorized routes, regardless of motorized route type and intensity of use, are treated the same.

Sources of Information for Wildlife Effects Analysis

GIS layers of the following wildlife resources were used for analysis:

- Bald Eagle – nest sites
- California Spotted Owl – nest sites, Activity Centers, Protected Activity Centers, Home Range Core Areas, CWHR habitat types 4M, 4D, 5M, 5D, and 6
- Northern Goshawk – nest sites, Protected Activity Centers, CWHR habitat types 4M, 4D, 5M, 5D, and 6
- Mule Deer – key deer habitat areas including winter, critical winter, fawning, and critical summer ranges. In addition, oak woodland and oak-conifer woodland habitats were used, since mule deer is a Management Indicator Species for oak and oak-conifer woodland habitats.
- Forest Carnivores (marten, fisher, Sierra Nevada red fox, and wolverine) – Tahoe Forest Carnivore Network, CWHR habitat types 4M, 4D, 5M, 5D, and 6)
- Snag analysis – 60 meters buffered on routes in forested habitats.

Affected Environment and Environmental Consequences by Species Groups

This section describes both the affected environment and environmental consequences of the alternatives arranged by species groups: wide-ranging carnivores, ungulates, oak and oak-conifer forests, shrubland, early- and mid-seral coniferous forest, late-seral open canopied coniferous forest, old coniferous forest, snag, and aquatic and riparian associated species. Selected species represented within each group include Threatened, Endangered, Sensitive, and Proposed (TESP) species, MIS, or other species of concern (such as, snag dependent species and forest coniferous birds) are included. While not all the species within the groups are necessarily analyzed in detail, each species group analysis provides enough information to infer impacts.

Affected Environment Description

The Affected Environment discussion focuses on pertinent literature available for selected species within the wildlife groups and does not represent an exhaustive or comprehensive literature summary on wildlife and road interactions. For some species represented in the group, little information may be available on wildlife interaction with roads and trails. Known information on the distribution and status of the species on the Tahoe NF is also presented in the affected environment section for each selected species, particularly species with special status (threatened, endangered, sensitive or management indicators species).

Environmental Consequences Description

Direct and Indirect Effects Boundary: Direct and indirect effects of each alternative are analyzed on NFS lands within the boundary of the Tahoe National Forest. The analysis area includes motorized roads and trails, collectively referred to as routes. Routes include existing system routes and motorized trails to the NFTS.

Cumulative Effects Boundary: Cumulative effects are bounded spatially and temporally. The geographic boundary for analyzing cumulative effects are lands that fall within the boundary of the Tahoe NF, including all NFS lands and non-NFS lands (private). This habitat type encompasses 821,035 acres of NFS lands and 373,359 acres of non NFS lands. This cumulative effects geographic boundary pertains to all species groups except for greater sandhill cranes and the oak and oak-conifer group. For sandhill cranes, the cumulative effects boundary is known sandhill crane breeding habitat at Sardine Valley, Carman Valley, and at Kyburz Flat on the Sierraville and Truckee Ranger Districts.

The cumulative effects boundary for the oak and oak-conifer species group (65,329 acres) falls within the Yuba River and the American River ranger districts within pure oak woodland and oak-conifer habitat on the west side of the Tahoe NF.

An appropriate scale to analyze cumulative effects of terrestrial and aquatic species for activities associated with motorized roads and trails requires an area sufficiently large to encompass wildlife habitat, movement patterns, and home ranges for the groups of species being analyzed within the project area including old forest associated species, wide-ranging species, riparian associated species and others; such an appropriate scale includes all lands within the boundary of the Tahoe NF.

Within the cumulative effects boundary, cumulative effects from motorized routes are analyzed quantitatively using route density by assessing the accumulation of all past, present, and future route-associated actions, including existing system routes, motorized routes added to the NFTS, and any future routes that would be created within the next 20 years within the boundary of the Tahoe NF (NFS and non-NFS lands). In addition, overall cumulative effects from other past, present, and reasonably foreseeable future actions are described. Twenty years is a reasonable timeframe for estimating cumulative impacts of motorized routes in the reasonably foreseeable future. Past actions include routes that were created within the last 50 to 100 years and will be incorporated into the existing condition, such as closed or decommissioned roads.

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

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

to predict the cumulative effects of the Proposed Action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions may risk 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 events contributed to those effects. Finally the Council on Environmental Quality issued an interpretive memorandum on June 34, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate aggregate effects of past actions without delving into the historical details of individual past actions." For these reasons, the analysis of past actions in this section is based on current environmental conditions and is represented in the current maps used to analyze cumulative effects that have occurred in the past 100 years or more.

In addition, Past actions for the previous 20 years will be discussed under each species as appropriate, including activities as timber harvest, grazing, and non-motorized recreation that provides pertinent information of relatively recent activities that may still be impacting species and their habitats.

Overall Relative Cumulative Impact Scores: As a relative measure of the negative and positive effects from motorized routes under each of the alternatives, a simple sum total of the percentages of some metrics were calculated. Some overlap of percentages may occur where route categories intersect, however, because it is a relative and not absolute score, the relationships remain valid. The metric is intended to provide only a relative measure of effects and does not include all impacts.

Summary of Effects Analysis for All Species and Species Groups

The following effects analysis reflects many detailed conclusions of the effects of the alternatives. This paragraph broadly generalizes the conclusions from all species and species groups. Alternative 1, the existing condition, is by far the most adverse condition for all species and species groups on the Tahoe NF due primarily to the disturbance, habitat alteration and potential mortality associated with unlimited cross country travel, including continued travel on unauthorized routes (user created and temporary roads) and motorized travel in areas where there are currently no unauthorized routes leading to the creation of additional routes. Most wildlife species are adversely affected by human disturbance to varying degrees, and the growth of unlimited cross country travel associated with an expanding human population and growing recreational use of public lands would continue to cause adverse effects into the future. This adverse effect is so great that all of the action alternatives in comparison are greatly beneficial to more or less degree.

All action alternatives have varying effects to each of the species and species groups, and are described in detail in the sections that follow. Due to the magnitude of the beneficial effect of controlling adverse impacts such as existing cross country use, all the action alternatives appear to have similar benefits to wildlife. However, when only the action alternatives are compared at a similar scale, the impacts among the alternatives are more apparent and indicate that Alternative 5 has the greatest potential

to negatively impact wildlife than the other action alternatives. Alternative 5 negatively impacts the most wildlife species and the most wildlife groups of the action alternatives. The species and groups most adversely affected by the existing condition are wide-ranging carnivores, mule deer, spotted owls and northern goshawks because these groups are especially affected by disturbance. Alternative 5 has the greatest negative impacts to these same groups, followed by Alternatives 2, 6, 7, 4, and 3 in descending order. In general, aquatic and riparian associated wildlife species are benefited by Alternatives 4, 5, and 6 which implement wet weather seasonal restrictions and would reduce the potential for sedimentation off of native-surfaced motorized routes into aquatic and riparian ecosystems**.**

Summary of Effects Common to All Species

Wet Weather Seasonal Closures: Wet weather restrictions generally would not affect terrestrial wildlife habitats. However, there is some potential for direct disturbance to terrestrial species from motorized use during the wet weather season. Wet weather restrictions would reduce disturbance to terrestrial species when wet weather restrictions are implemented. In addition, terrestrial wildlife species using riparian and aquatic habitats would benefit from proposed wet weather seasonal restrictions on native surfaced roads and trails. The effects of the alternatives on terrestrial wildlife species that use riparian and aquatic habitats are disclosed under the aquatic and riparian associated species section. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to aquatic and riparian species and their habitats.

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails. Riparian and aquatic dependent species would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially motorized roads and trails that are within close proximity to, or cross, streams or other riparian aquatic habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather seasonal restrictions on native surfaced motorized routes and therefore, aquatic and riparian dependent species would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of motorized stream crossings and highest Riparian Conservation Area (RCA) route densities. Alternative 1 has the highest potential to deliver sediment to aquatic and riparian habitats from wheeled motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles: Although responses to motorized vehicle use vary by species and depend upon the type of vehicle, in addition to the intensity, timing, speeds, and amount of motorized vehicle use, the specific species responses are not well understood. For these reasons, this analysis has assumed that all vehicle types result in the same disturbance to wildlife.

Overall, the change is the class of vehicles would not likely have a measurable effect to habitat, since the change in class of vehicles on existing motorized routes will generally not affect or alter habitat condition. In general, some smoothed surfaced roads may become rough surfaced roads through changed road maintenance. In addition, some existing motorized NFTS roads may receive different maintenance resulting in higher vegetation density at the road margins which would provide additional cover and/or

foraging habitat. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives.

Therefore, changes in the class of vehicles would not vary in their effects to species or species groups for all the action alternatives.

Density of motorized routes for habitat effectiveness: Route density has often been used as a surrogate to estimate habitat effectiveness or the direct and indirect effects of motorized routes on terrestrial wildlife. Route density thresholds for wildlife have not been established on the Tahoe NF, and thresholds for wildlife in the literature can vary by season and by geographic location. Therefore, road density "thresholds" will not be used to determine effects of the action alternatives, but rather road density is used for a relative comparison of the alternatives. Route density was determined at the scale of 7th field watershed, since this scale is sufficiently large to accurately estimate road densities. Route densities at a larger scale could potentially mask route density effects and therefore, underestimate effects to wildlife species. Route densities at any smaller scale may actually be amplified and therefore overestimate the effects to wildlife. Route density calculations for Alternative 1 include existing unauthorized routes because use of these routes can be assumed to continue as part of cross country travel. Route density includes all motorized routes, including existing NFTS system, non-NFS routes, etc. because route density must be calculated across an area (miles per square mile)

Table 3.03-4 provides a generalized overview of motorized route densities when looked as a measure of effects for all wildlife species for which route density is an issue. In the following sections, route densities are also calculated individually for species or species groups where helpful to determine effects.

Table 3.03-4. Generalized effects of motorized route densities (proportion of Tahoe NF acreage) between 0 miles per square mile and greater than 6 miles per square mile (averaged by 7th field watershed)

Alternatives		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Route Density (Percent of Forest Total)	**0 Miles/Square Mile**	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	0-2 Miles/Square Mile	17.2	26.6	27.7	26.6	25.0	27.2	26.6
	2-4 Miles/Square Mile	44.0	57.7	56.6	57.7	58.2	57.0	57.7
	4-6 Miles/Square Mile	31.4	11.5	11.9	11.5	12.6	11.5	11.5
	>6 Miles/Square Mile	6.9	3.5	3.1	3.5	3.6	3.5	3.5

*Alternative 1 includes miles of user created and temporary routes that would remain with continued use

Establishment of Motorized "Open Areas": One action alternative, Alternative 2, proposes open motorized areas at Greenhorn Area (60 acres) and access to 2,589 acres at the Boca, Stampede, and Prosser reservoirs on dry soils. Alternative 6 allows access to 244 acres at Boca, Stampede, and Prosser reservoirs on dry soils. The other action alternatives do not include this proposal so there would be no effect. For a few species, additional information is included in addition to the discussion below.

The Greenhorn area is located just outside of Nevada City. It is a popular four wheel drive and motorcycle use area by local residents. The majority of the area was hydraulically mined during the gold rush resulting in a lack of vegetation. The area also has a currently operating gravel plant. The Greenhorn area provides suitable habitat for very few species due to the amount of human activity and urban

development in the area. Therefore implementation of Alternative 2 would not likely pose a concern for the species analyzed in this document. If individual animals are using the area, they could receive some localized, direct disturbance, but because the area is already receiving concentrated use by people, any animals using the area likely have adapted to the amount of use occurring or have already avoided the area.

As water levels are drawn down in Boca, Stampede, and Prosser reservoirs, motor vehicles are used to access the shoreline for recreational activities during the summer months (boating, camping, fishing and picnicking). They are typically not used as open play areas as is the Greenhorn Area. The three reservoirs occur on the Truckee Ranger District within eastside pine habitat. Minor and incidental direct impacts to animals traveling in vicinity of the reservoirs may occur. The area used to access the reservoirs has no vegetation, and therefore does not provide cover or forage habitat. Overall, access to the three reservoirs designated in Alternatives 2 and 6 would have no to minimal direct, indirect, or cumulative impact to species analyzed here. Cross country use of these "Open Areas" would continue under Alternative 1.

Wide-Ranging Carnivores Species Group:

Affected Environment

Large and mid-sized carnivores are unique in their response to human-induced habitat changes due to their large spatial habitat needs and their sensitivity to landscape patterns, including road edge effects and road density (Buskirk and Zielinski 2003 In Zabel, et al 2003). The wolverine and the Sierra Nevada red fox may be considered to be sensitive to the presence of humans and human activities (Claar et al. 1999, Grinnell et al. 1937). Three species were included in the wide-ranging carnivore habitat assessment group: black bear (*Ursus americana*), the wolverine (*Gulo gulo*), and the Sierra Nevada red fox (*Vulpes vulpes necator*).

The following is a summary of some of the potential trail- and road-associated effects to wide ranging-carnivores (Gaines et al. 2003):

- Mortality from hunting or trapping as facilitated by road and trail access;
- Increased illegal poaching of animals as facilitated by trails and roads;
- Mortality or injury resulting from a motorized vehicle running over or hitting an animal;
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young;
- Change in behavior and/or increased mortality of animals (euthanasia or shooting) due to increased contact with humans, as facilitated by road and trail access including recreational sites, such as campgrounds;
- Interference with dispersal or other movements as posed by a road or trail itself or by human activities on or near roads, trails, or networks;
- Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities;

- A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise;
- Reduction in density of snags and down logs due to their removal near roads as facilitated by road access;
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young (i.e. fawning habitat); and
- Increase in heart rate or stress hormones when near a road or trail or network of roads or trails.

Wide-Ranging Carnivores Species Group: Environmental Consequences

Direct and Indirect Effects Common to All Wide-ranging Carnivores

Cross Country Travel: Wide ranging species would benefit under the action alternatives from the prohibition of cross country travel on NFS lands including areas that were previously prohibited to cross country motorized use. Under Alternative 1, cross country travel would continue on all NFS lands, except for areas previously prohibited to motorized use. Under Alternative 2, cross country travel would be prohibited on 715,200 acres of habitat. For Alternative 6, cross country travel would be prohibited on 717,600 acres of habitat and for the remaining action alternatives, cross country travel would be prohibited on 717,900 acres of habitat.

Establishment of Motorized "Open Areas": In addition to the discussion in Effects Common to All Species, the following additional discussion for wide-ranging carnivores is pertinent.

The three reservoir areas Boca, Stampede, and Prosser would be designated open for Alternative 2 on almost 2,700 acres (when combined with the designation of the Greenhorn Area) and for Alternative 3 on almost 300 acres. The reservoirs occur on the Truckee Ranger District within eastside pine habitat. Eastside pine habitat is generally lower in elevation than where wolverine and the Sierra Nevada red fox are known to occur (subalpine and alpine habitats) during the summer months when the reservoirs are used for recreational activities, and therefore would not affect wolverine and the red fox. Bear, wolverine, or red fox traveling in vicinity of the reservoirs may have minor and incidental direct impacts from disturbance. The area used to access the reservoirs has no vegetation, and therefore does not provide cover or forage habitat for bear, wolverine, and red fox. Overall, access to the three reservoirs would have no to minimal direct or indirect impacts to wide-ranging species.

Changes to the NFTS (Changes in Season of Use): Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and trails, where wide-ranging species would be benefited through the reduction of noise and disturbance associated with motorized use, especially motorized routes that are within wide-ranging species habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather restrictions on native surfaced motorized routes and therefore, there would be no benefit to wide-ranging species from wet weather seasonal restrictions under these alternatives.

Amendments to the Forest Plan: Under Alternatives 2, 5, and 6, an amendment to the Forest Plan would remove the Tahoe NF Forest Plan direction to restrict motorized vehicle use within key deer winter

range in Management Area 84 (Humbug-Sailor) from November 1 to May 1. Alternatives 1, 3, 4, and 7 would not have an amendment. Currently the area receives high recreational use, especially during the summer months. Implementing these alternatives would likely have a slight negative impact from potential disturbance to animals including bear, wolverine, and red fox. However, since the area receives concentrated recreational use, it likely does not currently provide high quality habitat for these species, particularly the wolverine and red fox, since the wolverine likely would avoid areas with concentrated human activity. Additionally, the area does not provide high quality wolverine denning habitat such as subalpine habitat with late persistent snow into the spring months. Overall, the potential for adverse effects would be minimal and would not likely be measurable, since these species are wide-ranging in nature.

Wide-ranging Carnivores Species Group: Cumulative Effects

The geographic boundary for analyzing cumulative effects to wide-ranging species (wolverine, Sierra Nevada red fox, and bear) are lands that fall within the boundary of the Tahoe NF including all NFS lands and non-NFS lands (private). The Tahoe NF boundary is sufficiently large to encompass the home ranges of wide-ranging species located on the Tahoe NF. In addition, the Forest boundary encompasses a wide variety of habitats used by these species, from early-seral to late-seral forests, subalpine and alpine habitats, meadows and riparian habitats, and oak and oak-conifer woodlands. The cumulative effects of past actions rely upon current environmental conditions as a proxy. As previously stated, existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. However, some past actions are presented in order to describe potential habitat changes of wide-ranging species that have occurred in the past.

The timeframe for analyzing cumulative effects of reasonably foreseeable future actions for wide-ranging species is approximately twenty years into the future. Twenty years into the future is a reasonable amount of time to estimate potential cumulative impacts to wide-ranging species from future foreseeable activities. The cumulative effects to wide-ranging carnivores are discussed for each species in the sections below.

Black Bear: Affected Environment

The black bear is a Management Indicator Species on the Tahoe NF. The Tahoe LRMP describes important bear habitat as all forested types, particularly in the early- and late-seral vegetation types. California Wildlife Habitat Relationships program (CWHR 2005) describes black bear habitats as dense, mature stands of forest habitats, and black bears feed in a variety of habitats including brushy stands of forest, valley foothill riparian and wet meadows. Habitat requirements include large trees and various cavities and hollows in trees, snags, stumps, logs, uprooted trees, talus slopes, or earth dens. Large undeveloped blocks of habitat, where bears will encounter few humans in the core areas within these blocks, are assumed to be important for black bear.

Black bears have been known to be affected by road and trail associated factors including collisions, hunting, poaching, negative human interactions, and displacement or avoidance (Gaines et al. 2003). On the Tahoe NF, bear collisions have been reported at various locations, primarily along state highways such as Interstate 89 and Interstate 49. The frequency of bear-vehicle collisions is relatively low.

Collisions, Hunting and Poaching: The California Department of Fish and Game (2004) report that the level of bear-vehicle collisions are low, and most probably occur on higher speed paved highways. Collisions on lower speed unpaved routes being evaluated for this project are not likely to occur.

Increased road density likely has an indirect impact on bears by increasing bear and human interaction, such as providing increased access to hunters. Bear harvest varies by habitat and accessibility to bear habitat. Bears are most vulnerable to harvest where road densities are high and escape cover is limited. The amount of human access for bear hunting and poaching opportunities is directly related to the proportion of roads and trails. As routes increase on the Tahoe NF, access for bear hunting and poaching increase. However, statewide bear monitoring indicates bear population trends are either stable or increasing. CDFG (2004) reports that legal and illegal bear harvest together "will not have significant negative effects on the State's bear resource." Therefore, it is possible to assume that human access for bear hunting and poaching does not have a negative impact on the bear population numbers on the Tahoe NF.

Negative Bear-Human Interactions: As human access increases, the potential for negative human interactions with bears also increases. On the Tahoe NF, negative bear-human interactions have primarily occurred at campgrounds, ski resorts, developed recreational facilities, etc. As bear populations in the Sierra Nevada continue to increase, bear-interactions on the Tahoe NF are also expected to increase. Bear mortalities may result from repeated negative bear-human interactions, but the number of bear killed as a result of these negative encounters is not expected to affect the overall bear population on the Tahoe NF.

Displacement or Avoidance: Little research has been conducted on the impacts on black bears from recreation in relation to the use of roads and trails. Therefore, impacts to black bears from OHV activities associated with roads and trails are not well understood. However, in Idaho, black bears are reported to respond to increases in road density by shifting their home ranges to areas of lower road densities (Young and Beecham 1986 *In* Joslin and Youmans, coordinators 1999). In Montana, Kasworm and Manley (1990) found that black bears avoided habitat within 274 meters of roads. Bears were more likely to be displaced by roads than by trails. A study in North Carolina indicated that road density had no effect in bear movement within their home ranges (Brody and Pelton 1989 *In* Joslin and Youmans, coordinators 1999).

Black Bear: Environmental Consequences

Black Bear: Indicators used to Measure Effects

The analysis measures used to analyze direct, indirect effects, and cumulative effects of the proposed alternatives for black bear are:

Cross Country Travel: Motorized cross country travel is analyzed to determine how black bear habitat is affected.

Establishment of Motorized "Open Areas": The establishment of motorized "Open Areas" is analyzed under effects common to all wide-ranging species.

Additions to the NFTS (Zone of Influence): Additions to the NFTS are measured by the Zone of Influence of motorized miles of route additions. Kasworm and Manley's (1990) studies in Montana found that black bears avoided habitat within 274 meters of roads. Although the habitat conditions on the Tahoe NF are quite different, a Zone of Influence of 274 meters from motorized routes will be used as an approximate analysis measure to compare alternatives for relative habitat effectiveness.

Changes to the NFTS: Change in class of vehicles is analyzed under environmental consequences common to all species and change is season of use is analyzed under environmental consequences common to all wide-ranging species. Reopening of Maintenance Level 1 roads are analyzed for bear by determining the Zone of Influence within 274 meters of Level 1 roads that would be reopened.

Black Bear: Direct and Indirect Effects

Cross Country Travel: Alternative 1 poses the greatest risk to black bear from the continuance of cross country travel on existing unauthorized routes, where 20% of bear habitat would be negatively influenced within 274 meters. The action alternatives benefit black bear habitat where cross country travel would be prohibited, including within 18% to 20% (Alternatives 5 and 6 would be the least percent prohibited, Alternatives 2, 3, 4, 7 would be the most percent prohibited) habitat within 274 meters of motorized unauthorized routes. Under the action alternatives, bear would benefit from the ban on cross country travel and associated concentrated use on unauthorized routes, resulting in increased bear habitat effectiveness by approximately 18% (Alternatives 5 and 6) to 20% (Alternatives 3 and 7).

Additions to the NFTS (Zone of Influence): Table 3.03-5 displays the direct, indirect, and cumulative effects to bear habitat within a 274-meter Zone of Influence of motorized miles of road/trail additions. As stated above, Alternative 1 reduces bear habitat effectiveness to the greatest extent (20%) because motorized use can be expected to continue on unauthorized routes during continued cross country travel where bear habitat effectiveness could be reduced or where negative bear-human interactions have the potential to occur.

Motorized routes added to the NFTS under the action alternatives would directly and indirectly influence from 0% to 2% bear habitat on the Tahoe NF, which would not measurably affect overall bear habitat effectiveness.

Changes to the NFTS: Table 3.03-5 indicates that Alternative 5 proposes reopening ML 1 roads which may negatively affect 1% of bear habitat on the Tahoe NF. Alternatives 4, 6, and 7 propose to reopen ML1 roads that many negatively affect less than 1% of bear habitat on the Tahoe NF. Affecting 1% bear habitat should not reduce the overall habitat effectiveness, but may increase bear disturbance or increased bear-human interactions at a local level. The remaining alternatives do not propose to reopen any existing ML 1 roads, and therefore would not increase bear-human interaction potential and would not affect bear habitat effectiveness.

Table 3.03-5. Proportion of Black Bear Habitat within a 274-meter "Zone of Influence" of Motorized Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of Proposed Alternatives							
Proposed motorized route additions to NFTS (negative impact)*	20%	2%	0%	1%	1%	2%	<1%
Reopened Maintenance Level 1 roads (negative impact)	0%	0%	0%	<1%	1%	<1%	<1%
Cumulative Effects of Past, Present, and Proposed Actions							
Existing motorized routes - NFS lands (negative impact)	28%	28%	28%	28%	28%	28%	28%
Existing motorized routes - non-NFS lands (negative impact)	15%	15%	15%	15%	15%	15%	15%
Positive Cumulative Effects (Past Actions)							
Decommissioned and Roads Closed in Previous NEPA (positive impact)	4%	22%	23%	23%	21%	22%	23%
Total Cumulative Effects							
Overall Relative Cumulative Impact Score = Sum Total of Motorized Routes both positive and negative (**Note**: Some overlap may occur where route categories intersect)	**63%**	**45%**	**43%**	**44%**	**46%**	**44%**	**43%**

*Motorized route additions: Alternative 1 includes existing unauthorized routes and use associated with continued cross country travel.

Black Bear: Summary of Direct and Indirect Effects

Table 3.03-6 summarizes the overall net effect to black bear from the proposed actions from motorized route additions, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-6. Black Bear: Summary of Overall Net Direct and Indirect Effect

Indicator		Alt 1[2]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Trend of Effect		Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres of Habitat Where Cross Country Travel is Prohibited		0	715,200	717,900	717,900	717,900	717,600	717,900
ZOI Percentage Affected[1]		0%	19%	20%	19%	18%	18%	20%
Proposed Motorized Route Additions to NFTS								
% ZOI Affected		20%	2%	0%	1%	1%	2%	<1%
Establishment of Motorized "Open Areas"		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Changes to the NFTS	**Change in Class of Vehicles**	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Wet Weather Restrictions	No Effect	No Effect	No Effect	Slight benefit from reduced disturbance	Slight benefit from reduced disturbance	Light benefit from reduced disturbance	No Effect
	Reopened ML 1 Roads (miles)	0	0	0	0.12	93.4	11.4	1.1
Amendments to the Forest Plan		No Effect	Localized disturbance in winter months	No Effect	No Effect	Localized increased disturbance in winter months	Localized increased disturbance in winter months	No Effect
Overall Net Effect of Proposed Actions		Negatively affects black bear habitat where cross country travel continued, including within 20% habitat within ZOI	Benefits black bear habitat where cross country travel is prohibited, including within 19% habitat within ZOI; although minor negative effects from route additions; overall reduces habitat fragmentation	Benefits black bear habitat where cross country travel is prohibited, including within 20% habitat within ZOI	Benefits black bear habitat where cross country travel is prohibited, including within 19% habitat within ZOI; although minor negative effects from route additions; overall reduces habitat fragmentation	Benefits black bear habitat where cross country travel is prohibited, including within 18% habitat within ZOI; although minor negative effects from route additions; overall reduces habitat fragmentation	Benefits black bear habitat where cross country travel is prohibited, including within 18% habitat within ZOI; although minor negative effects from route additions; overall reduces habitat fragmentation	Benefits black bear habitat where cross country travel is prohibited, including within 20% habitat within ZOI; although minor negative effects from route additions; overall reduces habitat fragmentation

[1]Zone of Influence is habitat within 274 meters of existing unauthorized routes

[2]Alternative 1 includes existing unauthorized motorized routes that would continue with cross country travel, while all the action alternatives include proposed route additions.

Black Bear: Cumulative Effects

The geographic boundary for analyzing cumulative effects to bear are lands that fall within the boundary of the Tahoe NF including all NFS lands and non-NFS lands (private). The Tahoe NF boundary is sufficiently large to encompass the home range of bears located on the Tahoe NF. In addition, the Forest boundary encompasses a wide variety of habitats used by the bear--from early-seral to late-seral forests, meadows and riparian habitats, and oak and oak-conifer woodlands. The timeframe for analyzing cumulative effects for the bear is approximately twenty years into the past and into the future. Twenty years into the future is a reasonable amount of time to estimate potential cumulative impacts to bear from future foreseeable activities.

Cumulative Effects from Motorized Routes:

Zone of Influence: The cumulative effects of existing authorized motorized routes on both NFS and non-NFS lands are displayed in Table 3.03-5 above. Cumulative effects of existing authorized motorized routes on NFS and non-NFS lands would influence 28% and 15%, respectively.

Route Density: Route density is a useful way to measure cumulative effects to bear from the sum total of all relevant past, present, and reasonably foreseeable future impacts associated with motorized routes. To assess the extent the action alternatives may influence bear habitat, including effects from hunting, poaching, and displacement, the density of motorized roads/trails across the Tahoe NF (includes both NFS and non-NFS lands) was determined by 7th field watersheds (Table 3.03-7). Motorized route density thresholds for black bear are not readily available in the literature, however, Hurley et al. (1981) recommended that preferred black bear habitat (high capability) has road densities below 0.5 miles per square mile, and moderate habitat capability has road densities below 5 miles per square mile. Therefore, bear habitat capability is highest where route density is lowest.

Table 3.03-7 displays percent of black bear habitat in route density categories (low, medium, and high), ranging from 0 to greater than 5 miles/square mile. Areas with lower the route densities provide higher bear habitat capability where security habitat is provided. Areas with higher route densities provide lower habitat capability where security habitat is at greater risk.

The cumulative effects of route density would be greatest under Alternative 1 (no action) compared to all the other alternatives, followed by Alternative 5. Under Alternative 1, approximately 19% of the Tahoe NF would be in low habitat capability where route density exceeds 5 miles/square miles, and approximately 20% of bear habitat would have reduced effectiveness within 274 meters of unauthorized routes. Unmanaged cross country travel would continue and increase over the next 20 years based on the increasing trend in sales of ATVs, motorcycles and 4 wheeled drive vehicles in recent years, likely resulting in an increase in unauthorized routes. The overall cumulative effects of Alternative 5 would only be slightly greater than Alternatives 2, 3, 4, 6, and 7. Alternatives 2, 3, 4, 6 and 7 would have similar cumulative effects and would not result in an appreciable change in overall bear habitat capability since the addition of unauthorized routes to the NFTS system would only cumulatively add between 0-2 percent. Refer to Table 3.03-8.

Motorized Route Density:

- **High habitat capability** for bear where motorized road/trail densities are less than 0.5 miles/square mile are similar for all the alternatives ranging from approximately 4 to 7 percent of the landscape on the Tahoe NF.
- **Moderate habitat capability** for bear (where motorized road/trail densities fall between 0.5 and 5 miles/square mile), would be the lowest in Alternative 1 (77%). The remaining alternatives provide similar amounts of moderate habitat capability for bear, ranging from about 86 to 88 percent.
- **Low bear habitat capability** has the highest route density at greater than 5 miles/square mile**.** Alternative 1 has the greatest amount of low habitat capability for bears at 19% of the Forest compared to all the alternatives. Alternative 5 provides the next highest amount of low capability bear habitat. The rest of the alternatives are similar in the amount of low bear habitat capability ranging from 6-7 percent.

Table 3.03-7. Black Bear: Percentage of Tahoe NF within high, moderate, and low habitat capability

		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Route Density (Percent of Habitat in Route Density Categories)	**High Capability** (Lowest Route Density - 0-0.5 Miles/Square Mile)	4.1%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%
	Moderate Capability (Moderate Route Density - 0.5-5 Miles/Square Mile)	77.0%	87.0%	87.6%	87.0%	86.3%	87.0%	87.0%
	Low Capability (Highest Route Density - >5 Miles/Square Mile)	18.9%	6.6%	6.0%	6.6%	7.2%	6.6%	6.6%

Table 3.03-8. Black Bear: Cumulative Effects Summary

Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Past and Present Effects – Proportion of Forest with low bear habitat capability (>5mi/square mile)	18.9%	6.6%	6.0%	6.6%	7.2%	6.6%	6.6%
Future Effects – Likelihood of increased route density contributing to low bear habitat capability	**High** potential for adversely affecting bear habitat capability from Unmanaged cross country travel will continue and increase over time	**Low** potential for adversely affecting bear habitat capablity, since cross country travel would be prohibited	**Low** potential for adversely affecting bear habitat capablity, since cross country travel would be prohibited	**Low** potential for adversely affecting bear habitat capablity, since cross country travel would be prohibited	**Low** potential for adversely affecting bear habitat capablity, since cross country travel would be prohibited	**Low** potential for adversely affecting bear habitat capablity, since cross country travel would be prohibited	**Low** potential for adversely affecting bear habitat capablity, since cross country travel would be prohibited
Overall Cumulative Effects	Lowest Habitat capability. Bear Habitat Capability is likely to be reduced in the long term.	2nd most beneficial alternative, shared with alternatives 4, 6, & 7. Bear Habitat Capability would improve compared to existing situation from reduced route densities.	Most beneficial alternative, no motorized route additions. Bear Habitat Capability would improve compared to existing situation from reduced route densities.	2nd most beneficial alternative, shared with alternatives 2, 6, & 7. Bear Habitat Capability would improve compared to existing situation from reduced route densities.	Least beneficial alternative. Bear Habitat Capability would improve compared to existing situation from reduced route densities, however route densities would be slightly greater than Alts 2, 4, 6, & 7.	2nd most beneficial alternative, shared with alternatives 2, 6, & 7. Bear Habitat Capability would improve compared to existing situation from reduced route densities.	2nd most beneficial alternative, shared with alternatives 2, 4, & 6. Bear Habitat Capability would improve compared to existing situation from reduced route densities.

Overall Cumulative Effects from Past, Present and Reasonably Foreseeable Future Actions: Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on private lands within the Tahoe NF boundary. Past and current cumulative effects to bear include loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheel drive vehicles, ATVs, and motorcycles.

Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to habitats for bear. Between 2001 and 2008, nearly 17,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. In general, management treatments which maintain cover and/or enhance foraging habitat for bear should benefit the bear, particularly projects that would promote bear forage species, such as fruit bearing shrubs and forbs.

Vegetation and fuels treatments generally do not increase forage quality and quantity for bear because they do not usually result in reducing the canopy cover below 40%. Higher canopy cover would not increase the production of understory species important for bear foraging. These treatments may result in the short-term reduction in cover for the bear, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Between 1994 and 2008, approximately 95,000 acres of NFS lands burned on the Tahoe NF, some of which have removed forested habitat for bear.

Thinning projects designed to reduce hazardous fuels will continue to be the primary activity affecting wide-ranging species habitat on the Tahoe (see Appendix H, Reasonably Foreseeable Projects and Cumulative Effects). It is expected that suitable habitat would be maintained, and it is anticipated that these treatments would reduce the amount forested wildlife habitat potentially lost from future stand replacing wildfires (USDA Forest Service 2004). The California Department of Forestry and Fire Protection currently lists approximately 12,000 acres of private land within the Tahoe NF administrative boundary for which timber harvest plans have been submitted. Timber harvest on private lands is generally more intensive and often changes the amount of forest cover available, but may increase foraging availability by increasing shrub habitats, particularly for bear.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increase in negative interactions between humans and bears. Developed recreational sites such as campgrounds and other facilities have the potential to be bear

attractant sites. Currently the Tahoe NF has a number of developed campgrounds and an unknown number of dispersed camp sites. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased negative human-bear interactions would be expected, particularly during the summer months. Appendix H lists the reasonably foreseeable recreation projects that are expected to occur. Two non-motorized routes are being proposed for development in the near future. The development and use of these routes are not expected to considerably increase human-bear interactions, but rather the sheer increase in humans using the Tahoe NF will likely lead to increased negative human-bear interactions. In addition, non-motorized use (hiking, mountain biking, equestrian) may occur on existing unauthorized routes until these areas are revegetated and recovered through active or passive restoration means. It is expected that, generally, non-motorized recreation on unauthorized routes is less of an impact than motorized recreation due to reduced noise levels, although this is uncertain.

Wolverine and Sierra Nevada Red Fox: Affected Environment

The wolverine and the Sierra Nevada red fox are wide-ranging carnivores that use a variety of vegetation types, but appear to select areas that are relatively free from significant human disturbance. Both the wolverine and the Sierra Nevada red fox are designated by the Regional Forester in the Pacific Southwest Region of the Forest Service as Sensitive.

In the Sierra Nevada, wolverines are known to occur from over 4,000 feet elevation to over 10,000 feet elevation. According, to Aubrey et al. (2008, pers. comm.), wolverine natal den sites are highly correlated with subalpine and alpine regions that have late persistent snow during April and May. Until recently, no verified sightings of wolverine have been documented within the State of California since the 1920's, though several anecdotal wolverine observations have been reported throughout the Sierra Nevada including several apparently reliable observations on the Tahoe NF in recent years.

In February and March 2008, four verified wolverine photographic detections were taken from remote controlled camera stations on the Tahoe NF between the towns of Truckee, CA, and Sierraville, CA. Wolverine photographs were documented from four separate baited camera locations. Genetic results indicate the DNA evidence that has been collected to date is from a single individual male. DNA testing also indicates this individual is not related to the wolverine population from the southern Sierra Nevada region and it is also not related to wolverine populations in the Cascades region of Washington state (Mike Schwartz, 2008,personal communication). DNA results indicate that this particular wolverine has haplotype A, which is ubiquitous and shared with wolverine populations in the Rocky Mountains, Canada, and Alaska. At this time, the origin of this individual is unknown. Given the results of DNA testing, three possibilities remain of this wolverine's origin: (1) it escaped from captivity, (2) it dispersed from the nearest known populations in the Rocky Mountains or (3) it is from native northern Sierra Nevada population that was previously undetected by Grinnell et al. (1937).

Between December 2008 and February 2009, Sierra Pacific Industries (SPI) documented nine additional verified wolverine detections on SPI lands located northwest of the four original Tahoe NF detections, ranging from the Henness Pass vicinity heading northwest near the town of Bassetts.

Subsequent DNA analysis indicated the wolverine detections on SPI lands were the same male detected in February/March 2008.

Wolverines are known to be sensitive to humans and road associated factors, but are not necessarily affected by summer recreation trails (Gaines et al. 2003). Gaines et al. (2003) reported that wolverines may be displaced from natal dens in subalpine cirques as a result of winter recreation activities.

Road and trail-associated factors that may affect wolverine include reduction in down logs, trapping, disturbance at a specific site, and vehicle collisions. Road density can be used as a relative measure of human influence on the wolverine, though no empirical data exist which correlate motorized route density with wolverine population numbers due to the scarcity of research, the low population numbers, and overall difficulty in studying species that encompass large home ranges. Studies indicate that home ranges in North America may vary from less than 38.6 square miles to over 347.5 square miles.

The current distribution and population status of the Sierra Nevada red fox is uncertain (CDFG 2004). The Sierra Nevada red fox has not been verified to occur on the Tahoe NF, though habitat for this species occurs within subalpine conifer habitats interspersed with meadows. The nearest known population of the native Sierra Nevada red fox is a small population located in the Lassen Peak vicinity (Lassen National Park and Lassen National Forest) which represents the only verified detections of the subspecies in recent years (Perrine 2005, Perrine et al. 2007). Road construction and increased human settlement in the Sierra Nevada has the potential to facilitate the dispersal of non-native red foxes into the historic range of the Sierra Nevada red fox, by providing access to areas previously unavailable to the exotic foxes. Roads provide a potential travel corridor for valley foxes to move into Sierra Nevada red fox habitat. Although the tolerance of Sierra Nevada red fox to the presence of humans is an unknown, it is evident that the non-native red foxes thrive in human-altered environments (Lewis et al. 1999, Kamler and Ballard 2002). In addition, urban development within the range of Sierra Nevada red fox may pose a risk to the species through an increased risk of predation from domestic pets, disease transmission, automobile collisions, and other human-wildlife conflicts.

Wolverine and Sierra Nevada Red Fox: Environmental Consequences

Wolverine and Sierra Nevada Red Fox: Indicators used to Measure Effects

Cross Country Travel, Changes to the NFTS (Change in Class of Vehicles and Changes is Season of Use): The prohibition of cross country travel and Changes to the NFTS (the change in class of vehicles and changes to season of use) are discussed under "Wide-ranging Carnivores Species Group: Environmental Consequences."

Establishment of Motorized "Open Areas": The establishment of motorized "Open Areas" is analyzed under effects common to all wide-ranging species.

Zone of Influence: The Zone of Influence within 60 meters of routes (route miles buffered by 60 meters on each side of route added) was used as a measure for analyzing habitat fragmentation as it pertains to loss of snags and down logs along routes within mature to late-seral coniferous forest habitat as classified by 4M, 4D, 5M, 5D, and 6 CWHR types within the Tahoe NF. Sixty meters is the maximum distance within which the removal of hazard trees for roads and trails would occur where logs and snags

important for wolverine and red fox may be lost due to public safety concerns. Additional analysis of habitat fragmentation is presented within Old Forest Emphasis Areas (OFEAs) and within the Tahoe NF Forest Carnivore Network, which is presented in the section for Late-seral coniferous Forest Associated Species Group.

Disturbance to a Specific Site (Wolverine only): The Sierra Nevada Forest Plan Amendment (2004) directs that upon detection of a verified wolverine, management impacts within 5 miles of the verified detection be analyzed. Activities associated with motorized routes represent potential direct disturbance to wolverine using the area. Therefore, the miles of routes proposed to be added to the NFTS within five miles of verified wolverine photographic detection sites on the Truckee and Sierraville Ranger Districts of the Tahoe NF and on Sierra Pacific Industries lands were evaluated for each of the action alternatives.

Several studies indicate wolverine den sites are strongly associated with subalpine or treeline habitats, and have late persistent snow during the months of April and May (Banci 1994, Aubry et al. 2007, Copeland et al. 2007, Aubry et al. 2008 – pers. com.). On the Tahoe NF, subalpine and treeline habitats generally occur near or above 8,000 feet; areas that have late spring, deep, persistent snow vary depending on the precipitation and the aspect. Activities associated with motorized routes are assessed for their potential to disturb wolverine den sites.

Changes to the NFTS (Reopened ML 1 Roads): Reopening ML 1 roads also have the potential to increase disturbance and fragment habitat within close proximity to known wolverine detections. The alternatives are analyzed for their potential to impact areas within 5 miles of known wolverine detections on the Tahoe NF.

Amendments to the Forest Plan: Amendments to the Forest Plan is analyzed under effects common to all wide-ranging species.

Wolverine and Sierra Nevada Red Fox: Direct and Indirect Effects

Cross Country Travel: Except for Alternative 1, no action, all the action alternatives would benefit the wolverine and red fox and their habitats, since 81,884 acres of habitat would be prohibited to cross country travel. Therefore, disturbance, avoidance and displacement to these species would be reduced under the action alternatives.

Additions to the NFTS and Reopened ML 1 Roads

Zone of Influence: Snags and down logs are important habitat components for wolverine and red fox. Habitat fragmentation, as measured by potential impacts to snags and down logs that may be removed for public safety, is determined by assessing the Zone of Influence within 60 meters of added motorized routes. The Zone of Influence within mature forest (CWHR 4M, 4D, 5M, 5D, 6), Old Forest Emphasis Areas, and the Tahoe NF Carnivore Network are analyzed for their potential impact of habitat fragmentation (potential loss of snags and down logs) along all motorized routes. These habitat types serve as a broad landscape proxy to evaluate habitat connectivity and fragmentation for mature and old forest conditions that are important for wide-ranging species such as the wolverine and Sierra Nevada red fox.

Motorized routes to be added to the NFTS are evaluated for each alternative as it relates to habitat fragmentation for the wolverine and the Sierra Nevada red fox. From a Forest-wide landscape perspective, Alternative 1 would contribute to the highest amount of potential habitat fragmentation through the incidental loss of snags and down logs on approximately 6% of mature and late-seral coniferous forest habitat by allowing cross country motorized use, including use on approximately 291 miles of identified motorized unauthorized routes, to continue on the Tahoe NF (Table 3.03-9). Alternatives 2, 4, 5, 6, and 7 all minimally affect landscape fragmentation through potential loss of down logs and snags that may be removed for public safety, at less than 1% or between 0.5 miles and 7.8 miles. Alternative 3 would not contribute to habitat fragmentation since unauthorized routes would not be added to the NFTS under this alternative.

Reopened ML 1 roads would contribute to less than 1% for Alternatives 2, 4, 5, 6, and 7, with Alternative 5 contributing to the greatest amount of potential loss in snags and down logs along 32.8 miles or 0.4% of old forest CWHR habitat within a 60 meter zone of influence, followed by Alternatives 6, 4, 2, and 7 in descending order. Alternatives 2, 4, 6, and 7 should not significantly affect the amount of available snags and down logs at the Forest-wide scale considering that less than 0.1% of Old Forest CWHR habitat types could be impacted by the incidental of removal of snags for public safety, and considering that the development and recruitment of snags and down logs is a dynamic process.

Table 3.03-9. Percent of NFS lands within a 60 meter "Zone of Influence" of motorized route additions and reopened ML 1 roads within Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, and 6)

Alternatives	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Zone of Influence (Motorized Additions)	7%	0.3%	0%	0.1%	0.4%	0.3%	0.2%
Miles Added	290.9	4.4	0	0.5	7.5	7.8	0.9
Zone of Influence (Reopened ML1 Roads)	0%	<0.1%	0%	<0.1%	0.4%	<0.1%	<0.1%
Miles of ML1 Roads Reopened	0.0	1.2	0.0	1.7	32.8	3.9	0.7

*Alternative 1 includes existing unauthorized routes

Disturbance to a Specific Site (Wolverine only): The Sierra Nevada Plan Amendment Standard and Guideline #32 (SNFPA ROD 2004) directs that upon detection of a verified wolverine, an analysis be conducted to determine if activities within 5 miles of the detection have the potential to affect the species. Thirteen individual, verified wolverine detections were documented on the Tahoe NF and SPI lands during the winters of 2008 and 2009. For this analysis, the miles motorized routes that are proposed to be added to the NFTS under each alternative were evaluated to determine the potential for motorized use to disturb wolverine that may be foraging or traveling through the area within 5 miles of the thirteen verified wolverine detections. Generally, wolverines move up into the higher elevation subalpine and treeline environments during the breeding period (January 1 to June 30). High elevation subalpine and alpine habitat within close proximity to the wolverine detection sites occurs at Mt. Lola, Basin Peak and Castle Peak with elevations above 8,000 feet. Mt. Lola is the nearest location with subalpine and treeline conditions to the verified wolverine detections. It is unknown whether the wolverine that was detected during February and March of 2008 on the Truckee and Sierraville Ranger Districts would be in the

vicinity where it was originally detected during the time when the majority of motorized use would occur. However, if wolverine are foraging or traveling in an area when motorized use occurs, Alternative 1 results in the greatest miles of routes within 5 miles of verified wolverine detections where direct disturbance could potentially occur (Table 3.03-10) within the 5 miles. Alternative 5 results in the next greatest potential disturbance to wolverine by activities associated with motorized unauthorized routes that would be added to the NFTS (9 miles), followed by Alternatives 2, 6, 7, and 4 in descending order. Alternative 3 does not add any motorized routes to the NFTS, and therefore, would not have any direct effects to wolverine within 5 miles of known detection locations.

Effects to potential alpine/subalpine denning habitat above 8,000 feet: The largest and most contiguous potential wolverine alpine/subalpine denning habitat within 5 miles of verified wolverine detections occurs in the vicinity of Mt. Lola. Smaller alpine/subalpine areas above 8,000 feet are scattered near the Pacific Crest trail, Webber Peak, Maiden Valley, and the Sierra Buttes. Generally, areas above 8,000 feet are primarily non-motorized due to the steep terrain condition and inaccessibility.

None of the proposed route additions for any of the action alternatives falls within the Mt. Lola area. The majority of proposed routes additions are located well below alpine/subalpine habitat in areas that currently are moderately to highly roaded. Motorized use on the proposed routes would occur when they are snow-free and outside of the wet weather seasonal restriction period (Open April 1 to December 31 and /or May to December 31).

Motorized activities on the proposed route additions for the preferred alternative, Alternative 6, would not likely affect denning wolverine habitat and would not require a Limited Operating Period from January 1 to June 30. Only Alternative 5 proposes a route addition within a very small isolated habitat area above 8,000 feet, just west of Maiden Valley and may not be suitable for wolverine denning due to the small area and isolated nature. This small patch of denning habitat is located adjacent to an area with an existing high density of motorized routes.

In addition, potential subalpine denning habitat in the Basin Peak and Castle Peak area occur just beyond 5 miles of any wolverine detections, and no proposed route additions occur within these areas. All the action alternatives benefit wolverine from the ban of cross country travel, including on 93 to 104 miles (Alternative 5 would benefit the least, Alternative 3 would benefit the most).

Table 3.03-10. Miles of Proposed Motorized Route Addition to the NFTS and Existing Unauthorized Motorized Routes within 5 miles of Known Verified Wolverine Detections

Within 5 Miles of Wolverine Detections	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Route Additions to NFTS	104	4	0	2	9	3	2
Unauthorized Motorized Routes where cross country travel would be prohibited	0	100	104	102	93	101	102

*Alternative 1 includes existing unauthorized routes that are associated with continued cross country travel

Changes to the NFTS (reopened Maintenance Level 1 Roads)

Disturbance to a Specific Site (Wolverine): Alternative 5 has the greatest potential to impact areas within 5 miles of known wolverine detections from reopening ML 1 roads, where 7.5 miles would be

reopened where wolverine could be directly disturbed and habitat could be affected from fragmentation though snag and down log removal (Table 3.03-11). Alternative 6 proposes to reopen 0.6 miles (SV005), which would slightly affect wolverine which could potentially increase disturbance from vehicle related noise. However, since wolverine have large home ranges and can travel long distances within a day, reopening less than 1 mile of ML 1 road should not be a pose a significant risk to wolverine. The remaining alternatives do not propose reopening any ML 1 roads within 5 miles of known detections and therefore would not affect wolverine or its habitat within 5 miles of wolverine detections.

Effects to potential alpine/subalpine denning habitat above 8,000 feet: None of the ML 1 roads proposed for reopening occurs within alpine/subalpine habitat above 8,000 feet potentially suitable for wolverine denning, and therefore there is no need to implement a Limited Operating Period.

Zone of Influence at 60 meters (Disturbance to a Specific site for Wolverine Only): Only Alternatives 5 and 6 propose to reopen any ML 1 routes within 5 miles of wolverine detections. The Zone of Influence within 60 meters of reopened ML1 routes within 5 miles of wolverine detections was determined to affect less than one percent of the area for both Alternatives 5 and 6. Alternative 5 has the most potential to directly and indirectly affect wolverine through direct disturbance or habitat modification, where approximately 7.5 miles of ML 1 roads would be reopened within 5 miles of known wolverine detections (Table 3.03-11). These ML 1 roads are historic roads which were primarily used for timber harvest. Alternative 6 proposes to reopen 0.6 miles of ML 1 roads (SV-005) within 5 miles of known wolverine detections. Although Alternative 5 affects a slightly greater proportion of wolverine habitat than Alternative 6, this amount of motorized influence would not be measurable at the landscape scale, and therefore would not likely affect the wolverine either through disturbance or habitat condition.

The remaining alternatives would not reopen any ML 1 roads within 5 miles of known detections, and therefore would not directly or indirectly affect the wolverine.

Table 3.03-11. Miles and Zone of Influence of Reopened Maintenance Level 1 Roads within 5 miles of Known Verified Wolverine Detections

Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
ZOI Percentage Affected (Reopened ML 1 Roads)	0%	0%	0%	0%	<1%	<1%	0%
Miles of Reopened ML 1 Roads	0	0	0	0	7.5	0.6	0

Wolverine and Sierra Nevada Red Fox: Summary of Direct and Indirect Effects

Table 3.03-12 summarizes the overall net effect to red fox and wolverine from the proposed actions from motorized route additions, prohibition of cross country travel, establishment of “Open Areas,” and changes to the NFTS.

Table 3.03-12. Wolverine and Sierra Nevada Red Fox: Summary of Overall Net Direct and Indirect Effects

Indicator			Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel									
Trend of Effect			Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres of Habitat Where Travel is Prohibited			0	715,200	717,900	717,900	717,900	717,600	717,900
ZOI Percentage Affected[1]			0%	6%	6%	6%	6%	6%	6%
Proposed Motorized Route Additions to NFTS									
Trend of Effect			Negative (existing unauthorized routes)	Negative	No effect	Negative	Negative	Negative	Negative
% ZOI Affected			6%	<1%	0%	0%	<1%	<1%	<1%
Miles Added[2]			290.9	4.4	0	0.5	7.5	7.8	0.9
Establishment of Motorized "Open Areas"			No Effect	Localized Adverse effects at Greenhorn Creek (60ac) and Boca, Stampede, and Prosser Reservoirs (2,589 ac)	No Effect	No Effect	No Effect	Localized minimal adverse effects at Boca, Stampede, and Prosser Reservoirs	No Effect
Changes to the NFTS	**Change in Class of Vehicles**		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Change in Season of Use		No Effect	Slight Benefit	No Effect	Slight benefit from reduced disturbance	Slight benefit from reduced disturbance	Light benefit from reduced disturbance	No Effect
	Reopening Maintenance Level 1 roads	**Trend of Effect**	No Effect	No Effect	No Effect	No Effect	Negative	Minimal Negative	No Effect
		ZOI Percentage Affected within 5 miles of wolverine detections	0%	0%	0%	0%	<1%	<1%	0%

Indicator			Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
		Miles of Reopened within 5 miles of wolverine detections	0	0	0	0	7.5	0.6	0
		ZOI Percentage Affected within 5 mi. of wolverine detections	0%	0%	0%	0%	<1%	<1%	0%
		Miles Reopened within old forest CWHR habitat	0	1.2	0.0	1.7	32.8	3.9	0.7
Amendments to the Forest Plan			No Effect	Negligible localized negative effect	No Effect	No Effect	Negligible localized negative effect	Negligible localized negative effect	No Effect
Overall Net Effect (compared to Alternative 1)			Negative effects because unauthorized cross country travel would continue; lowest habitat security because the most habitat is in highest route density categories.	Beneficial effect from prohibited cross country travel; although minor negative effects from route additions; higher habitat security from increased proportion of roads in lowest road density categories; overall reduces habitat fragmentation.	Beneficial effect from prohibited cross country travel; higher habitat security from increased proportion of roads in lowest road density categories. Greatest habitat security increase among the action alternatives.	Beneficial effect from prohibited cross country travel; although minor negative effects from route additions;higher habitat security from increased proportion of roads in lowest road density categories; overall reduces habitat fragmentation.	Beneficial effect from prohibited cross country travel; although minor negative effects from route additions; higher habitat security from increased proportion of roads in lowest road density categories; overall reduces habitat fragmentation.	Beneficial effect from prohibited cross country travel; although minor negative effects from route additions; higher habitat security from increased proportion of roads in lowest road density categories; overall reduces habitat fragmentation.	Beneficial effect from prohibited cross country travel; although minor negative effects from route additions; higher habitat security from increased proportion of roads in lowest road density categories; overall reduces habitat fragmentation..

[1]Zone of Influence for Wolverine and Red Fox is 60 m.

[2]Route Miles Added to NFTS: Alternative 1 includes unauthorized routes with continued cross country travel.

Wolverine and Sierra Nevada Red Fox: Cumulative Effects

Cumulative Effects from Motorized Routes: The geographic boundary for analyzing cumulative effects to wolverine and the Sierra Nevada red fox are lands that fall within the boundary of the Tahoe NF including all NFS lands and non-NFS lands (private). The Tahoe NF boundary is sufficiently large to encompass the home ranges of the wolverine and Sierra Nevada red fox located on the Tahoe NF. In addition, the Forest boundary encompasses a wide variety of habitats used by the wolverine and red fox: various forested habitats, subalpine meadow habitats, and riparian streamside habitats. The timeframe for analyzing reasonably foreseeable cumulative effects for the wolverine and Sierra Nevada red fox is approximately 20 years into the past and into the future, which is a reasonable amount of time to estimate potential cumulative impacts to these species from future foreseeable activities.

Motorized Route Density: Motorized route density thresholds for wolverine and Sierra Nevada red fox have not been established, and are hard to determine because of the rarity of these species and their elusive behavior patterns. Therefore, motorized route density across the Tahoe NF provides a relative measure of habitat effectiveness and/or the amount of security habitat available to the wolverine and the Sierra Nevada red fox at the broad landscape scale for which to compare the proposed alternatives. Many literature references indicate wolverine and red fox are primarily associated with remote, secluded areas and may be sensitive to human presence. Therefore, it would follow that as route density increases, human presence may also increase and which reduces security habitat for wolverine and red fox. To compare alternatives, route density categories between 0 to greater than 6 miles/square mile are presented.

The motorized route density within 7th field watersheds was determined for all motorized routes including those on NFS lands and non-NFS lands. Motorized route density represents the sum total cumulative route density for all motorized routes. Since the wolverine is known to avoid areas within high concentrations of human presence, security habitat is best provided for where route densities are the lowest. In addition, motorized route densities are compared within old forest habitat types (CWHR types 4M, 4D, 5M, 5D, and6), Old Forest Emphasis Areas, and within the Tahoe NF Forest Carnivore Network (See Old Forest Associated Species Section).

Table 3.03-13 provides data on the proportion of lands within the Tahoe NF with motorized route densities between 0 and greater than 6 miles/square mile. Alternative 1 has the lowest proportion of land with motorized routes density less than 2 miles/square mile (17% - high to moderate security). The remaining alternatives are similar in their proportion of land base with motorized route density less than 2 miles/square mile (25% to 26%). Moderate security habitat represented by motorized route density category of 2-4 miles/square mile indicates Alternative 1 provides the least amount (44%) moderate security habitat, followed by Alternative 5. The remaining action alternatives provide slightly greater amounts of moderately secure habitat. Alternative 1 provides the most amount of area with lower (32% - 4 to 6 mi/sq. mi.) and least secure habitat (7% greater than 6 mi/sq. mi.). Therefore, Alternatives 3, 4, 2, 6, 7, and 5 in descending order provide the most security habitat for the wolverine and Sierra Nevada red fox, and Alternative 1 provides the least amount of security habitat for these two species.

Table 3.03-13. Percent of Tahoe NF with motorized route densities between zero and greater than 6 miles/square mile

Motorized Route Density	Security Risk*	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
0 Miles/Square Mile	High Security	<1%	<1%	<1%	<1%	<1%	<1%	<1%
0-2 Miles/Square mile	Moderately High Security	17%	25%	26%	25%	25%	25%	25%
2-4 Miles/Square mile	Moderate Security	44%	56%	57%	57%	53%	57%	57%
4-6 Miles/Square mile	Lower Security	32%	15%	13%	14%	17%	14%	14%
>6 Miles/Square mile	Least Security	7%	4%	4%	4%	5%	4%	4%

*Security risk was developed based on a review of literature from various sources on wide-ranging species and professional judgment.

The overall cumulative effects to wolverine and Sierra Nevada red fox from motorized routes are evaluated by analyzing the effects of the alternatives in terms of motorized route density, habitat fragmentation, and disturbance to a specific site (wolverine only) from past, present, and reasonably foreseeable actions (Table 3.03-14). Past and present motorized route densities are combined to represent the current existing condition. Since no thresholds of motorized route density for these species have been established, motorized route density is only used to compare the relative differences between the alternatives. Motorized route densities categories greater than 4 miles/square mile ("lower security" and "least security") are used as a metric to compare relative route densities of the alternatives where human impacts of motorized routes may render habitat less suitable and/or secure to wolverine and red fox. Habitat fragmentation through removal of snags and down logs for public safety is also used to evaluate the cumulative impacts of the proposed alternatives.

Table 3.03-14. Wolverine and Sierra Nevada Red Fox Cumulative effects from Motorized Route Density, Habitat Fragmentation, and Disturbance to a Specific Site

Alternatives		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Present and Past Effects								
Acres of Cross Country Travel Prohibited		0	715,200	717,900	717,900	717,900	717,600	717,900
Total Combined Percent with route density categories of 4 to 6 Miles/square mile (lower security) and >6 miles/square mile (least security habitat)		39%	19%	17%	18%	23%	19%	19%
Cumulative Motorized Route Density								
Zone of Influence (60 meters)		26%	<20%	<20%	<20%	22%	<20%	<20%
Miles Added (Disturbance to a specific site – within 5 miles of wolverine site)		0	4.4	0	0.5	7.5	7.8	0.9
Establishment of Motorized "Open Areas"		None	Slight Negative Effect Greenhorn Area (60 ac), Prosser, Boca, and Stampede Reservoirs (2,589 ac)	None	None	None	Slight negative effect at Prosser, Boca, and Stampede Reservoir Access Areas (244 acres)	None
Changes to NFTS	**Change in Class of Vehicles**	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Change in Season of Use	No Effect	No Effect	No Effect	Slight benefit from reduced disturbance	Slight benefit from reduced disturbance	Light benefit from reduced disturbance	No Effect
	Miles Reopened ML 1 Roads (Disturbance to a specific site – within 5 miles of wolverine site)	0	0	0	0	7.5	0.6	0

Alternatives	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Future Effects							
Potential for route proliferation contributing to motorized route density and habitat fragmentation into the future	High potential for increased route density and habitat fragmentation in the future due to unmanaged cross country travel	Low potential for increased route density and habitat fragmentation– Cross country travel would be prohibited	Low potential for increased route density and habitat fragmentation– Cross country travel would be prohibited	Low potential for increased route density and habitat fragmentation– Cross country travel would be prohibited	Low potential for increased route density and habitat fragmentation– Cross country travel would be prohibited	Low potential for increased route density and habitat fragmentation– Cross country travel would be prohibited	Low potential for increased route density and habitat fragmentation– Cross country travel would be prohibited
Cumulative Effects							
Overall Cumulative Effect of past, present and future motorized routes to wolverine and red fox	Greatest cumulative effect from route density and proportion of Forest fragmented by routes	Cumulative effects of route density and habitat fragmentation are similar to Alternatives 3, 4, 6, 7	Cumulative effects of route density and habitat fragmentation are similar to Alternatives 2, 4, 6, 7	Cumulative effects of route density and habitat fragmentation are similar to Alternatives 2, 3, 6, 7	Next highest Cumulative effect after Alternative 1, slightly higher cumulative effect than Alternatives 2, 3, 4, 6, & 7	Cumulative effects of route density and habitat fragmentation are similar to Alternatives 2, 3, 4, 7	Cumulative effects of route density and habitat fragmentation are similar to Alternatives 2, 3, 4, 6

*Alternative 1 includes existing unauthorized routes under continued motorized cross country travel.

Overall Cumulative Effects from Past, Present, and Reasonably Foreseeable Future Actions: Past and current cumulative effects to wolverine and Sierra Nevada red fox include current and historic grazing; loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, winter recreation (skiing and snowmobiling), and general recreation activities including all forms of motorized use including 4 wheel drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands. Improved range conditions as a result of implementing the revised grazing standards and guidelines should benefit prey species for both the wolverine and red fox, especially as site specific allotment management plans are developed.

Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to habitats for wolverine and red fox. Between 2001 and 2008, approximately 17,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. It is uncertain how vegetation treatments actually affect the wolverine as no empirical data exists on how vegetation management affects habitat quality for both the wolverine and the red fox. In general, management treatments which maintain or enhance habitat for deer should benefit the wolverine.

Vegetation and fuels treatments generally do not increase forage quality and quantity for deer (wolverine prey species) because they do not usually result in reducing the canopy cover below 40%. Higher canopy cover would not increase the production of understory species important for deer foraging. These treatments may result in the short-term reduction in cover for the California wolverine and the Sierra Nevada red fox, though it is expected that in the longer term, habitat would be protected by reducing wildfire risk. Between 1994 and 2008, approximately 95,000 acres burned on the Tahoe NF, some of which have removed forested habitat for wide-ranging species.

On the Tahoe NF, present and past recreational impacts to the wolverine and red fox are far-reaching. The impact of humans from commercial harvest and trapping of wolverine during the turn of the century likely significantly contributed to the decline (and potential extirpation) in wolverine compared to historic conditions in the Sierra Nevada. The Tahoe NF recreation activities include many forms of recreation including both passive and active recreation. Summer recreation includes fishing, hiking, camping at developed and dispersed sites, hunting, off highway use, and wildlife viewing. Winter recreation includes developed ski areas, cross country skiing, and over snow recreation. Since no scientific studies are available that show how these activities impact these species, it is unknown how these recreational activities affect the distribution and abundance of wolverine and the red fox.

The wolverine and the red fox are considered to be primarily associated with areas with low human influence, such as remote wilderness and roadless areas. Increased recreational use on the Tahoe NF in the near future has the potential to impact wolverine if den sites at high elevation subalpine and alpine areas

are disrupted during the breeding period (January to June 30). Increases in recreational activities associated with motorized routes are generally not likely to affect subalpine and alpine areas considered to be suitable for wolverine and red fox denning habitat when they are covered by snow.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires, and recreation, Alternative 1 poses the greatest risk to the wolverine and red fox on the Tahoe NF, where 39% of the Tahoe NF has motorized route densities that fall in the lower security (motorized route density category 4-6 mi/sq. mi.) and least secure (motorized route density category greater than 6 mi/sq. mi.) habitat condition, followed by Alternative 5 (23%). The remaining action alternatives are similar to each other and only slightly increase overall cumulative impacts to wolverine and Sierra Nevada red fox on the Tahoe NF. Alternative 3 does not add any routes to the NFTS, so it does not add to existing cumulative impacts. All the action alternatives would result in a beneficial impact to wolverine prey (mule deer) from the ban of cross country travel on over 715,000 acres, including the use on between 257 and 390 miles of existing unauthorized routes, depending on the alternative (Alternative 5 least benefit to Alternative 3 greatest benefit), compared to Alternative 1.

Non-motorized (hiking, mountain biking, equestrian) use may occur on existing unauthorized routes. Generally, it is expected that non-motorized recreation would be less impactive than motorized recreation, but the degree of the reduced impact depends upon the type and intensity of non-motorized use. Over time, it is expected that these existing motorized routes would eventually become revegetated through active or passive restoration. The time of recovery would depend upon the site-specific soil and vegetative conditions.

In addition, Alternatives 4, 5, and 6 would benefit wolverine prey on deer winter ranges through the implementation of wet weather closures on native surfaced roads and trails. Finally, Alternative 1, with continued cross country travel, including continued use of existing unauthorized routes, has the greatest number of route miles occurring within a 5-mile radius of verified wolverine detections (104 mi.), followed by the remaining alternatives in descending order (Alternative 5, 9 mi.; Alternative 2, 4 mi.; Alternative 6, 3 mi.; Alternatives 4 and 7, 2 mi.; Alternative 3, none).

Wolverine and Sierra Nevada Red Fox: Management Direction

Sensitive Species Determination: The Biological Evaluation for the Travel Management EIS project (Project file, which is incorporated by reference) made a determination that implementation of Alternative 6, the Preferred Alternative, may affect the California wolverine and the Sierra Nevada red fox, but is not likely to result in a trend toward Federal listing or loss of viability for the California wolverine or the Sierra Nevada red fox within the planning area of the Tahoe National Forest. Alternative 6 would prohibit current and future cross country travel, including motorized use on 104 miles of unauthorized routes within 5 miles of verified wolverine detections, would impact less than 1 % of wolverine and the Sierra Nevada red fox habitat, would result in route densities of >4 miles/square mile (low security risk) in 18% of the Tahoe NF, would not affect alpine or subalpine habitat above 8,000 feet, and would only add 3 miles of routes to the NFTS within 5 miles of verified wolverine detections. Beneficial effect from

prohibited cross country travel; although minor negative effects from route additions; higher habitat security from increased proportion of roads in lowest road density categories; overall reduces habitat fragmentation. In the absence of a range-wide viability assessment, this viability determination is based on local knowledge of this species as discussed previously in this evaluation, and professional judgment.

Compliance with the Forest Plan and Other Direction: The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified the following standard and guideline applicable to wolverine and red fox was analyzed for the Motorized Travel Management Project:

Wolverine and Sierra Nevada Red Fox Detections: Detection of a wolverine or Sierra Nevada red fox will be validated by a forest carnivore specialist. When verified sightings occur, conduct an analysis to determine if activities within 5 miles of the detection have a potential to affect the species. If necessary, apply a limited operating period from January 1 to June 30 to avoid adverse impacts to potential breeding. Evaluate activities for a 2-7 year period for detections not associated with a den site (Standard and Guideline 32). This standard and guideline does not apply to the Sierra Nevada red fox because there have been no verified detections of it on the Tahoe NF.

The Travel Management Project analyzed how proposed motorized route additions would affect the area within a 5 mile radius of known verified wolverine detections. The analysis shows when wolverine may be using the area for foraging or traveling when motorized use tends to occur, motorized use has the potential to disturb the wolverine. Alternative 1 continues cross country travel, where use on 104 miles of unauthorized routes would occur within 5 miles of verified wolverine detections where direct disturbance could potentially occur. Alternative 5 results in the next greatest potential disturbance to wolverine by activities associated with 9 miles of proposed motorized route additions within 5 miles of known wolverine detections, followed by Alternatives 2, 6, 7, and 4 in descending order. Alternative 3 does not add motorized trail to the NFTS, and therefore, would not have any direct effects to wolverine within 5 miles of known detection locations. In addition, the prohibition of cross country travel on approximately 715,000 acres of habitat across the Forest significantly improves habitat effectiveness for all the action alternatives.

Alternative 6 would not propose any route additions to the NFTS or would reopen any ML 1 roads within alpine and subalpine areas above 8,000 feet (i.e. Mt. Lola area) that may be suitable for wolverine denning habitat, and therefore would not require a Limited Operating Period from January 1 to June 30. No verified detections of the Sierra Nevada red fox are known at this time, and therefore, a site-specific analysis is not warranted.

Mule Deer (Ungulates): Affected Environment

The mule deer is the only species in the Ungulate Species Group. The mule deer is a Management Indicator Species on the Tahoe NF. The Tahoe LRMP indicates that mule deer use a mix of all successional stages, but the most important mule deer habitat types are early successional types, hardwoods, and shrublands. Most deer on the Tahoe NF migrate seasonally between higher elevation summer range and low elevation winter range. In general, critical winter range, critical summer range,

and fawning habitats represent key habitats for deer where heavier use and higher quality habitats for wintering and summer use are expected to occur.

The Tahoe National Forest has four main deer herds within its administrative boundaries: Downieville, Nevada City, Blue Canyon and Loyalton/Truckee. The Sloat, Mooretown and Doyle herds overlap with small portions of the Tahoe NF in the extreme north sections of the administrative boundaries and are insignificant on a forest scale.

The Tahoe LRMP currently has restrictions on cross country travel within the four primary deer herd boundaries, including Blue Canyon (49,542 acres), Downieville (71 acres), Nevada City (16,819 acres) and Loyalton-Truckee (4,053 acres).

Table 3.03-15 shows deer habitat acreage by deer habitat type for each of the primary deer herds (Blue Canyon, Downieville, Nevada City, and Loyalton-Truckee) occurring on NFS lands and non-NFS lands within the boundary of the Tahoe NF.

Table 3.03-15. Mule Deer Acreage of Habitat by type for each major deer herd within Tahoe NF boundary

Deer Herd	Habitat Type	Total Acres	FS Acres
Blue Canyon	Critical Summer	**64,829**	51,463
	Critical Winter	**12,115**	11,196
	Fawning	**730**	700
	Holding	**846**	846
	Summer	**170,000**	123,563
	Winter	**60,533**	49,871
Downieville	Critical Summer	**60**	22
	Critical Winter	**4,868**	1,973
	Fawning	**0**	0
	Holding	**0**	0
	Summer	**247,422**	185,859
	Winter	**56,679**	38,541
Nevada City	Critical Summer	**60,162**	37,853
	Critical Winter	**14,101**	9,066
	Fawning	**8,118**	4,107
	Holding	**2,455**	572
	Summer	**110,000**	60,651
	Winter	**37,071**	19,309
Loyalton-Truckee	Critical Summer	**25,748**	20,474
	Critical Winter	**8,524**	5,876
	Fawning	**4,440**	2,120
	Holding	**0**	0
	Summer	**301,974**	197,891
	Winter	**4,508**	2,173

Many studies have been conducted on the interaction of road and trail-associated activities and mule deer, and have shown that road and trail-associated factors have the potential to impact mule deer populations directly and indirectly, including mortality from vehicle-collisions, modification of behavior (avoidance or flight), mortality from hunting and poaching, habitat fragmentation, edge effects of roads and trails, and others. Roads and trails can result in the disturbance or disruption of individuals in a deer population. Deer inhabiting areas near roads and trails may move away from the area when disturbed by humans. Several factors affect the degree to which trail and road associated human activities disrupt deer. This section will highlight some examples of the way in which roads and trails can affect individual deer and deer populations. Studies on both white-tailed deer and mule deer are included in the summaries.

Displacement or Avoidance: In general, 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. 2004). Wisdom et al. (2004) found that mule deer showed little measurable flight response to experimental OHV treatments but cautioned that deer may well be responding with fine-scale changes in habitat use (i.e. avoidance), rather than substantial increases in movement rates and flight responses. Several studies have found that mule deer avoid areas in proximity to roads. Deer avoid primary roads more than secondary or tertiary roads and also avoid roads more in open habitats as opposed to areas with vegetative or topographic cover (deVos et al. 2003).

Various studies have shown that mule deer have displacement distances that vary between 200 and 800 meters, depending upon the road type and traffic level, and the surrounding habitat (Perry and Overly 1977, Rost and Bailey 1979, Johnson et al. 2000). One study found that if habitat was available away from a linear road or trail, then deer avoided the disturbance corridor (Jalkotzy et al. 1997). However, when no suitable deer habitat was available away from the road or trail, then deer used the habitat adjacent to the road or trail. Rost and Bailey (1979) reported that deer and elk in Colorado avoided roads, especially within 200 meters of a road. Perry and Overly (1977) reported that deer were displaced up to 800 meters from roads.

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). Where disturbance causes deer to avoid areas within preferred habitats, animals may be forced into less preferred or lower quality habitats. Such shifts, particularly if repeated, can result in adverse impacts to the energy balance of individual deer and ultimately can decrease population productivity, especially on winter ranges (deVos et al. 2003).

Mortality: *Hunting and Poaching:* Greater human access can increase opportunities for hunting as well as poaching of deer. During the hunting season, deer may become more wary of humans, and disturbance to deer is greater when being hunted. In New York State, antlered deer were found to have longer flight distances than deer that were not hunted (Jalkotzky et al. 1997). Hunted deer populations tend to have stronger reactions to people on foot than motorized vehicles. This may be due to the fact the deer can detect a vehicle from greater distances rather than getting surprised by quieter humans on foot.

Roads and trails can facilitate deer harvest success. A study using 143 radio-collared deer in Minnesota revealed that deer mortality during the hunting season was 2-4 times higher for deer that lived 0.2 km from a road versus those that were at greater than 0.3 km from a road. Major access routes radiating from urban centers into deer range provide increased opportunities for hunters.

Since hunting levels for deer are controlled through hunting zone quotas and tag limits established by the California Department of Fish and Game (CDFG), an increase in hunting opportunity or hunter success is unlikely to impact deer populations (deVos 2003). Hunting limits also take into account estimates of the amount of illegal kill and road kill occurring. Levels of illegal harvest are not presently described as a significant source of mortality for deer herds on the Tahoe NF (CDFG 2003, CDFG 1998).

Thomas et al. (1979) used Perry and Overly's data to develop a habitat effectiveness model based on road densities. The model indicated that a 20% loss in habitat effectiveness occurred when road densities were about 2 miles/mi^2 for summer range habitat. At road densities of 6 miles/mi^2, habitat effectiveness declined by 50-95% depending on the type of road.

One study found that all terrain vehicles altered deer feeding and use patterns, and these deer produced fewer young the following year (Yarmaloy 1988). An Arizona study using deer and elk decoys reported that illegal road hunting was widespread (Bancroft *IN* Watson 2005). Eleven of 19 archery elk and deer hunters and 41of 53 firearms hunters committed violations by attempting illegal take after observing a decoy from their vehicle.

Collisions: Vehicle collisions with deer can contribute considerably to direct deer mortality. Deer are probably the most frequently-killed large mammal along North America's roads. The Insurance Institute for Highway Safety commissioned a study which estimated that more than 1.5 million deer/vehicle collisions occur annually, resulting in more than 29,000 human injuries and 150 deaths. Romin and Bissonette (1996), conservatively estimated that the U.S. national deer road kill in 1991 totaled at least 500,000 deer. Deer road kills vary considerably by region and by season. In California, mule deer road kill along a 3 mile stretch of secondary highway was estimated at 3.7 and 4.8 per kilometer per year during spring and fall migrations, respectively (Jalkotzy et al. 1997).

There are little to no data on deer road kills along Forest roads, however roads maintained at a higher standard for passenger vehicle (Maintenance Levels 3, 4, and 5), where vehicle speeds are greatest, have the most potential to contribute to deer-vehicle collisions. Deer-vehicle collisions on roads and trails which are maintained for high clearance vehicles (maintenance level 2 roads) are probably not appreciable in number due to the lower speeds and the amount of use received by these roads.

Summary of trail and road associated impacts to mule deer:

- Mortality from hunting or trapping as facilitated by motorized road and trail access
- Increased illegal take of animals as facilitated by trails and roads
- Mortality or injury resulting from a motorized vehicle colliding with an animal
- Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities.

- Increased mortality of animals (euthanasia or shooting) due to increased contact with humans, as facilitated by road and trail access
- Interference with dispersal or other movements as posed by a road or trail itself or by human activities on or near roads, trails, or networks
- Spatial shifts in populations or individuals animals away from human activities on or near roads, trails, or networks
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young
- Increase in heart rate or stress hormones when near a road or trail or network of roads or trails.

Mule Deer: Environmental Consequences

Mule Deer: Indicators used to Measure Effects

Cross Country Travel: The prohibition of cross country travel is analyzed for its effects on the Blue Canyon, Downieville, Nevada City, and Loyalton-Truckee deer herds within each deer habitat type.

Additions to the NFTS (miles of motorized routes and Zone of Influence): To assess the potential direct and indirect impacts to deer from motorized route associated disturbance including noise, hunting, poaching, etc., the miles of motorized routes to be added to the NFTS were determined for each alternative by key deer habitat type (critical summer, fawning, winter, and critical winter) within each of the deer herds - Blue Canyon, Downieville, Nevada City, and Loyalton-Truckee.

Critical winter range is considered to provide key habitat for deer during the winter months, and fawning habitat and critical summer range is expected to receive heavier deer use in the summer months. Determining the proportion of critical winter range and the proportion of critical fawning and summer range occurring within a Zone of Influence associated with roads or motorized trails, provides another measure of the effects of action alternatives upon these key deer types.

Based upon the Rost and Bailey's 1979 study in Colorado, which indicated that deer were displaced within a 200 meter distance of secondary roads, a distance of 200 meters was applied to represent the Zone of Influence related to motorized routes, since the majority of Tahoe NF roads and trails are likely most similar to those roads addressed in the Colorado study area. The use of a larger Zone of Influence (i.e., 400 meters or 800 meters) could potentially exaggerate the effects of motorized routes, as the science of motorized route effects vary upon many factors. The proportion of each deer herd's critical winter range habitat and critical summer range and fawning habitat occurring within this Zone of Influence was determined for each Alternative. Thresholds associated with this measure have not been established, but relative changes in habitat effectiveness can be evaluated and compared.

Changes to the NFTS: (Changes to Wet Weather Seasonal Restrictions, and Reopening Maintenance Level 1 Roads): Wet weather seasonal restrictions would apply to Alternatives 4, 5 and 6 on native surfaced roads and motorized trails. The benefits to deer of these additional wet weather closures are analyzed for the alternatives. Reopening Maintenance Level 1 Roads that were previously closed to motorized use is analyzed for its potential for disturbance to the four major deer herds.

Amendments to the Forest Plan: The 1990 Tahoe LRMP (Forest Plan) recognizes that the restriction of motorized vehicle access within certain deer habitat areas is important to deer, especially within key deer winter ranges. Seasonal restrictions for deer habitat as specified in the 1990 Tahoe Forest Plan and contained in existing Forest Orders would be continued. Table 3.03-16 displays the current seasonal restrictions specified in the Forest Plan. These seasonal restrictions apply to all native surface roads and motorized trails within the specified Management Areas.

Table 3.03-16. Tahoe Forest Plan Motor Vehicle Deer Seasonal Restrictions by Management Area (MA)

MA #	MA Name	Motor Vehicle Use Restriction	Restricted Dates
11	Smithneck	Prohibit wheeled vehicle travel off of designated routes in Bear and Jones Valleys for protection of winter deer range	None specified
12	Antelope	Key Deer Winter Range and Migration Corridor – Closed to all motorized vehicle use. Designated routes only in summer season. Restricted period can be amended if weather conditions are such that deer are not on the winter range.	November 1 to May 1
23	Pendola	Designated routes only, except closed south of the Long Point Road on key deer winter range. This restriction can be amended if weather conditions are such that deer are not on the winter range.	November 1 to May 1
24	Oregon	Designated routes only, except closed November 1 to May 1 in wildlife areas such as Plum Valley, Lohman Ridge, and Studhorse Canyon. This restriction can be amended if weather conditions are such that deer are not on the winter range.	November 1 to May 1
42	South Yuba	Designated routes only, southwest of Bloody Run Creek and the Graniteville Road is closed November 1 to May 1 on deer winter range. Restricted period can be amended if weather conditions are such that deer are not on the winter range.	November 1 to May 1
59	Casa Loma	Key Deer Winter Range - Designated routes only, except closed November 1 to May when deer are using the area.	November 1 to May 1
65	Chalk	Key Deer Winter Range - Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle (OHV) use areas. This restriction can be amended if weather conditions are such that deer are not on the winter range in the Burlington Ridge and Greenhorn areas.	November 1 to May 1
84	Humbug-Sailor	Key Deer Winter Range - Closed November 1 to May 1. This restriction can be amended if weather conditions are such that deer are not on the winter range.	November 1 to May 1
102	End of the World	Designated routes only, except seasonal closure of deer holding area during the period September 15 to December 31 annually. During winters with low preceipitation, this area will be closed. This restriction can be amended if weather conditions are such that deer are not on the holding area.	September 15 to December 31
106	Big Oak	Designated routes only in summer. Closed November 1 to May 1on key deer winter range. This restriction can be amended if weather conditions are such that deer are not on the winter range.	November 1 to May 1
108	Little Oak	Designated routes only in summer. Closed November 1 to May 1 on key deer winter range. This restriction can be amended if weather conditions are such that deer are not on the winter range.	November 1 to May 1

For Alternatives 2, 5 and 6, the Forest Plan would be amended to remove the November 1 to May 1 seasonal closure in Management Area 84 (Humbug-Sailor) on key winter deer range.

Mule Deer: Direct and Indirect Effects

Cross Country Travel: The prohibition of cross country travel was analyzed for the Blue Canyon, Downieville, Nevada City, and Loyalton-Truckee deer herds within each deer habitat type. The Tahoe NF LRMP has previously designated some areas within the deer herd boundaries closed to cross country travel which would continue for all alternatives. For each of the deer herds, under Alternative 1, cross country travel would continue (except for the existing LRMP closures), resulting in disturbance, disruption, avoidance, and abandonment of suitable habitats. Acreages where cross country travel is not currently prohibited for the four primary herds total 753,640 acres (Blue Canyon: 188,096 acres; Downieville: 226,324 acres; Nevada City: 114,739 acres; Loyalton-Truckee: 224,481 acres). For all action alternatives, for all herds, and in all seasonal ranges, the acres of proposed cross country motorized travel prohibitions would be equal to the amount of habitat available in each seasonal type, thus all action alternatives would substantially benefit all deer herds and reduce negative effects associated.

Additions to the NFTS: Table 3.03-17 displays the miles of proposed motorized route additions to the NFTS for the action alternatives, and the total miles of existing unauthorized routes for Alternative 1 for each deer herd. Motorized route additions displays a way to compare alternatives to assess the direct and indirect impacts to deer from motorized routes where access for hunting and poaching, and disturbance and avoidance may occur. Key deer habitat within Critical Summer, Fawning, Critical Winter, and Winter Ranges are shown below. Alternative 1 poses the greatest risk to all deer herds on all deer seasonal ranges where over 450 miles of existing motorized unauthorized routes would continue to be used with continued cross-country travel. The action alternatives (except Alternative 3) range from adding 5 to 12 miles of motorized routes, in ascending order (Alternatives 4, 7, 2, 6, and 5). Alternative 3 does not add any motorized routes, and therefore, does not add additional motorized impacts within key seasonal ranges for any of the major deer herds on the Tahoe NF.

Blue Canyon Deer Herd: Alternative 1 poses the greatest risk to the Blue Canyon Deer Herd on both critical summer and critical winter/winter ranges. The action alternatives (except Alternative 3) add 4 to 6 miles (Alternative 4 – least to Alternative 5 – most) of motorized routes within critical summer and critical winter/winter ranges. Within Critical Summer Range, implementing Alternative 1, with continued cross-country travel and associated use of unauthorized routes, would have motorized route miles that exceed all the action alternatives by about 50 miles. Within winter and critical winter ranges, Alternative 1 exceeds action alternatives (Alternatives 2, 3, 4, 5, 6, 7) by least 130 miles.

Downieville Deer Herd: Alternative 1 poses the greatest risk to the Downieville Deer Herd on both critical winter and winter ranges where resources may be scarce and deer may be stressed during the winter months. For the Downieville Deer Herd, only about 60 acres of critical summer and no fawning areas fall within the boundaries of the Tahoe NF. Within critical winter range, Alternative 1 has 17 motorized route miles, and the all the action alternatives have 14 miles of motorized routes each. Within winter range, Alternative 1 has the highest number of motorized route miles (76.3 miles), where direct

and indirect disturbance associated with motorized routes could occur when deer are stressed during the winter. Alternatives 2, 4, 5, 6, and 7 each adds 0.2 miles of motorized route miles within winter range,

Nevada City Deer Herd: Alternative 1 poses the greatest risk to the Nevada City Deer Herd on all key deer habitat types - critical summer, critical winter, and winter habitats when deer are most vulnerable to disturbance. Motorized miles in Alternative 1 exceeds the action alternatives in all key seasonal ranges by at least 138 miles, with Alternative 5 having the most motorized additions (5 miles) followed by Alternatives 2, 6, 7, 4.

When comparing critical summer and fawning habitat for the Nevada City Deer Herd, Alternative 1 exceeds the action alternatives by at least 37 miles (in descending order - Alternatives 6, 5, 2, 7, 4, and 3). For critical winter habitat and winter ranges, Alternative 1 exceeds the action alternatives by 100 miles. Alternative 5 adds 3 miles of motorized routes, followed by Alternatives 2 and 6, with 1 mile and 0.1 mile added, respectively within key winter ranges. The remaining alternatives would not add motorized routes in key winter ranges.

Loyalton-Truckee Deer Herd: Motorized route miles for the Loyalton-Truckee Deer Herd are greatest under Alternative 1, where motorized route miles exceed all the action alternatives by at least 50 miles within all seasonal ranges (Table 3.03-17). With the exception Alternative 6 where 1 mile of motorized route is added within critical summer habitat, the remaining action alternatives do not add any motorized miles to the NFTS within any seasonal ranges for the Loyalton-Truckee Deer Herd.

Table 3.03-17. Miles of Motorized Route Additions on within deer herd winter ranges, critical winter ranges, critical summer, and fawning areas on the Tahoe NF

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Blue Canyon Deer Herd	Critical Summer	51.0	1.3	0	0.2	1.5	1.5	0.9
	Fawning	0.1	0	0	0	0	0	0
	Critical Winter	22.6	0	0	0	0	0	0
	Winter	112.7	4.6	0	4.1	4.9	4.8	4.5
	All Seasonal Ranges	**186.4**	**5.9**	**0**	**4.3**	**6.4**	**6.3**	**5.4**
Downieville Deer Herd	Critical Summer	0.1	0	0	0	0	0	0
	Fawning	0	0	0	0	0	0	0
	Critical Winter	1.7	0	0	0	0	0	0
	Winter	74.5	0.2	0	0.2	0.2	0.2	0
	All Seasonal Ranges	**76.3**	**0.2**	**0**	**0.2**	**0.2**	**0.2**	**0**

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Nevada City Deer Herd	Critical Summer	30.3	1.7	0	0.5	1.7	2.3	0.8
	Fawning	9.5	0.3	0	0	0.3	0.3	0.2
	Critical Winter	40.2	0	0	0	0	0	0
	Winter	62.9	1.0	0	0	3	0.1	0
	All Seasonal Ranges	**142.9**	**3.0**	**0**	**0.5**	**5.2**	**2.9**	**1.0**
Loyalton-Truckee Deer Herd	Critical Summer	39.0	0	0	0	0	1.1	0
	Fawning	3.4	0	0	0	0	0	0
	Critical Winter	6.0	0	0	0	0	0	0
	Winter	3.6	0	0	0	0	0	0
	All Seasonal Ranges	**52.0**	**0**	**0**	**0**	**0**	**1.1**	**0**
Total for all herds within all seasonal ranges		**457.6**	**9.1**	**0**	**5**	**11.6**	**10.3**	**6.4**

* Alternative 1 includes miles of unauthorized routes that would remain with continued use

Zone of Influence: As stated above, deer were found to respond to disturbance associated with secondary motorized roads and trails within a 200-meter distance. Analyzing for these variables can be complex because deer may respond differently, depending on the type of motorized route and the type of surrounding vegetation, the intensity of animal use, and the degree to which motorized activities overlap with deer use. The action alternatives consider the addition of motorized routes, and therefore, a Zone of Influence within 200 meters of motorized route additions was used by to compare differences in the direct and indirect impacts between alternatives for each deer herd, within key deer ranges (Table 3.03-18). Although major roads (i.e., paved and surfaced roads used by passenger vehicles which receive higher use levels and rates of speed, including county roads, state highways, etc.) may have a greater influence on deer than secondary motorized routes, a 200-meter Zone of Influence was used to analyze all existing motorized routes consistently because using a greater Zone of Influence may result in excessive overlap in habitat when considering all motorized routes, and therefore, overstate the effects of motorized routes.

Areas that are less influenced by motorized routes are considered “security habitat,” whereas, areas influenced by motorized routes are considered “zones of influence” where deer are less secure. For Alternative comparison purposes, a simple ranking system, such as the one developed by Gaines et al. (2003), is used. For this purpose, less than 25 percent of key habitat affected was ranked as a low level of road or trail influence, 25 to 50 percent of key habitat affected was ranked as a moderate level of influence, and greater than 50 percent of key habitat affected was ranked as a high level of influence. Using this ranking system, Alternative 1 results in a “high” level of motorized route influence on each deer herd’s critical summer and winter ranges combined, where the effectiveness of critical deer range habitat could be reduced. All the action alternatives result in a “low” influence to key summer and winter ranges from the addition of routes, and therefore considerably improves deer habitat security or effectiveness compared to Alternative 1. The sections below describe how the alternatives affect key deer seasonal habitats from the addition of motorized routes.

Blue Canyon Deer Herd: Alternative 1 poses the greatest risk to the Blue Canyon Deer Herd from reduced habitat effectiveness from potential disturbance or avoidance behavior as a result of factors

associated with cross country travel, including continued use of unauthorized routes. Under Alternative 1, approximately 20% of key winter deer ranges are influenced by continued use of existing unauthorized routes. Unauthorized routes influence key summer ranges of the Blue Canyon herd at a relatively low level (2% fawning, 11% critical summer). All the action alternatives result in a low influence (0-1%) on key deer ranges from proposed motorized additions. Motorized route additions for Alternative 5 influences 3% of critical winter ranges compared to the other action alternatives.

Downieville Deer Herd: The Downieville Deer Herd is moderately affected overall by Alternative 1, where 42% of critical summer ranges, 7% critical winter, and 16% winter ranges are within a 200-meter Zone of Influence of existing motorized unauthorized routes. Alternatives 2, 3, 4, 6 and 7 do not directly or indirectly affect key deer habitats. Alternative 5 contributes to a low amount of key habitats affected by adding motorized routes within a 200-meter Zone of Influence where, on average, 1% of key deer habitats are affected.

Nevada City Deer Herd: Alternative 1 poses the greatest risk where a "moderate" amount of key winter deer habitat (27%) is influenced by continued use on unauthorized routes associated with cross country travel within the Nevada City Deer Herd resulting in a moderate reduction of habitat effectiveness on winter ranges when deer are stressed and resources may be low. Critical summer and fawning habitat is influenced by unauthorized routes by 9% and 15%, respectively, which individually contributes to a relatively low level of potential disturbance by motorized use when deer are on key summer ranges. The action alternatives all result in a "low" amount of key deer habitat (0-2%) being influenced by motorized routes added to the NFTS.

Loyalton-Truckee Deer Herd: All the alternatives result in a "low" influence on key deer habitats within the Loyalton-Truckee Deer herd, with Alternative 1 resulting in the greatest amount of key deer habitats influenced by disturbance potential from continued use of unauthorized routes associated with cross country travel. Alternative 1 directly and indirectly affects between 13 to 19% key summer habitats and 11% key winter ranges. The remaining alternatives affect between 0 to 2% of key deer summer and winter habitats, and therefore would not result in a measurable change in habitat effectiveness.

Table 3.03-18. Percent of Key Deer Ranges within a 200-meter "Zone of Influence" of Motorized Route Additions by Herd

	Range Type	Acres	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Blue Canyon Deer Herd	Critical Summer	64,829	11%	<1%	0%	<1%	1%	1%	<1%
	Fawning	730	2%	0%	0%	0%	0%	0%	0%
	Critical Winter	12,115	20%	0%	0%	0%	3%	0%	0%
	Winter	60,533	21%	1%	0%	1%	1%	1%	1%
Downieville Deer Herd	Critical Summer	60	42%	0%	0%	0%	0%	0%	0%
	Fawning	0	0%	0%	0%	0%	0%	0%	0%
	Critical Winter	4,868	7%	0%	0%	0%	0%	0%	0%
	Winter	56,679	16%	0%	0%	0%	0%	0%	0%

	Range Type	Acres	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Nevada City Deer Herd	Critical Summer	60,162	9%	1%	0%	<1%	1%	2%	<1%
	Fawning	8,118	15%	1%	0%	0%	1%	1%	1%
	Critical Winter	14,101	27%	0%	0%	0%	0%	0%	0%
	Winter	37,071	17%	0%	0%	0%	2%	0%	0%
Loyalton-Truckee Deer Herd	Critical Summer	25,748	19%	0%	0%	0%	0%	2%	0%
	Fawning	4,440	13%	0%	0%	0%	0%	0%	0%
	Critical Winter	8,524	11%	0%	0%	0%	0%	0%	0%
	Winter	4,508	11%	0%	0%	0%	0%	1%	0%

*Alternative 1 includes unauthorized routes associated with continued cross country travel.

Changes to the NFTS (Wet Weather Seasonal Restrictions, Reopening Maintenance Level 1 Roads): ***Wet Weather Seasonal Restrictions***: Wet weather seasonal restrictions of native surface motorized roads and trails are analyzed for the action alternatives. Alternatives 4, 5, and 6 provide additional wet weather seasonal restrictions, which may benefit deer that may potentially use areas that are not currently under existing Forest Plan deer seasonal restrictions. In areas outside current Forest Plan deer seasonally restricted areas, the wet weather seasonal closures would provide an additional 3 months wet weather closure (3 months for the Burlington Ridge and Greenhorn area) and would reduce the effects of motorized vehicles upon deer using these areas, as compared to Alternatives 1, 2, 3, and 7, which have no wet weather seasonal closures. Alternatives 4, 5, and 6 could result in shorter or longer wet weather closure periods, but this would vary annually depending upon rainfall and soil conditions.

Reopened Maintenance Level 1 Roads: Reopening Maintenance Level 1 roads (ML 1) has the potential to introduce disturbance to deer from activities associated with motorized vehicles on key deer habitat where deer are most vulnerable. Miles of reopened ML 1 roads and the Zone of Influence within 200 meters were determined for each of the deer herds.

Reopened ML 1 Roads: Alternative 5 potentially affects the most seasonal deer ranges across the Tahoe NF, where approximately 16 miles of ML 1 roads would be reopened to motorized use and could increase disturbance to deer on key summer and winter ranges (Table 3.03-19). Alternatives 2 and 6 would reopen a total of about 1 mile of ML 1 roads, for about ½ mile each within winter range of the Downieville deer herd and critical summer range of the Loyalton-Truckee deer herd. Alternative 4 would reopen a total ½ mile ML 1 road within Blue Canyon critical summer and Nevada City Deer Herd key winter range. The remaining alternatives do not reopen ML 1 roads, and therefore would not increase disturbance to deer on key seasonal habitats.

Table 3.03-19. Miles of Reopened Maintenance Level 1 Roads within Key Deer Habitats

		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Blue Canyon Deer Herd	Critical Summer	0	0	0	0.3	3.7	0	0
	Fawning	0	0	0	0	0.1	0	0
	Critical Winter	0	0	0	0	3.9	0	0
	Winter	0	0	0	0	2.7	0	0
Downieville Deer Herd	Critical Summer	0	0	0	0	0	0	0
	Fawning	0	0	0	0	0	0	0
	Critical Winter	0	0	0	0	0	0	0
	Winter	0	0.5	0	0	0.5	0.5	0
Nevada City Deer Herd	Critical Summer	0	0	0	0	0	0	0
	Fawning	0	0	0	0	0	0	0
	Critical Winter	0	0	0	0.1	2	0	0
	Winter	0	0	0	0.1	2.6	0	0
Loyalton-Truckee Deer Herd	Critical Summer	0	0.6	0	0	0.6	0.6	0
	Fawning	0	0	0	0	0	0	0
	Critical Winter	0	0	0	0	0	0	0
	Winter	0	0	0	0	0	0	0
Total Miles Reopened ML 1 Roads		**0**	**1.1**	**0**	**0.5**	**16.1**	**1.1**	**0**

Zone of Influence: Table 3.03-20 displays the percent of key deer ranges within a 200-meter Zone of Influence of reopened ML 1 roads by alternative for each of the deer herds. Alternative 5 is the only alternative that impacts any of the deer herds from the reopening of ML 1 roads, with the exception of Alternative 2 which only affects less than 1% of critical summer habitat of the Loyalton-Truckee herd. This minor amount of effect from Alternative 2 should not pose a measurable risk to the Loyalton-Truckee herd. The Downieville Deer Herd has no impacts from any alternative

Although Alternative 5 would potentially impact three of the four major deer herds from the reopening of ML 1 roads, implementing Alternative 5 would only influence about 1-2% of any given habitat type. At the herd scale, this proportion of impact should not pose a concern to either the Blue Canyon, Nevada City, or the Loyalton-Truckee herds, and therefore overall habitat security would not be greatly compromised from reopening ML 1 roads. However, there may be localized impacts which may increase disturbance to individual deer. These impacts would vary depending on the amount of disturbance already occurring from existing roads and activities. Areas where checkerboard ownership patterns have already highly fragmented deer winter range, such as the Nevada City and the Blue Canyon herds, deer could experience even more disturbance and harassment.

Table 3.03-20. Percent of Key Deer Ranges within a 200-meter "Zone of Influence" of Reopened Maintenance Level 1 Roads by Herd

	Range Type	Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Blue Canyon Deer Herd	Critical Summer	64,829	0%	0%	0%	0%	1%	0%	0%
	Fawning	730	0%	0%	0%	0%	2%	0%	0%
	Critical Winter	12,115	0%	0%	0%	0%	0%	0%	0%
	Winter	60,533	0%	0%	0%	0%	1%	0%	0%
Downieville Deer Herd	Critical Summer	60	0%	0%	0%	0%	0%	0%	0%
	Fawning	0	0%	0%	0%	0%	0%	0%	0%
	Critical Winter	4,868	0%	0%	0%	0%	0%	0%	0%
	Winter	56,679	0%	0%	0%	0%	0%	0%	0%
Nevada City Deer Herd	Critical Summer	60,162	0%	0%	0%	0%	0%	0%	0%
	Fawning	8,118	0%	0%	0%	0%	0%	0%	0%
	Critical Winter	14,101	0%	0%	0%	0%	1%	0%	0%
	Winter	37,071	0%	0%	0%	0%	1%	0%	0%
Loyalton-Truckee Deer Herd	Critical Summer	25,748	0%	<1%	0%	0%	<1%	0%	0%
	Fawning	4,440	0%	0%	0%	0%	0%	0%	0%
	Critical Winter	8,524	0%	0%	0%	0%	0%	0%	0%
	Winter	4,508	0%	0%	0%	0%	0%	0%	0%

Amendments to the Forest Plan

Key Deer Winter Range for the Blue Canyon Deer Herd: Existing Forest Plan direction for the Humbug-Sailor Management Area (#84) includes the following: "Off-Highway Vehicle Restrictions - On key winter deer winter range, closed November 1 to May 1. This restriction can be amended if weather conditions are such that deer are not on the winter range."

Winter range (winter and critical winter) for the Blue Canyon Deer Herd encompasses a large area (72, 648 acres). Within Blue Canyon Deer Herd winter range, the Forest Plan identified a total of 16,108 acres as key deer winter range located in two separate locations. One key winter range area lies in the northwest portion of the Blue Canyon deer winter range and falls within several management areas, including Casa Loma, North Fork, American, Sugar Pine Point, Macy, Sugar Pine and Humbug-Sailor. The other key winter range area lies near the southern edge of the winter range and overlaps with the Big Oak, Little Oak and Mosquito management areas (Figure 3.03-1). There are currently 79.2 miles of roads and motorized trails within key winter range of the Blue Canyon Deer Herd (See Figure 3.03-1). Alternatives 1, 3, 4, and 7 do not proposed to amend the Forest Plan deer restriction within the Humbug-Sailor MA, and therefore would have no affect to deer.

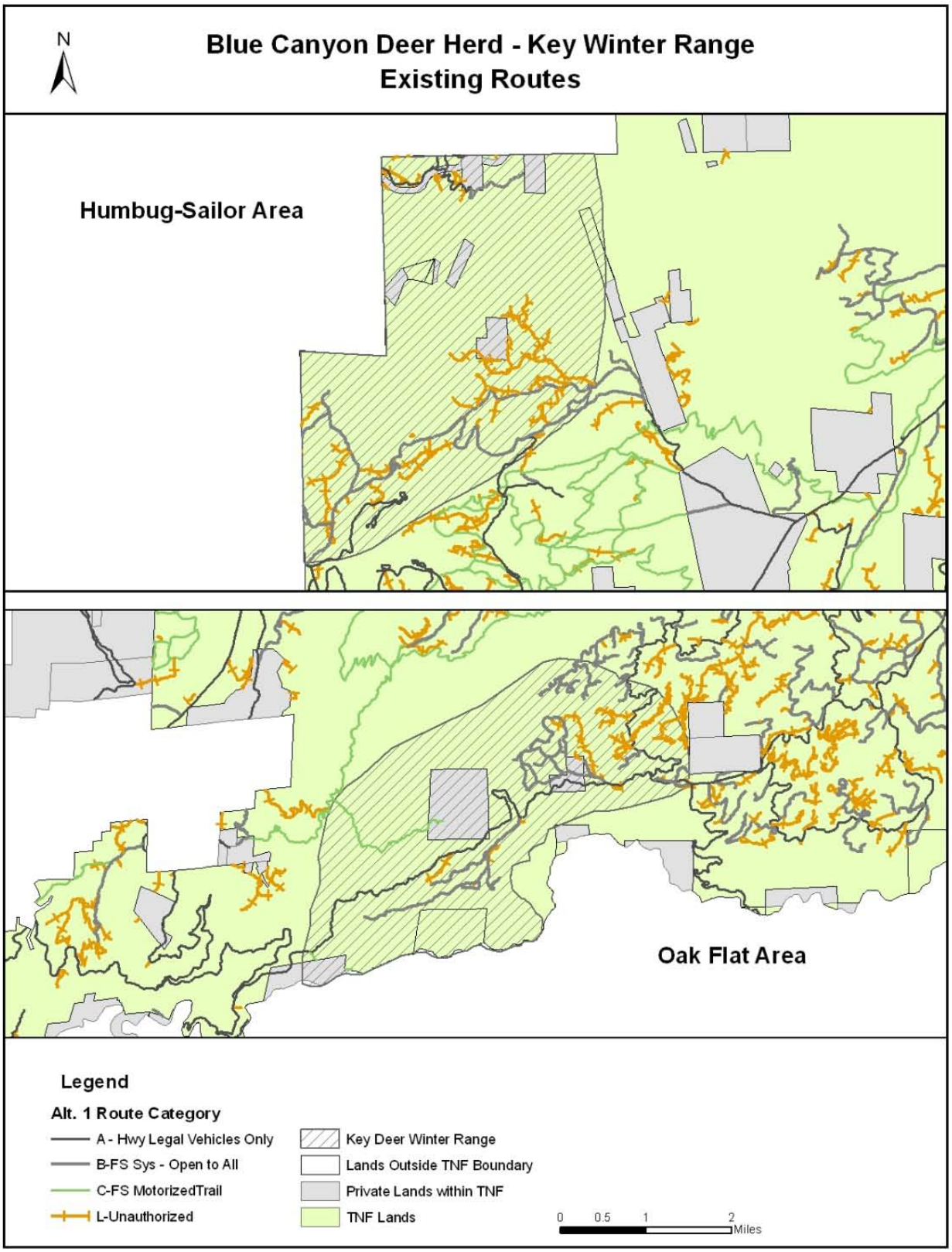

Figure 3.03-1. Blue Canyon Deer Herd Key Winter Range – Existing Motorized Routes

Alternatives 2, 5, and 6 propose to amend the Forest Plan by changing the motorized season of use of May1 to Nov 1 within the Humbug-Sailor Management Area (#84), thereby reducing the seasonal restriction period by a total of 2-3 months along 8.6 miles of existing NFTS (26 Road) as shown in Tables 3.03-21 and 22. This would result in potentially affecting 1,228 acres (200 meters Zone of Influence) or 7.6% of total key deer winter range of the Blue Canyon Deer Herd (Table 3.03-21) (Figure 3.03-2) located at the southern edge of the key deer winter range in the Humbug-Sailor area where deer may potentially be temporarily disturbed from motorized related noise or displaced.

In addition, alternatives 4, 5, and 6 would result in 3.6 - 6.8 fewer miles that are currently open year round to having a wet weather seasonal restriction (Table 3.03-22). Ultimately, the Forest Plan Amendment to alter the current deer seasonal restriction under Alternatives 2, 5, and 6 is not expected to pose a significant risk to the overall condition and trend of the Blue Canyon deer herd especially since annual weather conditions are likely to have a greater influence on deer herd numbers in the area compared to motorized use along existing roads during the months of November, December, and April. Furthermore, motorized use in this area is relatively low during these months, especially in April when the area may still be under snow. Therefore, motorized vehicle and deer interactions are likely to be negligible since motorized use and deer presence along the 26 Road are likely to be minimal, and therefore would have little effect on the Blue Canyon Deer Herd.

Table 3.03-21. Blue Canyon Deer Herd - Key Deer Winter Range Summary for Alternatives 2, 5, and 6

Description	Status
Total Acres Key Deer Winter Range	16,108 acres
Seasonal Restriction within Humbug-Sailor MA	Alts 2 & 6 reduced by 3 months, Alt 5 reduced by 2 months
Miles Affected Within Key Deer Winter Range Affected	8.6 miles
Acres Key Deer Winter Range Affected (200 meter ZOI)	1,228 acres
Percent of Key Deer Winter Range Affected	7.6%

Beneficial Effects to Key Deer Winter Range from Other Actions:

- Prohibition of Cross Country Travel on 16,108 acres Key Deer Winter Range (including 28 miles of unauthorized routes).
- Wet Weather Restrictions within Key Deer Winter Range on an additional 3.7 miles (615 ac or 3.8% of key winter range) that were previously open all year.

Table 3.03-22. Motorized Season of Use within Blue Canyon Herd Key Deer Winter Range

	Season Of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles Motorized NFTS Roads and Trails	Year round	15.6	15.6	15.6	12.0	8.8	12.0	15.6
	May 1 - Nov 1 (LMP Deer Key Winter Range)	29.1	20.5	29.1	29.1	25.1	20.5	29.1
	May 1 - Dec 31 (Wet Weather)	0	0	0	3.6	15.5	0	0
	Apr 1 - Dec 31 (Wet Weather)	0	8.7	0	0	0	12.3	0
Miles Unauthorized Routes		28.0	0	0	0	0	0	0
Total		**72.8**	**44.8**	**44.8**	**44.8**	**49.4**	**44.8**	**44.8**

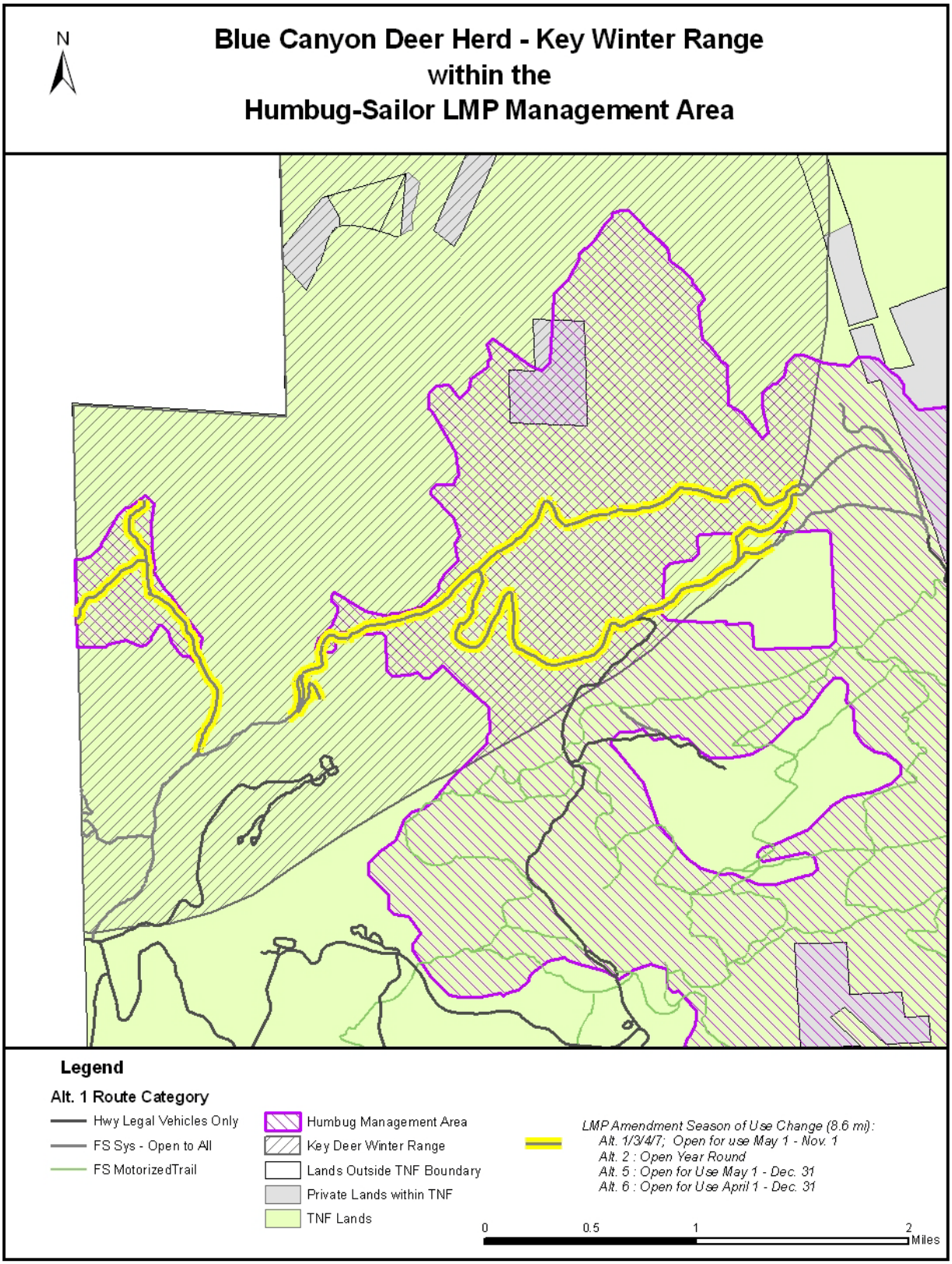

Figure 3.03-2. Blue Canyon Deer Herd - LMP Amendment Proposed Change in Season of Use within the Humbug-Sailor Management Area

Blue Canyon Deer Herd Population Trend

The deer population in Zone D-4 is considered stable to slightly increasing for the period from 1999 to 2008 (Table 3.03-23 and Figure 3.03-3). The Blue Canyon deer herd on the Tahoe NF falls within the larger Deer Hunt Zone D-4 located in portions of Colusa, Nevada, Placer, Sacramento, Sutter, Yolo and Yuba counties. Short-term fluctuations in deer populations are usually attributed to weather events that affect forage production. Table 3.03-23 displays population numbers from 1999 to 2008 from the California Dept. of Fish and Game that are created using a model utilizing harvest data. A major assumption of this model is a correlation between hunter success and population size. Factors that might affect hunter success, such as weather, are not accounted for in the model. Hence, the year to year variation is probably smaller than the population numbers show.

Table 3.03-23. Zone D-4 Deer Population Numbers 1999-2008

Year	Population Numbers
1999	3,340
2000	3,273
2001	6,140
2002	5,000
2003	5,800
2004	3,670
2005	4,870
2006	2,240
2007	4,830
2008	5,590

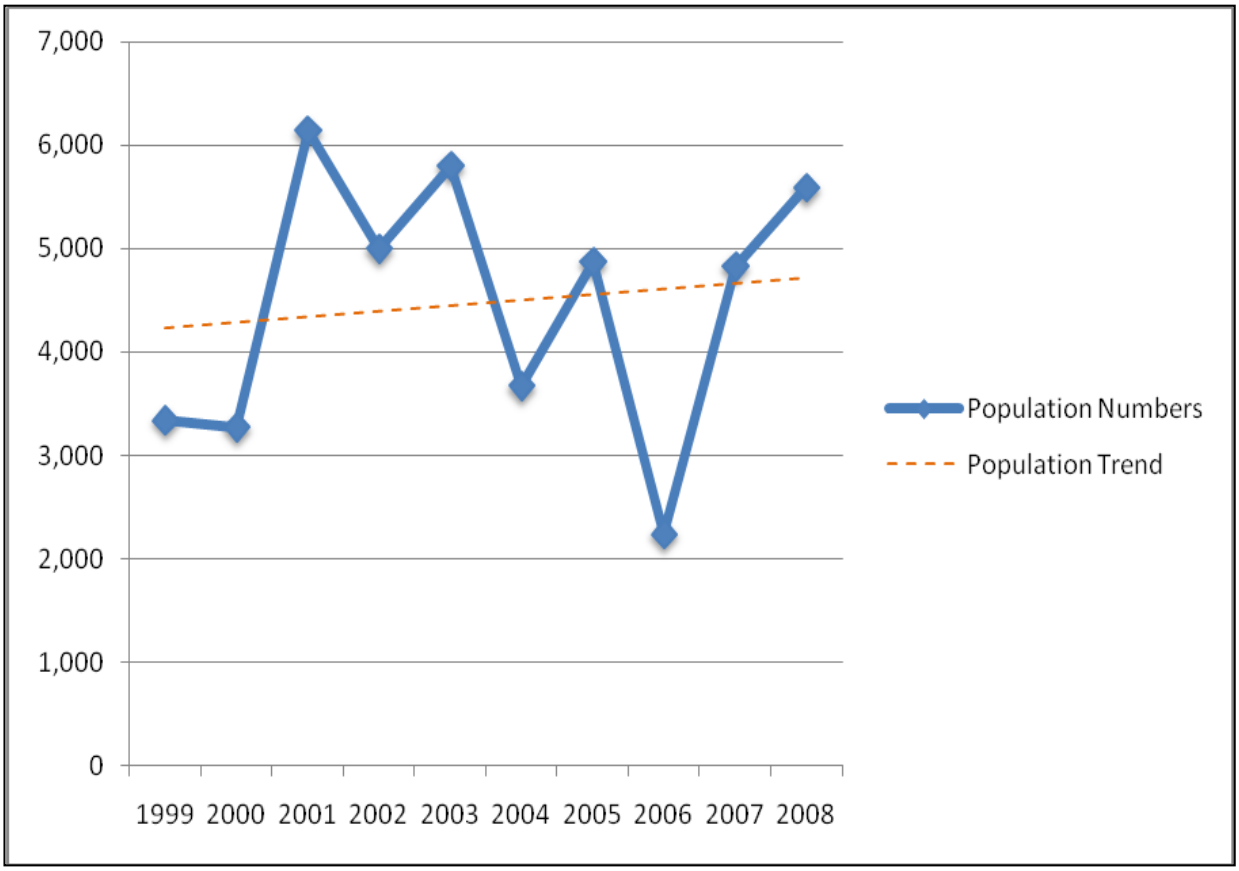

Figure 3.03-3. Blue Canyon Deer Herd Population Trend within the Deer Hunt Zone D-4

Due to the complexity of factors that affect deer population trends within the Deer Hunt Zone D-4 (i.e., urbanization, hunting, long-term habitat condition, annual weather variation, etc.), it is not likely that a shift in changing the season of motorized use under alternatives 5 and 6 by 2-3 months and for Alternative 2 by 6 months, affecting less than 8% of key winter range in the local Humbug-Sailor area would significantly affect deer such that population numbers within D-4 would change. In addition, the overall effects of the prohibition of cross country travel on 16,108 acres of key winter range, including on unauthorized routes and imposing additional motorized wet weather seasonal restrictions within key winter range and surrounding areas would provide an overall net benefit by reducing motorized disturbance within the Blue Canyon Deer Herd under all the action alternatives, and therefore, would meet the intent of Forest Plan S&G to "Limit vehicle access on key deer winter ranges when deer are present."

Mule Deer: Summary of Direct and Indirect Effects

Table 3.03-24 summarizes the overall net effect to the mule deer from the proposed actions from cross country travel, motorized route additions to NFTS, establishment of motorized "Open Areas," changes to the NFTS (Change in season of use, change in class of vehicles, reopening of Maintenance Level 1 roads), and amendments to the Forest Plan by removing motorized seasonal restrictions in the Humbug-Sailor Management Area 84.

Table 3.03-24. Mule Deer - Summary of Overall Net Direct and Indirect Effects*

Indicator		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Trend of Effect		Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres of Habitat Where Travel is Prohibited		70,485	751,981	751,981	751,981	751,981	751,981	751,981
Miles of user created and temporary roads where cross country travel would continue		458	0	0	0	0	0	0
Motorized Route Additions to NFTS								
Trend of Effect		Negative (most impactive alternative)	Negative (3rd most impactive alternative)	No Effect	Negative (shares 5th most impactive alternative with 7)	Negative (2nd most impactive alternative)	Negative (4th most impactive alternative)	Negative (shares 5th most impactive alternative with 4)
Miles of motorized route additions		0	9	0	5	12	10	6
Establishment of Motorized "Open Areas"		No Effect	Increased Localized Disturbance Potential at Greenhorn (60 ac) and at Boca, Prosser and Stampede Reservoirs (2589 acres)	No Effect	No Effect	No Effect	Increased Localized Disturbance Potential at Boca, Prosser and Stampede Reservoirs (244 ac)	No Effect
Changes to the NFTS	**Change in Season of Use (wet weather restrictions)**	No Effect	No Effect	No Effect	Reduces disturbance when deer are on winter and spring ranges	Reduces disturbance when deer are on winter and spring ranges	Reduces disturbance when deer are on winter and spring ranges	No Effect
	Change in Class of Vehicles	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Miles of Maintenance Level 1 (ML 1) Roads Reopened							
	Trend of Effect	No Effect	Negative (2nd most impactive shared with Alt 6)	No Effect	Negative (3rd most impactive)	Negative (most impactive)	Negative (2nd most impactive shared with Alt 2)	No Effect
	Miles of ML 1 Roads Reopened	0	1	0	0.5	16	1	0

Indicator	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Amendments to the Forest Plan	Existing deer seasonal restrictions (Nov 1 to May	Removes Humbug Sailor MA 84 deer seasonal restrictions	Existing deer seasonal restrictions (Nov 1 to May)	Existing deer seasonal restrictions (Nov 1 to May	Removes Humbug Sailor MA 84 deer seasonal restrictions, however wet weather seasonal restrictions apply (Jan 1 to April 30)	Removes Humbug Sailor MA 84 deer seasonal restrictions, however wet weather seasonal restrictions apply (Jan 1 to April 30)	Removes Humbug Sailor MA 84 deer seasonal restrictions
Overall Net Effect of Proposed Actions (compared to Alternative 1)	Negative effects from unauthorized cross country travel; fewer controls on winter and spring ranges.	Beneficial effect from prohibited cross country travel;localized disturbance on winter ranges in Humbug Sailor MA 84; and minor negative effects from route additions and reopened ML 1 roads; overall reduces habitat fragmentation.	Beneficial effect from prohibited cross country travel.	Beneficial effect from prohibited cross country travel; reduced disturbance on winter and spring ranges; although minor negative effects from route additions and reopened ML 1 roads; overall reduces habitat fragmentation.	Beneficial effect from prohibited cross country travel; reduced disturbance on winter and spring ranges; localized disturbance on winter ranges in Humbug Sailor MA 84; and minor negative effects from route additions and reopened ML 1 roads; overall reduces habitat fragmentation.	Beneficial effect from prohibited cross country travel; reduced disturbance on winter and spring ranges; localized disturbance on winter ranges in Humbug Sailor MA 84 and minor negative effects from route additions and reopened ML 1 roads; overall reduces habitat fragmentation.	Beneficial effect from prohibited cross country travel; although minor negative effects from route additions; overall reduces habitat fragmentation.

Mule Deer: *Also see summary of direct and indirect effects to oak associated species

Cumulative Effects

Cumulative Effects from Motorized Routes: The geographic boundary for assessing cumulative effects of motorized and non-motorized routes includes all lands within the Tahoe NF. The Tahoe NF encompasses the majority of the land base within the Blue Canyon, Nevada City, Downieville, and Loyalton-Truckee deer herds. The Tahoe NF is sufficiently large enough to assess cumulative effects of motorized and non-motorized routes since the Tahoe ranges from low elevation to high elevation and includes an array of habitat types used by migratory mule deer. It also covers a variety of deer habitat types including critical summer, summer, fawning, critical winter, winter, holding areas, and migration corridors. The timeframe for assessing past cumulative effects from motorized routes to mule deer takes into consideration the aggregate approach of the existing condition. The current condition and current use of motorized routes is the result of past actions. The timeframe for considering foreseeable future actions is approximately 20 years out. Cumulative effects to deer from motorized routes is assessed by using indicators of cumulative **route density** across the Tahoe NF, cumulative **motorized route miles**, and the **Zone of Influence** of all motorized routes.

Motorized Route Density: Road density has traditionally been used as an indicator for deer habitat effectiveness models (Perry and Overly 1977, Thomas, et al. 1979). These models indicate that as road density increases, deer use declines (Thomas et al. 1979, Witmer et al 1985). Factors such as hunting pressure, poaching, and other human disturbances are also likely to relate to road densities. Critical winter range, critical summer range, and fawning habitats represent key habitats for deer where heavier use and higher quality habitats for wintering and summer use are expected to occur. The average motorized route densities within critical winter range, critical summer range, and fawning habitat for each deer herd within the Tahoe NF was determined.

Table 3.03-25 shows the average road and trail densities within deer herd ranges under each Alternative (calculated by dividing the total road or trail mileage on NFS lands in deer ranges by the square miles of NFS lands in deer ranges).

For all major deer herds occurring within the boundaries of the Tahoe NF, Alternative 1 would have the greatest cumulative route densities compared to all the action alternatives within essential summer (fawning and critical summer) and winter (critical winter and winter) ranges. Alternative 5 would have slightly greater route densities than all the remaining action alternatives. Within critical summer and fawning areas, Alternative 1 poses a somewhat higher risk to all deer herds on the Tahoe NF and may therefore pose a greater risk in the ability for these deer herds to successfully reproduce and rear fawns, as compared to all the action alternatives. The action alternatives are similar in their motorized route densities and therefore, impacts to the Tahoe deer herds within critical summer or critical winter ranges do not vary amongst the action alternatives. Alternative 1 also has the greatest direct and indirect effects to winter ranges, especially on the west side of the Forest, where Alternative 1 motorized route densities exceed the action alternatives by over 1 mile/square mile in some instances, where habitat effectiveness would be reduced.

Blue Canyon Deer Herd: Implementing Alternative 1 would result in route densities that exceed route densities for all the action alternatives by over 1 mile per square mile within winter range for the

Blue Canyon Deer Herd, and would be approximately the same within critical winter range. Within critical summer ranges, Alternative 1 exceeds route densities for the action alternatives by 0.5 miles/mile^2. For all alternatives, route densities within fawning habitat are approximately 2 miles/mile^2, whereas Alternative 1 exceeds action alternative route densities by about 1 mile/mile^2.

Downieville Deer Herd: For the Downieville Deer Herd, only about 60 acres of critical summer range falls within the boundaries of the Tahoe NF. No motorized route miles fall within fawning habitat for this deer herd. In critical summer habitat, Alternative 1 has route densities of 3 miles/miles^2 or 0.3 miles/square miles higher than all other alternatives. Within critical winter range, Alternative 1 route densities are slightly higher than all the action Alternatives (Alternative 1 3 mi/mi^2, action alternatives 2.8 mi/mi^2 Within winter range, Alternative 1 has route densities of 3.5 miles/square mile, which exceed route densities in all the action alternatives by at least 0.8 mile/square mile.

Nevada City Deer Herd: Alternative 1 route densities exceed all the action alternative route densities by about 1/2 mile/square mile within critical summer range, and by nearly 1 mile/square mile within fawning habitat, where increased disturbance could reduce reproductive productivity. Within winter range, Alternative 1 route densities exceed the action alternatives by nearly a mile/square mile and slightly less than that compared to Alternative 5. Critical winter habitat for the action alternatives range from 2.6 to 2.7 miles/square mile, whereas Alternative 1 has route densities at nearly 4 ½ miles/square mile, and poses a considerable increased risk of disturbance to deer while on critical winter ranges when motorized vehicles are present.

Loyalton-Truckee Deer Herd: Route densities for the Loyalton-Truckee deer herd are greatest under Alternative 1, where route densities exceed all the action alternatives approximately ½ to 1 mile/square mile within each of critical summer, fawning, critical winter, and winter ranges. There are no differences in route densities for the action alternatives within all seasonal ranges for the Loyalton-Truckee deer herd.

Table 3.03-25. Average route densities (miles/square mile) on NFS lands within deer herd winter ranges, critical winter ranges, critical summer, and fawning areas on the Tahoe NF

	Range Type	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Blue Canyon Deer Herd	Critical Summer	2.1	1.6	1.6	1.6	1.6	1.6	1.6
	Fawning	0.1	0	0	0	0.1	0	0
	Critical Winter	3.4	2.1	2.1	2.1	2.3	2.1	2.1
	Winter	4.6	3.2	3.2	3.2	3.3	3.2	3.2
Downieville Deer Herd	Critical Summer	0.6	0	0	0	0	0	0
	Fawning	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Critical Winter	3.0	2.8	2.8	2.8	2.8	2.8	2.8
	Winter	3.5	2.7	2.7	2.7	2.7	2.7	2.7

	Range Type	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Nevada City Deer Herd	Critical Summer	2.5	2.1	2.0	2.0	2.1	2.1	2.1
	Fawning	3.9	3.1	3.1	3.1	3.1	3.1	3.1
	Critical Winter	4.4	2.6	2.6	2.6	2.7	2.6	2.6
	Winter	4.3	3.2	3.2	3.2	3.3	3.2	3.2
Loyalton-Truckee Deer Herd	Critical Summer	2.9	2.0	2.0	2.0	2.0	2.0	2.0
	Fawning	4.7	4.1	4.1	4.1	4.1	4.1	4.1
	Critical Winter	1.8	1.2	1.2	1.2	1.2	1.2	1.2
	Winter	2.7	2.2	2.2	2.2	2.2	2.2	2.2

*Alternative 1 includes motorized unauthorized routes associated with continued cross country travel.

Cumulative Motorized Route Miles: The total cumulative motorized route miles (existing routes on the Tahoe NFTS, existing private routes, proposed motorized additions, and reopened of Maintenance Level 1 roads) are shown in Table 3.03-26 and described below for each deer herd.

Blue Canyon Deer Herd: Alternative 1 poses the greatest risk to the Blue Canyon Deer Herd on both critical summer and critical winter/winter ranges, followed next by Alternative 5. Within Critical Summer Range, implementing Alternative 1 would have motorized route miles that exceed Alternative 5 by about 18 miles, and exceed Alternatives 2, 3, 4, 6, by nearly 40 miles for the Blue Canyon Deer Herd. The miles of motorized routes within fawning habitat for the Blue Canyon herd is minor.

Within critical winter ranges, Alternatives 1 has the most motorized route miles at 65 miles, followed by Alternative 5 with 50 miles. Approximately miles of motorized routes in critical winter range for the remaining action alternatives. A similar pattern emerges for winter range.

Downieville Deer Herd: Alternative 1 poses the greatest risk to the Downieville Deer Herd on both critical winter and winter ranges where resources may be scarce and deer may be stressed during the winter months. For the Downieville Deer Herd, only about 60 acres of critical summer and no mapped fawning areas fall within the boundaries of the Tahoe NF. Within critical winter range, Alternative 1 has 17 motorized route miles, and the all the action alternatives have 14 miles of motorized routes each. Within winter range, Alternative 1 has the highest number of motorized route miles (310 miles), where direct and indirect disturbance associated with motorized routes could occur when deer are stressed during the winter. All the action alternatives are similar in their motorized route miles within winter range (242 to 243 miles).

Nevada City Deer Herd: Alternative 1 poses the greatest risk to the Nevada City Deer Herd on all key deer habitat types - critical summer, fawning, critical winter, and winter habitats when deer are most vulnerable to disturbance. When comparing the miles of motorized routes within critical summer and fawning habitat of the Nevada City Deer Herd, Alternative 1 exceeds the action alternatives by at least 30 miles. For critical winter habitat and winter ranges, Alternative 1 exceeds Alternative 5 by about 84 miles; and the remaining action alternatives by an additional 20 miles.

Loyalton-Truckee Deer Herd: Alternative 1 poses the greatest risk than the action alternatives within key ranges, where the Loyalton-Truckee Deer Herd are most vulnerable to factors associated with

motorized vehicles. Motorized route miles for the Loyalton-Truckee Deer Herd are greatest under Alternative 1, where motorized route miles exceed all the action alternatives by at least 18 miles (Alternative 5) within critical summer ranges (Table 3.03-26). Within fawning habitat, route miles are similar for all alternatives, with Alternative 1 exceeding the remaining alternatives by 2-3 miles. Alternative 1 poses the greatest concern to the Truckee-Loyalton Deer Herd on both critical summer ranges and fawning habitat that are important to for reproduction and rearing young during the summer months.

Motorized route miles in critical winter and winter ranges are highest in Alternative 1, exceeding the action alternatives by 6-7 miles. There are relatively no differences in motorized route miles for the action alternatives within winter or critical winter ranges.

Table 3.03-26. Cumulative Motorized Route Miles

Miles of Motorized Routes		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Blue Canyon Deer Herd	Critical Summer	212	162.4	161.1	161.6	166.3	162.6	162.0
	Fawning	0.1	0	0	0	0.1	0	0
	Critical Winter t	61.8	39.2	39.2	39.2	43.1	39.2	39.2
	Winter	414.7	306.6	302	306.1	309.6	306.8	306.5
Downieville River Deer Herd	Critical Summer	0.1	0	0	0	0	0	0
	Fawning	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Critical Winter	23.0	21.3	21.3	21.3	21.3	21.3	21.3
	Winter	310.3	236.5	235.8	236	236.5	236.5	235.8
Nevada City Deer Herd	Critical Summer	222.3	193.7	192	192.5	193.7	194.3	192.8
	Fawning Habitat	48.3	39.1	38.8	38.8	39.1	39.1	39
	Critical Winter	97.2	57.0	57.0	57.1	59.0	57.0	57.0
	Winter Habitat	166.3	103.4	103.4	103.5	109	103.5	103.4
Loyalton-Truckee Deer Herd	Critical Summer	117.8	79.4	78.8	78.8	79.4	80.5	78.8
	Fawning Habitat	31.8	28.4	28.4	28.4	28.4	28.4	28.4
	Critical Winter Habitat	22.2	16.2	16.2	16.2	16.2	16.2	16.2
	Winter	19.3	15.7	15.7	15.7	15.7	15.7	15.7
Total Cumulative motorized miles for all herds		**1747.2**	**1298.9**	**1289.7**	**1295.2**	**1317.4**	**1301.1**	**1296.1**

* Alternative 1 includes miles of unauthorized routes associated with continued cross country travel.

Zone of Influence: Tables 3.03-27 through 3.03-30 display the percent of key deer ranges within a 200-meter Zone of Influence of all motorized routes on both public and private lands within the boundary of the Tahoe National Forest for each of the major deer herds: Blue Canyon, Downieville, Nevada City, and Loyalton-Truckee. The cumulative effects of all motorized and non-motorized routes are discussed for each deer herd for the alternatives.

Blue Canyon Deer Herd: The Blue Canyon Deer Herd has approximately equal amounts of key winter range and key summer range (Table 3.03-15). Overall cumulative effects (Table 3.03-27) within the Blue Canyon Deer Herd (including unauthorized motorized routes (unauthorized routes), existing

system routes, and non-motorized routes on both NFS and non-NFS lands), indicates that critical winter and winter ranges are moderately influenced by existing motorized routes, where habitat effectiveness is reduced by 53% and 64%, respectively. Approximately 20% of the key winter ranges are influenced by cross country travel, including use on existing unauthorized routes. This amount of influence from motorized routes could have significant ramifications to the Blue Canyon Deer Herd when the deer are already stressed during the winter months, especially since unmanaged cross country travel would continue at an unknown rate in the future.

Under all the action alternatives, only a "low" proportion of key deer winter range is influenced by proposed motorized route additions (0% to 3%). Under the action alternatives, between 17% and 20% of key deer winter range would benefit from the prohibition of cross country travel, including motorized use on existing unauthorized routes. However, since these motorized routes would continue to remain in place until they are physically revegetated, non-motorized use on these routes may occur which could still reduce habitat quality, but the effects would likely be less depending on the type of activity.

Overall cumulative effects to key summer ranges result in an overall "moderate" influence from all motorized and non-motorized routes under all the alternatives. Alternative 1 has the highest overall cumulative impacts (critical summer - 44%, fawning - 12%). The remaining action alternatives are similar to the overall cumulative impact to critical summer and fawning habitats, with Alternative 5, followed by Alternative 6 having slightly greater (1-2%) disturbance potential than all the remaining alternatives. Alternative 1 directly and indirectly affects 9-11% of critical summer ranges and 0-2% fawning habitat from cross country motorized travel on existing unauthorized routes.

Alternatives 5 and 6 minimally increase the cumulative impact to critical summer range from the addition of motorized routes (1% in critical summer). Only Alternative 5 increases cumulative impacts from the reopening of ML 1 roads (1% critical summer, 2% fawning). However, the cumulative effects to key summer ranges from both motorized route additions and reopening ML 1 roads would not likely be measurable at the forest-wide scale, but may have localized direct and indirect impacts.

The remaining action alternatives do not contribute cumulative impacts to summer ranges. Between 9% and 11% of key summer range influenced by unauthorized routes would benefit deer due to the prohibition of cross country travel, including use on existing unauthorized routes.

Table 3.03-27. Proportion of Blue Canyon Herd Key Deer Ranges within a 200-meter "Zone of Influence"

Blue Canyon Herd	Range Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives								
Motorized routes to be added to NFTS (negative impact)*	Critical Summer	11%	<1%	0%	<1%	1%	1%	<1%
	Fawning	2%	0%	0%	0%	0%	0%	0%
	Critical Winter	20%	0%	0%	0%	3%	0%	0%
	Winter	21%	1%	0%	1%	1%	1%	1%
Changes to the NFTS - Reopened ML 1 Roads	Critical Summer	0%	0%	0%	0%	1%	0%	0%
	Fawning	0%	0%	0%	0%	2%	0%	0%
	Critical Winter	0%	0%	0%	0%	0%	0%	0%
	Winter	0%	0%	0%	0%	0%	0%	0%

Blue Canyon Herd	Range Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cumulative effects of past, present, and proposed actions								
Existing motorized and non-motorized routes (NFS and non NFS lands) (negative impact)	Critical Summer	33%	33%	33%	33%	33%	33%	33%
	Fawning	10%	10%	10%	10%	10%	10%	10%
	Critical Winter	33%	33%	33%	33%	33%	33%	33%
	Winter	43%	43%	43%	43%	43%	43%	43%
Routes decommissioned and/or ML 1 closed to motorized use (positive impact)	Critical Summer	1%	11%	11%	11%	10%	11%	11%
	Fawning	0%	2%	2%	2%	0%	2%	2%
	Critical Winter	2%	22%	22%	22%	19%	22%	22%
	Winter	3%	23%	23%	23%	22%	23%	23%
Total Cumulative Effects								
Cumulative Impact (both positive and negative)	**Critical Summer**	**44%**	**33%**	**33%**	**33%**	**35%**	**34%**	**33%**
	Fawning	**12%**	**10%**	**10%**	**10%**	**12%**	**10%**	**10%**
	Critical Winter	**53%**	**33%**	**33%**	**33%**	**36%**	**33%**	**33%**
	Winter	**64%**	**44%**	**43%**	**44%**	**45%**	**44%**	**44%**

* Motorized routes to be added to NFTS: Alternative 1 includes miles of unauthorized routes associated with continued cross country travel.

Downieville Deer Herd: Habitat within the boundary of the Downieville Deer Herd has a higher proportion of key winter range than key summer range (Table 3.03-15). Therefore, the majority of this discussion will focus on cumulative effects to key winter ranges. Only 60 acres of key summer ranges fall within the boundary of the Downieville Deer Herd. However, Alternative 1 results in a “moderate” cumulative impact where 42% of critical summer range is specifically influenced by cross country motorized travel, including use on existing unauthorized routes. The action alternatives do not affect critical summer range.

Overall cumulative effects (Table 3.03-28) from all routes within the Downieville Deer Herd (including proposed motorized route additions, reopening ML 1 roads, existing system routes, and non-motorized routes on both NFS and non-NFS lands), indicates all the alternatives “moderately” reduce habitat effectiveness within key deer winter ranges (critical winter and winter).

Alternative 1 poses the greatest risk cumulative impact of reduced habitat effectiveness within key winter ranges, where 36% (critical winter) and 47% (winter) would be influenced by existing routes and continued cross country motorized travel, including use on existing unauthorized routes. This moderate influence of routes may potentially result in adverse impacts to the Downieville Herd when deer may be stressed during the winter months, especially since unmanaged cross country travel would continue at an unknown rate in the future under this alternative.

Under the action alternatives, approximately 29% (critical winter) to 31% (winter) of key winter ranges are cumulatively impacted by existing motorized and non-motorized routes, resulting in a moderate amount of reduced habitat effectiveness (i.e., increased disturbance) to the Downieville Deer Herd. None of the action alternatives would result in adding direct and indirect impacts to existing cumulative impacts on key deer winter range from either motorized additions or reopening of ML 1 roads.

Under the action alternatives, all existing unauthorized routes within key winter habitat would be prohibited from the ban of cross country travel, ranging from 7% (critical winter) to 16% (winter). However, these unauthorized routes would continue to remain in place until they are re-vegetated. Non-motorized use on these unauthorized routes may occur which could still reduce habitat quality, but the effects would likely be less than motorized use depending on the type and intensity of non motorized use.

Table 3.03-28. Proportion of Downieville Herd Key Deer Ranges within a 200-meter "Zone of Influence"

	Range Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives								
Motorized routes to be added to NFTS (negative impact)*	Critical Summer	42%	0%	0%	0%	0%	0%	0%
	Fawning	0%	0%	0%	0%	0%	0%	0%
	Critical Winter	7%	0%	0%	0%	0%	0%	0%
	Winter	16%	0%	0%	0%	0%	0%	0%
Changes to the NFTS - Reopened ML 1 Roads	Critical Summer	0%	0%	0%	0%	0%	0%	0%
	Fawning	0%	0%	0%	0%	0%	0%	0%
	Critical Winter	0%	0%	0%	0%	0%	0%	0%
	Winter	0%	0%	0%	0%	0%	0%	0%
Past, present, and proposed actions								
Existing motorized and non-motorized routes (NFS and non NFS lands) (negative impact)	Critical Summer	0%	0%	0%	0%	0%	0%	0%
	Fawing	0%	0%	0%	0%	0%	0%	0%
	Critical Winter	29%	29%	29%	29%	29%	29%	29%
	Winter	31%	31%	31%	31%	31%	31%	31%
Routes decommissioned and/or ML 1 closed to motorized use (positive impact)	Critical Summer	0%	42%	42%	42%	42%	42%	42%
	Fawning	0%	0%	0%	0%	0%	0%	0%
	Critical Winter	0%	7%	7%	7%	7%	7%	7%
	Winter	2%	17%	17%	17%	17%	17%	17%
Total Cumulative Impacts								
Cumulative Impact (both positive and negative)	**Critical Summer**	**42%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
	Fawning	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
	Critical Winter	**36%**	**29%**	**29%**	**29%**	**29%**	**29%**	**29%**
	Winter	**47%**	**31%**	**31%**	**31%**	**31%**	**31%**	**31%**

*Motorized routes to be added to NFTS: Alternative 1 includes ZOI of motorized routes unauthorized for motorized use associated with continued cross country travel.

Nevada City Deer Herd: The Nevada City Deer Herd has a slightly higher proportion of key summer range (~40%) to key winter ranges (~60%) (Table 3.03-15). Overall cumulative effects (Table 3.03-29) within the Nevada City Deer Herd (including unauthorized routes, reopening ML 1 roads, existing system routes, and non-motorized routes on both NFS and non-NFS lands), indicate Alternative 1 "highly" reduces habitat effectiveness within key deer winter habitats where 62% to 67% are cumulatively affected, followed by Alternative 5 (40-48%), and then by the remaining action alternatives (40-49%). Existing NFTS system and non-NFS routes influences from 40 to 45 percent key winter habitats. Alternative 1 poses the greatest risk to reduced habitat effectiveness within key winter ranges where 17 to

27 percent of key winter range affected is attributed to continued cross country motorized use, including use of existing unauthorized routes, where current existing NFS and non-NFS motorized routes are already influencing key deer winter ranges by at least 40%. This additional reduction in habitat effectiveness could pose a significant cumulative impact to the Nevada City Deer Herd, especially considering habitat fragmentation within the existing checkerboard ownership pattern in this region, including the urban development and encroachment. Increased stress from this amount of motorized use could affect this herd's population numbers, especially since unmanaged cross country travel would continue at an unknown rate in the future.

Under Alternative 5, about 2% of key winter ranges within a 200-meter Zone of Influence of proposed route additions to the NFTS would add to existing cumulative impacts. Another 1% of key winter ranges within a 200-meter Zone of Influence would be impacted by the reopening of ML 1 roads with the implementation of Alternative 5.

The remaining action alternatives would not add to existing cumulative impacts to key winter range as no motorized routes would be added to the NFTS, and no ML 1 roads would be reopened, which would directly or indirectly affect winter range for the Nevada City Deer Herd. Within key winter range, the majority (15-27%) of unauthorized routes would be prohibited from motorized use under the action alternatives where deer would benefit. However, since these unauthorized routes would continue to remain on the ground, and may receive non-motorized use, habitat effectiveness would continue to be reduced, but the effects would likely be less than motorized use, depending on the intensity, duration, and type of activity.

Alternative 1 has the highest overall cumulative impacts (47-63%) to key summer ranges. Alternative 1 directly and indirectly affects between 9 to 15 percent of critical summer and fawning habitat, respectively, from unauthorized routes where cross country travel would continue.

All the action alternatives result in a overall "moderate" cumulative impact to key summer ranges, from all motorized and non-motorized routes. The action alternatives would cumulatively affect between 38% and 49% of key summer ranges (critical summer and fawning) by all motorized and non-motorized routes. The remaining action alternatives contributes a relatively small proportion to existing cumulative impacts, where between 0% and 2% of key summer range is affected by the addition of motorized routes. None of the ML 1 roads would be reopened for the action alternatives. Under the action alternatives, approximately 9-15% of key summer range would be a benefit to the Nevada City Deer Herd, where cross country travel influenced by unauthorized routes would be banned. Finally, the prohibition of cross country travel on 25,418 acres of key summer range (critical summer and fawning) would be an additional benefit to the Nevada City Deer Herd.

Table 3.03-29. Proportion of Nevada City Herd Deer Ranges within a 200-meter "Zone of Influence"

	Range Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives								
Motorized routes to be added to NFTS (negative impact)*	Critical Summer	9%	1%	0%	<1%	1%	2%	<1%
	Fawning	15%	1%	0%	0%	1%	1%	1%
	Critical Winter	27%	0%	0%	0%	0%	0%	0%
	Winter	17%	0%	0%	0%	2%	0%	0%
Changes to the NFTS - Reopened ML 1 Roads	Critical Summer	0%	0%	0%	0%	0%	0%	0%
	Fawning	0%	0%	0%	0%	0%	0%	0%
	Critical Winter	0%	0%	0%	0%	1%	0%	0%
	Winter	0%	0%	0%	0%	1%	0%	0%
Cumulative effects of past, present, and proposed actions								
Existing motorized and non-motorized routes (NFS and non NFS lands) (negative impact)	Critical Summer	38%	38%	38%	38%	38%	38%	38%
	Fawning	48%	48%	48%	48%	48%	48%	48%
	Critical Winter	40%	40%	40%	40%	40%	40%	40%
	Winter	45%	45%	45%	45%	45%	45%	45%
Routes decommissioned and/or ML 1 closed to motorized use (positive impact)	Critical Summer	3%	10%	11%	11%	10%	10%	11%
	Fawning	2%	15%	16%	16%	15%	15%	16%
	Critical Winter	2%	3%	3%	3%	3%	3%	3%
	Winter	2%	19%	19%	19%	18%	19%	19%
Total Cumulative Effects								
Cumulative Impact (both positive and negative)	**Critical Summer**	**47**	**39%**	**38%**	**38%**	**39%**	**40%**	**38%**
	Fawning	**63**	**49%**	**48%**	**48%**	**49%**	**49%**	**49%**
	Critical Winter	**67**	**40%**	**40%**	**40%**	**40%**	**40%**	**40%**
	Winter	**62**	**45%**	**45%**	**45%**	**48%**	**45%**	**45%**

* Motorized routes to be added to NFTS: Alternative 1 includes miles of unauthorized routes associated with continued cross country travel.

Loyalton-Truckee Deer Herd: ***Key Summer Ranges***: The Loyalton-Truckee Deer Herd has more than twice the amount of key summer range (~70%) compared to key winter ranges (~30%) (Table 3.03-15). Overall cumulative effects (Table 3.03-30) within the Loyalton-Truckee Deer Herd (including motorized route additions, reopening ML 1 roads, existing system routes, and non-motorized routes on both NFS and non-NFS lands), indicate Alternative 1 has a high risk of negatively influencing habitat effectiveness on key summer ranges, where 52% critical summer and 73% fawning habitats are cumulatively affected. Under Alternative 1, cross country motorized travel, including use of unauthorized routes, would reduce habitat effectiveness by an additional 13% and 19% of fawning and critical summer ranges, respectively, where current existing NFS and non-NFS motorized routes are already moderately to highly influencing key summer ranges. Implementing Alternative 1 could pose considerable cumulative impacts to the Loyalton-Truckee Deer Herd from increased stress and disturbance which may potentially result in altered behavior and/or negatively affect reproductive productivity. Ultimately, total cumulative

effects of Alternative 1 could result in downward population trends, especially since unmanaged cross country travel would continue at an unknown rate in the future.

All the action alternatives reduce habitat effectiveness at a moderate to high proportion within key deer summer habitats where between 33% of fawning and 60% critical summer ranges are cumulatively affected, predominately from existing routes. Alternatives 5 and 6, each negatively influences a small amount of critical summer range (less than 1-2%), where overall habitat effectiveness within critical summer and fawning habitat would not measurably add to existing cumulative effects. The remaining action alternatives do not affect key summer ranges from the addition of motorized routes or the reopening of ML 1 roads.

Alternative 6 adds a small amount of cumulative effects from motorized route additions (2%) and reopening of ML 1 roads (less than 1%) within key summer habitat for the Loyalton-Truckee Deer Herd. The remaining action alternatives would not add to existing cumulative impacts to key summer range since no motorized routes would be added to the NFTS. Alternative 5 affects less than 1 percent of critical summer range from reopening ML 1 roads.

Key Winter Ranges: The vast majority of existing unauthorized routes within key winter habitat would not be added to the NFTS under the action alternatives, where deer would benefit. However, since these motorized routes would continue to remain in place until they are restored, non-motorized use on these routes may occur which could reduce deer habitat quality, but the effects would likely be less depending on the type of activity and the intensity of use.

Alternative 1 directly and indirectly affects an average of 11% of key winter ranges from cross country motorized travel, including use on existing unauthorized routes. Total cumulative effects from all existing routes and continued cross country travel on unauthorized routes influences a moderate proportion (33-48%) of key winter ranges where habitat effectiveness within key winter ranges could be reduced under the No Action Alternative.

Under all the action alternatives, cumulative effects to key winter ranges results in an overall “moderate” influence where between 22% (critical summer) and 37% (fawning) key summer ranges would be affected. Under all the action alternatives, approximately 11% of key winter ranges would benefit from the ban of cross country travel where disturbance from motorized use would be eliminated, including on 2,173 acres.

Table 3.03-30. Proportion of Loyalton-Truckee Herd Key Deer Ranges within a 200-meter "Zone of Influence"

	Range Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives								
Motorized routes to be added to NFTS (negative impact)*	Critical Summer	19%	0%	0%	0%	0%	2%	0%
	Fawning	13%	0%	0%	0%	0%	0%	0%
	Critical Winter	11%	0%	0%	0%	0%	0%	0%
	Winter	11%	0%	0%	0%	0%	1%	0%
Changes to the NFTS - Reopened ML 1 Roads	Critical Summer	0%	0%	0%	0%	<1%	<1%	0%
	Fawning	0%	0%	0%	0%	0%	0%	0%
	Critical Winter	0%	0%	0%	0%	0%	0%	0%
	Winter	0%	0%	0%	0%	0%	0%	0%
Cumulative effects of past, present, and proposed actions								
Existing motorized and non-motorized routes (NFS and non NFS lands) (negative impact)	Critical Summer	33%	33%	33%	33%	33%	33%	33%
	Fawing	60%	60%	60%	60%	60%	60%	60%
	Critical Winter	22%	22%	22%	22%	22%	22%	22%
	Winter	37%	37%	37%	37%	37%	37%	37%
Routes decommissioned and/or ML 1 closed to motorized use (positive impact)	Critical Summer	2%	21%	22%	22%	21%	20%	22%
	Fawning	3%	15%	15%	15%	15%	15%	15%
	Critical Winter	3%	13%	13%	13%	13%	13%	13%
	Winter	0%	11%	11%	11%	11%	10%	11%
Total Cumulative Effects								
Cumulative Impact (both positive and negative)	**Critical Summer**	**52%**	**33%**	**33%**	**33%**	**33%**	**33%**	**33%**
	Fawning	**73%**	**60%**	**60%**	**60%**	**60%**	**60%**	**60%**
	Critical Winter	**33%**	**22%**	**22%**	**22%**	**22%**	**22%**	**22%**
	Winter	**48%**	**37%**	**37%**	**37%**	**37%**	**37%**	**37%**

* Motorized routes to be added to NFTS: Alternative 1 includes miles of unauthorized routes associated with continued cross country travel.

Overall Cumulative Effects from Past, Present, and Reasonably Foreseeable Future Actions: Past and current cumulative effects to mule deer include current and historic grazing of mule deer habitat; loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on NFS and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the mule deer within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities

have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to mule deer habitats. Between 2001 and 2008, nearly 17,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally do not increase forage condition for deer because they do not usually result in reducing the canopy cover below 40%, except for group selection harvest treatments on the Sierraville RD. Group selection harvests are expected to increase forage condition and increase forest structural diversity. These thinning treatments may result in the short-term reduction in cover for deer, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Many recent, current, and future vegetation and fuels reduction projects are emphasizing habitat improvement for deer by removing competing conifers within oak habitats and aspen habitats which are designed to enhance mule deer foraging condition. Between 1994 and 2008, approximately 95,000 acres burned on the Tahoe NF, some of which have removed mule deer habitat.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increase in negative interactions between humans and mule deer. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased disturbance to mule deer would be expected, particularly during the summer months. Two non-motorized routes are being proposed for development in the near future. The development and use of these routes may slightly increase disturbance to mule deer since deer have been shown to demonstrate increased responses to humans when humans are in close proximity to deer, especially when humans are on foot.

Table 3.03-31 summarizes the major reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit reissuance's and a description of the potential impact to mule deer and their habitat.

Table 3.03-31. Direct, Indirect, and Cumulative Impact to Mule Deer from Reasonably Foreseeable Future Projects

Project type	Number of Projects	Mule Deer Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/ fuels reduction projects – thinning, group select,	~30	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in oak habitats.	• Short-term adverse impacts during harvest. • Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Aspen enhancement	8	Cover and forage habitat enhancement	• Short-term adverse impacts during implemtation • Long-term beneficial cumulative effects through improved forage and cover production
Mastication, site prep and release of small trees, and prescribed burns	~20	Short-term disturbance during project implementation Various site-specific effects.	• Short-term adverse impacts during implementation • Long-term beneficial cumulative beneficial effects depending on site-specific conditions
Hazard tree removal	4	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Salvage Fire Burned Trees	2	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance.	Slight increase in cumulative impact.
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from grazing, vegetation/fuels projects, wildfires, and recreation, Alternative 1 poses the greatest risk to the 4 major deer herds on the Tahoe NF, where between 12% and 27% of key winter ranges are influenced by unauthorized routes, and between 7% and 41% of key summer ranges are affected, depending on the deer herd. Alternative 5 slightly increases the amount of cumulative effects on key deer habitats over the other action alternatives, where site specific localized effects may occur. The remaining action alternatives are similar and only slightly increase overall cumulative impacts to the 4 major deer herds on the Tahoe NF. Alternative 3 does not add any motorized routes to the NFTS, so does not add to existing cumulative impacts. All the action alternatives will result in a beneficial impact to all deer ranges across the Tahoe NF from the ban on cross country travel, including motorized travel on approximately 1,123 to 1,294 miles of existing unauthorized routes depending on the alternative. It is expected that non-motorized use may occur on these unauthorized routes which would likely result in less disturbance to mule deer. However, some studies indicate that certain non-motorized activities (hiking, mountain bicycling, equestrian, etc.) could actually result in greater disturbance to mule deer. At any rate, the

amount of disturbance caused by non-motorized use will depend on the type, intensity and duration of the use. As existing unauthorized routes become re-vegetated and recover over time, either through active or passive restoration efforts, overall mule deer disturbance from motorized routes is expected to diminish.

In addition, Alternatives 4, 5, and 6 would benefit deer on winter ranges through the implementation of wet weather closures on native surfaced roads and trails.

Mule Deer: Management Direction

Management Indicator Species (MIS) Summary: The Sierra Nevada Forests Bioregional MIS Report and Travel Management MIS Project-Level Report are incorporated by reference. Alternative 1 poses the greatest cumulative effects to mule deer MIS oak-associated hardwood and hardwood/conifer habitat on the Tahoe NF where 13,695 acres out of 99,238 acres of mule deer habitat would be affected within a 200-meter Zone of Influence of existing unauthorized routes. This would add to existing cumulative effects by approximately 14%. Alternative 1 could contribute to a downward trend in mule deer habitat effectiveness within oak-associated and hardwood/conifer habitats on the Tahoe NF.
All the action alternatives would benefit mule deer oak habitats by prohibiting cross-country. All the action alternatives would influence from 0% to 0.6% oak-associated hardwood and hardwood/conifer habitat at the Tahoe NF scale (Alt 3 adds no impacts, Alt 5 adds the most) from addition of motorized routes. In addition Alternative 5 proposes to reopen ML 1 roads which would affect an additional 1% of motorized influence on mule deer oak habitat. None of the action alternatives would alter existing trends in oak-associated hardwood and hardwood/conifer habitat on the Tahoe NF from either motorized route additions or reopening ML 1 roads.

The change in the class of vehicles would have no effect to mule deer habitat, since the change in class of vehicles on existing motorized routes would generally not affect mule deer habitat condition. Wet weather seasonal restrictions under Alternatives 4, 5, and 6 on all native surfaced roads and motorized trails would benefit mule deer habitat effectiveness through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted. Finally, cross country travel would be prohibited on 65,329 acres with the implementation of the action alternatives where disturbance, avoidance, and abandonment by mule deer would be reduced or eliminated. Alternative 1 would have the greatest risk to mule deer habitats, where cross country travel would continue, affecting 65,329 acres of oak-associated hardwood and hardwood/conifer habitat. Refer to Table 3.03-32.

Table 3.03-32 Acres of Cross Country Travel Prohibitions and Proportion of Mule Deer MIS habitat within a 200-meter "Zone of Influence" of Proposed Route Additions to the NFTS

		Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres of Cross Country Travel Prohibitions Within Oak-Associated Hardwood and Hardwood/Conifer Habitats								
Acres oak-associated and hardwood conifer habitat where cross country travel would be prohibited		0	65,329	65,329	65,329	65,329	65,329	65,329
Proportion of Mule Deer MIS habitat within a 200-meter "Zone of Influence" of Proposed Route Additions								
Acres Oak-associated hardwood and hardwood/conifer habitats		13,695	496	0	99	595	298	199
Proportion of Sierra Nevada Habitat	809,000	1.7%	0.06%	0%	<0.01%	0.01%	0.04%	0.02%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat[2]	99,238	14%	0.5%	0%	0.1%	0.6%	0.3%	0.2%
Habitat Security Risk in Tahoe NF		Low	Low	Low	Low	Low	Low	Low
Proportion of Mule Deer MIS habitat within a 200-meter "Zone of Influence" of Reopned ML 1 Roads								
Acres Oak-associated hardwood and hardwood/conifer habitats		0	0	0	208.0	812.4	0	0
Proportion of Sierra Nevada Habitat	809,000	0%	0%	0%	<0.01%	0.1%	0%	0%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat	99,238	0%	0%	0%	0.2%	0.8%	0%	0%
Habitat Security Risk in Tahoe NF		Low	Low	Low	Low	Low	Low	Low
Total acres oak-associated hardwood and hardwood/conifer Habitat Affected		**13,695**	**496**	**0**	**307**	**1,407**	**298**	**199**
Total proportion of Sierra Nevada Habitat Affected		**1.7%**	**0.06%**	**0%**	**0.04%**	**0.11%**	**0.04%**	**0.02%**
Total proportion of Tahoe NF Habitat Affected		**14%**	**0.1%**	**0%**	**0.3%**	**1.4%**	**0.3%**	**0.2%**

[1]Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel.

[2]The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands

Summary of Mule Deer Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mule deer; hence, the effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the mule deer. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 809,000 acres of oak-associated hardwood and hardwood/mixed conifer habitat on NFS lands in the Sierra Nevada. The trend is slightly increasing (within the last decade, changing from 5% to 7% of the acres on NFS lands).

Population Status and Trend. The mule deer has been monitored in the Sierra Nevada at various sample locations by herd monitoring (spring and fall) and hunter survey and associated modeling (CDFG 2007). California Department of Fish and Game (CDFG) conducts surveys of deer herds in early spring to determine the proportion of fawns that have survived the winter, and conducts fall counts to determine herd composition (CDFG 2007). This information, along with prior year harvest information, is used to estimate overall herd size, sex and age rations, and the predicted number of bucks available to hunt (ibid). These data indicate that mule deer continue to be present across the Sierra Nevada, and current data at the range wide, California, and Sierra Nevada scales indicate that, although there may be localized declines in some herds or Deer Assessment Units, the distribution of mule deer populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mule Deer Trend. Alternative 1 results the greatest amount of oak-associated hardwood and hardwood/conifer habitat 13,695 acres (1.7% of Sierra Nevada-wide habitat) affected by cross country travel, including use on existing unauthorized routes.

All the action alternatives would result in a benefit to mule deer and oak-associated hardwood and hardwood/conifer habitats, since cross country travel would be banned. Alternative 5 benefits the least where 1,407 acres or 0.1% of Sierra Nevada-wide habitat within oak-associated hardwood and hardwood/conifer habitat types would be reduced in habitat effectiveness from motorized route additions and reopened ML 1 roads. The remaining action alternatives would affect from 0 to less than 0.1% Sierra Nevada wide habitat. Based on the small percentage of habitat affected, implementing the Tahoe NF Motorized Travel Management Project would not alter the existing habitat trend, nor would it lead to a change in the distribution of mule deer across the Sierra Nevada bioregion.

Compliance with the Forest Plan and Other Direction: The Tahoe NF LRMP (1990) provides management direction for deer habitat management in the following Standard and Guideline:

> *Limit vehicle access on key deer winter ranges when deer are present. Also limit vehicle access in key summer range habitats during periods of migration and fawning.*

The Tahoe Travel Management Project provides project design standards for minimizing effects of deer habitat on key deer winter ranges and key summer ranges, including maintaining existing LRMP OHV seasonal restrictions for deer, the prohibition of cross country travel (acres), and wet weather seasonal restrictions. The effects of these actions and the addition of motorized routes to the NFTS and established “Open Areas” were analyzed within key deer habitats for the major deer herds on the Tahoe NF, including Blue Canyon herd, Downieville herd, Nevada City herd, and the Loyalton-Truckee herd. The analysis of effects indicated that Alternative 1 least complies with the Tahoe NF LRMP Standard and Guideline and poses the greatest risk to the four major deer herds, where between 12% and 27% of key winter ranges are influenced by unauthorized routes, and between 7% and 41% of key summer ranges are affected, depending on the deer herd. All of the action alternatives meet this Standard and Guideline by limiting access to varying degrees. Of the action alternatives, Alternative 5 least limits vehicle access, while Alternative 3 most limits access. Alternatives 2, 4, 6, and 7 comply with LRMP deer direction

similarly, somewhat less than Alternative 3, and slightly more than Alternative 5. All the action alternatives would result in a beneficial impact to all deer ranges across the Tahoe NF from the ban on cross country travel, including motorized travel on approximately 1,123 to 1,294 miles of existing unauthorized routes depending on the alternative. In addition, Alternatives 4, 5, and 6 would benefit deer on winter ranges through the implementation of wet weather closures on native surfaced roads and motorized trails.

LRMP Amendment to Change Season of Use in the Humbug-Sailor Management Area: Due to the complexity of factors that affect deer population trends (i.e., urbanization, hunting, long-term habitat condition, annual weather variation, etc.), it is not likely that amending the LRMP to change the season of motorized use within the Humbug-Sailor Management Area under Alternatives 5 and 6 by 2-3 months and for Alternative 2 by 6 months, affecting less than 8% of key winter range, would significantly affect deer such that population numbers of the Blue Canyon deer herd would change. In addition, the overall effects of the prohibition of cross country travel on 16,108 acres of key winter range, including on unauthorized routes and imposing additional motorized wet weather seasonal restrictions within key winter range and surrounding areas would provide an overall net benefit by reducing motorized disturbance within the Blue Canyon Deer Herd under all the action alternatives, and therefore, would meet the intent of Forest Plan S&G to "Limit vehicle access on key deer winter ranges when deer are present."

> *Guidance regarding management indicator species (MIS) set forth in the Tahoe NF LRMP as amended by the 2007 SNF MIS Amendment ROD directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and (2) at the bioregional scale, monitor populations and/or habitat trends of MIS, as identified in the Tahoe NF LRMP as amended.*

The mule deer was selected as Management Indicator Species for the Tahoe NF as amended by the 2007 SNF MIS Amendment ROD. Project-level effects to mule deer were analyzed for each alternative and disclosed in the sections above under Environmental Consequences in the MIS Summary Section and in the Tahoe NF Motorized Travel Management Project Level MIS report, which is incorporated by reference. In addition, population and habitat trends for mule deer are conducted at the bioregional scale.

Oak Woodland and Oak-Conifer Associated Species: Affected Environment

Introduction: Species within the Oak Woodland and Mixed Oak-Conifer Forest Group include mule deer, wild turkey, band-tailed pigeon, western gray squirrel, and the pallid bat. The mule deer is identified as a Management Indicator Species in the Sierra Nevada Forests (Sierra Nevada Forests Management Indicator Species Amendment Record of Decision 2007). See previous section for mule deer MIS analysis. The pallid bat is designated as a Forest Service Sensitive Species by the Regional Forester.

Species associated with pure oak woodland and mixed oak-conifer forest have the potential to be affected by road and trail-associated factors. The relationship between road and motorized trail associated factors to population trends of these species is unknown.

Mortality from hunting or trapping: In general, roads facilitate access to the hunted species and their habitat in this group. Impacts of road and trail associated factors to wild turkeys varies. Turkeys in Alabama were found to show no apparent impact when approached by vehicles. However, after several years of being hunted and receiving an increase in disturbance, turkeys went for cover when vehicles approached (Wright and Speake 1975 *In:* Joslin and Youmans, coordinators 1999).

Fragmentation, Edge and Microclimate Effects: Roads can also create edge effects which may alter microclimates near roads. This may enhance habitat for these species or may have negligible impacts to their habitat overall.

Disturbance and changes in behavior: Pallid bats may be sensitive to human disturbance. If roost sites are disturbed by route associated factors, local pallid bat populations may be negatively impacted.

Summary of Route associated factors to hardwood associated species:

- Mortality from hunting or trapping as facilitated by road and trail access (wild turkey, western gray squirrel, band-tailed pigeon)
- Changes to habitat microclimate associated with the edge induced by roads or trails
- Changes in behavior that may lead to loss of reproductive success due to trail and road associated factors.

Oak Woodland and Oak-Conifer Associated Species: Environmental Consequences

Indicators to Measure Direct and Indirect Effects

Cross Country Travel: The acres of cross country travel that would be prohibited within oak and oak-conifer habitats are determined for each of the alternatives.

Additions to the NFTS: For motorized additions to the NFTS, the Zone of Influence within oak and oak-conifer habitat is analyzed by alternative under the Management Indicator section for the mule deer.

Establishment of "Open Areas": Establishment of "Open Areas" is discussed under "Effects Common to All Species."

Changes to the NFTS: The Zone of Influence of reopened Maintenance Level 1 roads is determined for each alternative within oak and oak-conifer habitats under the Management Indicator Section of the Deer Environmental Consequences Section. The changes in class of vehicle are analyzed under "Summary of Effects Common to All Species."

Amendments to the Forest Plan: The effects to oak woodland and oak-conifer species are analyzed by their potential to be affected by the Forest Plan amendments of removing seasonal restrictions to deer in the Deer Environmental Consequences Section.

Direct and Indirect Effects common to all oak woodland and oak-conifer species

Prohibition of Cross Country Travel: Alternative 1 poses the greatest risk to oak associated species where cross country travel would not be prohibited on 65,329 acres, where oak associated species could be subjected to disturbance, avoidance, and abandonment. The remaining action alternatives would prohibit cross country travel within oak and oak/conifer woodlands on approximately 65,329 acres.

Changes to the NFTS (Change in wet weather seasonal restrictions): Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and trails, where oak associated species would benefit from the reduction of noise and disturbance associated with motorized use, especially motorized routes that are within oak and oak-conifer associated habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather restrictions on native surfaced motorized routes and therefore, there would be no benefit to oak and oak-conifer associated species from wet weather seasonal restrictions under these alternatives.

Summary of Direct and Indirect Effects

Table 3.03-33 summarizes the overall net effect to oak and oak-conifer habitat from the proposed actions from motorized route additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-33. Oak and Oak/Conifer Habitat - Summary of Overall Net Direct and Indirect Effects*

Indicator			Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel									
Trend of Effect			Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres of Habitat Where Travel is Prohibited			33,909	65,329	65,329	65,329	65,329	65,329	65,329
Motorized Route Additions to NFTS									
Trend of Effect			Negative (most impactive alternative)	Minimal Effect	No Effect	No Effect	Slight Negative (2nd most impactive following Alt 1)	Minimal Effect	No Effect
200-meter Zone of Influence			14%	<1%	0%	0%	1%	<1%	0%
Establishment of Motorized "Open Areas"			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Changes to the NFTS	**Change in Season of Use (wet weather restrictions)**		No Effect	No Effect	No Effect	Beneficial from reduced disturbance	Beneficial from reduced disturbance	Beneficial from reduced disturbance	No Effect
	Change in Class of Vehicles		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Reopened Maintenance Level 1 Roads	**Trend of Effect**	No Effect	No Effect	No Effect	No Effect	Negative (Most impactive)	No Effect	No Effect
		200 meter ZOI	0%	0%	0%	0%	1%	0%	0%
Amendments to the Forest Plan			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Overall Net Effect of Proposed Actions			Most impactive alternative. Negatively effects 14% oak and oak-conifer habitat acres primarily from continued motorized cross country travel.	Benefits 65,329 acres oak and oak-conifer habitat acres where cross country travel is prohibited; motorized route additions affects <1% habitat; overall reduces habitat fragmentation.	Benefits 65,329 acres oak and oak-conifer habitat acres where cross country travel is prohibited	Benefits 65,329 acrs oak and oak-conifer habitat acres where cross country travel is prohibited; overall reduces habitat fragmentation.	Benefits 65,329 acres oak and oak-conifer habitat acres where cross country travel is prohibited, negatively affects approx. 2% habitat from combined motorized additions and reopened ML 1 routes; overall reduces habitat fragmentation.	Benefits 65,329 acres oak and oak-conifer habitat acres where cross country travel is prohibited; motorized route additions affects <1% habitat; overall reduces habitat fragmentation.	Benefits 65,329 acrs oak and oak-conifer habitat acres where cross country travel is prohibited; overall reduces habitat fragmentation.

*Alternative 1 includes existing unauthorized routes that are associated with continued cross country travel.

Oak and Oak-conifer Habitat: Cumulative Effects to Habitat in the Analysis Area

Motorized Route Density: Motorized route density provides a relative index of cumulative impacts to oak associated species. For example, motorized route density levels can provide a relative index of the amount of human access to hunt species, including mule deer, wild turkey, gray squirrel, and the band-tailed pigeon, which can have an impact on population numbers. Roads and motorized trails have the potential to cause adverse impacts to pallid bats through the loss of oak habitat, especially for urban expansion on private lands. Motorized routes within oak habitats may lead to changes in behavior and may ultimately result in reduced reproductive success for oak associated species.

The cumulative effects to oak associated species were determined by assessing the proportion of pure oak and oak-conifer habitats for motorized route densities, including all existing system routes, proposed route additions, and Maintenance Level 1 routes that would be reopened. Motorized route densities were determined between 0 and 6 miles/square mile (Table 3.03-34) across the Tahoe NF. Under Alternative 1, with continued cross country motorized travel, including continued use of existing unauthorized routes, 84% of the Tahoe NF oak habitats (pure oak woodland and mixed oak-conifer types) would have motorized route densities that exceed 2 miles/square mile, where increased access to hunters may potentially have an impact on oak associated species, such as wild turkey, gray squirrels, and band-tailed pigeon. Pallid bats have the greatest potential to be disturbed within oak habitats under Alternative 1 compared to all the action alternatives.

Alternative 5 would result in approximately 75% of oak habitat with motorized route densities exceeding 2 miles/square mile. The remaining alternatives would have similar proportions of oak habitats (71-72%) where motorized route densities would exceed 2 miles/square mile.

Table 3.03-34. Proportion of Oak Habitat (Percent) with Motorized Route Densities between 0 and 6 miles/square mile

Motorized Route Density (miles/square mile)	**Alt 1***	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
0-2 miles/square mile	17%	29%	29%	29%	27%	29%	29%
2-4 miles/square mile	48%	64%	64%	64%	67%	65%	64%
4-6 mile/square mile	35%	7%	7%	7%	8%	7%	7%
6+ miles/square mile	1%	<1%	0%	<1%	<1%	<1%	<1%

*Alternative 1 includes route density of existing unauthorized routes, with continued cross country travel.

Fox Sparrow and Shrubland (West-Slope Chaparral) Habitat: Affected Environment

The fox sparrow was selected as the MIS for shrubland (chaparral) habitat on the west-slope of the Sierra Nevada, comprised of montane chaparral (MCP), mixed chaparral (MCH), and chemise-redshank chaparral (CRC) as defined by the California Wildlife Habitat Relationships System (CWHR) (CDFG 2005). The Sierra Nevada Forests Bioregional MIS Report and Travel Management MIS Project-Level Report are incorporated by reference. Recent empirical data from the Sierra Nevada indicate that, in the

Sierra Nevada, the fox sparrow is dependent on open shrub-dominated habitats for breeding (Burnett and Humple 2003, Burnett et al. 2005, Sierra Nevada Research Center 2007).

The project area, comprised of the Tahoe NF boundary, currently has 62,928 acres of shrubland habitat. Shrubland habitat is comprised of various age classes that range from young shrubs, intermediate age classes, and mature to decadent shrub classes. In this section, where effects to fox sparrow are noted, it is assumed that effects also occur for the shrubland habitat also.

Fox Sparrow: Environmental Consequences

Indicators to Measure Direct and Indirect Effects

Cross Country Travel: The acres of cross country travel that would be prohibited within shrubland habitat (west-slope chaparral) habitats are determined for each of the alternatives.

Additions to the NFTS (Zone of Influence): For the proposed alternatives, the Zone of Influence of disturbance used in this analysis was the amount of shrubland habitat (west-slope chaparral) that fell within a 200 meter Zone of Influence of proposed motorized routes. The No Action Alternative (Alternative 1) was analyzed by determining the amount of shrubland habitat that fell within a 200 meter Zone of Influence of existing unauthorized routes.

Establishment of "Open Areas": Establishment of "Open Areas" is discussed under "Summary of Effects Common to All Species."

Changes to the NFTS: The Zone of Influence of reopened Maintenance Level 1 roads is determined for each alternative within shrubland habitat (west-slope chaparral). The changes in class of vehicle and changes in seasonal restrictions are analyzed under "Summary of Effects Common to All Species."

Fox Sparrow: Direct and Indirect Effects

Cross Country Travel. Under Alternative 1, cross country travel would continue, potentially affecting 39,639 acres of shrubland (west slope chaparral) habitat and potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the fox sparrow. All action alternatives would prohibit this cross country travel, accordingly reducing or eliminating those existing impacts. Existing LRMP motorized prohibitions would remain in effect.

Additions to the NFTS (Zone of Influence): The direct and indirect effects to fox sparrow shrubland habitat from proposed motorized route additions results in a decrease in habitat quality from disturbance, displacement and/or avoidance of habitat as a result of activities associated with motorized vehicle use. Based on the analysis conducted for fox sparrow shrubland habitat, Alternative 1 would affect the greatest amount of habitat within a 200-meter Zone of Influence (Table 3.03-35). Approximately 10,068 acres or 1% of Sierra Nevada-wide habitat would be affected by continued cross country travel on existing unauthorized routes. Alternative 5 has the next highest direct and indirect effects to fox sparrow habitat, where 1,259 shrubland acres or 0.14% of Sierra Nevada-wide habitat would be affected by proposed motorized route additions to the NFTS. Alternatives 2, 6, and 7 are similar in their affects to shrubland habitat, where 629 acres or 0.07% of Sierra-wide habitat would be affected. Alternatives 3 and 4 do not result in any direct or indirect effects to fox sparrow habitat.

Table 3.03-35. Proportion of Fox Sparrow MIS habitat within a 200-meter "Zone of Influence" of Proposed Route Additions

		Alt 1[1]	Alt 2, 6, 7	Alt 3, 4	Alt 5
Acres Shrubland (west-slope chaparral types) within ZOI	Habitat Acres	10,068	629	0	1,259
Proportion of Habitat in Sierra Nevada	922,000	1%	0.07%	0%	0.14%
Proportion of Habitat in Tahoe NF boundary[2]	62,928	16%	1%	0%	2%

[1] Alternative 1 includes existing unauthorized motorized routes that would continue with cross country travel.
[2] The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Changes to the NFTS (Reopened ML 1 Roads): The direct and indirect effects to fox sparrow shrubland habitat from reopened ML 1 roads would result in a decrease in habitat quality from disturbance, displacement and/or avoidance of habitat as a result of activities associated with motorized vehicle use. Based on the analysis conducted for fox sparrow shrubland habitat, Alternative 5 would affect the greatest amount of habitat affected by reopened ML 1 roads within a 200-meter Zone of Influence (Table 3.03-36). Approximately 629 acres or .07% of Sierra Nevada-wide habitat would be affected by reopening ML 1 roads to motorized use. Alternative 6 reopens a very short segment of ML 1 road within fox sparrow habitat, but the amount is so small that the effects to habitat would be negligible. Therefore, Alternatives 1, 2, 3, 4, 6, and 7 do not affect shrubland habitat, and would not result in any direct or indirect effects to fox sparrow habitat.

Table 3.03-36. Proportion of Fox Sparrow MIS habitat within a 200-meter "Zone of Influence" of Reopened ML 1 Roads

		Alt 1, 2,3, 4 6, 7	Alt 5
Acres Shrubland (west-slope chaparral types)	Habitat Acres	0	629
Proportion of Habitat in Sierra Nevada	922,000	0%	.07%
Proportion of Habitat in Tahoe NF boundary[2]	62,928	0%	1%

Fox Sparrow: Summary of Direct and Indirect Effects

Table 3.03-37 summarizes the overall net effect to fox sparrow habitat from the proposed actions from motorized route additions, prohibition of cross country travel, and changes to NFTS.

Table 3.03-37. Fox Sparrow - Summary of Overall Net Direct and Indirect Effects

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Trend of Effect		Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Habitat affected by Motorized Cross Country Travel		39,639	0	0	0	0	0	0
Proposed Motorized Route Additions to the NFTS								
Trend of Effect		Negative, most impactive	Negative, similar to Alts 6, & 7.	No Effect	No Effect	Negative, next most impactive following Alt 1.	Negatively shares 3rd most impacts with Alts 2 & 7.	Negative, shares 3rd most impacts with Alts 2 & 6.
ZOI		16%	1%	0%	0%	2%	1%	1%
Changes to NFTS								
Wet Weather Restrictions		No Effect	No Effect	No Effect	Beneficial from reduced disturbance	Beneficial from reduced disturbance	Beneficial from reduced disturbance	No Effect
Change in Class of Vehicles		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Reopened ML 1 Roads	**No Effect**	No Effect	No Effect	No Effect	No Effect	Negative, most impactive	Negative, 2nd most impactive	No Effect
	ZOI	0%	0%	0%	0%	1%	<1%	0%
Overall Net Effect of Proposed Actions		Negatively affects fox sparrow habitat primarily from continued cross country travel on existing unauthorized routes within 39,639 acres.	Benefits fox sparrow habitat from the ban of cross country travel on 39,639 acres,; slight habitat impacts (1%) from the addition of motorized routes; overall reduces habitat fragmentation.	Benefits fox sparrow habitat from the ban of cross country travel on 39,639 acres.	Benefits fox sparrow habitat from the ban of cross country travel on 39,639 acres	Benefits fox sparrow habitat from the ban of cross country travel on approx. 39,639 acres, 2nd most impactive following Alt 1 affecting appox. 3% habitat from both motorized additions and reopening ML 1 roads; overall reduces habitat fragmentation..	Benefits fox sparrow habitat from the ban of cross country travel on 39,639 acres; slight habitat impacts (1%) from motorized route additions and reopened ML 1 roads; overall reduces habitat fragmentation..	Benefits fox sparrow habitat from the ban of cross country travel on 39,639 acres,; slight habitat impacts (1%) from the addition of motorized routes; overall reduces habitat fragmentation.

*Alternative 1 includes existing unauthorized routes that would continue with cross country travel, while all the action alternatives include proposed route additions.Fox Sparrow: Cumulative Effects to Habitat in the Analysis Area

Fox Sparrow: Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to fox sparrow includes all suitable fox sparrow shrubland on the west slope of the Tahoe NF on the Yuba River Ranger District and the American River Ranger District. Past and current cumulative effects to fox sparrow include current and historic grazing of fox sparrow habitat; loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4-wheel drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 22 active livestock grazing allotments on the American River and Yuba River Ranger Districts, including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on NFS and private lands within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to fox sparrow habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Thinning, mastication, and under burning treatments may result in some removal of shrubland habitat in the short-term, but may increase fox sparrow shrubland habitat in the long-term. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have removed fox sparrow habitat, but over time, a large percentage of the burned areas quickly become re-vegetated by shrubland habitats, especially on highly productive sites on the west slope of the Tahoe NF.

Overall Cumulative Effects: Alternative 1 poses the greatest cumulative effects to fox sparrow MIS shrubland habitat on the Tahoe NF, where 10,068 acres out of 62,928 acres of fox sparrow habitat would be affected within a 200-meter Zone of Influence of existing unauthorized motorized routes. This would add to existing cumulative effects by approximately 16%. Alternative 1 could contribute to a downward trend in fox sparrow habitat effectiveness within shrubland habitat (west slope chaparral) on the Tahoe NF from continued motor vehicle use on existing unauthorized routes. Alternative 5 would cumulatively affect approximately 1,888 acres out of 62,928 acres fox sparrow shrubland habitat or 3% of the Tahoe NF fox sparrow shrubland habitat from both the addition of motorized routes and reopened ML 1 roads combined. Alternative 5 would result in a small downward trend in habitat effectiveness on the Tahoe NF. Alternatives 2, 6, and 7 affect about 629 out of 62,928 acres fox sparrow shrubland habitat or 1% of the fox sparrow habitat on the Tahoe NF, and would not alter overall fox sparrow shrubland habitat. Alternatives 3 and 4 do not directly or indirectly affect fox sparrow MIS habitat, therefore, no cumulative effects would occur from implementation of Alternatives 3 and 4.

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where fox sparrow habitat effectiveness would be benefited through the reduced

disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted during the wet weather season. The change in the class of vehicles would not affect fox sparrow habitat for any of the alternatives. Finally, all the action alternatives would prohibit motorized cross country travel on 39,639 acres of fox sparrow habitat, where habitat effectiveness would be enhanced through reduced disturbance and road-side avoidance.

Fox Sparrow: Management Direction

Management Indicator Species (MIS) Summary: ***Summary of Fox Sparrow Status and Trend at the Bioregional Scale***. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the fox sparrow; hence, the shrubland effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the fox sparrow. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 922,000 acres of west-slope chaparral shrubland habitat on NFS lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. The fox sparrow has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including: 1997 to present – Lassen National Forest (Burnett and Humple 2003, Burnett et al. 2005); 2002 to present - Plumas and Lassen National Forests (Sierra Nevada Research Center 2007); on-going monitoring through California Partners in Flight Monitoring Sites (CPIF 2002); 1992 to 2005 – Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that fox sparrows continue to be present at these sample sites, and current data at the range wide, California, and Sierra Nevada scales indicate that, although there may be localized declines in the population trend, the distribution of fox sparrow populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Fox Sparrow Trend. The Tahoe NF Travel Management Project would directly, indirectly, and cumulatively affect between 10,068 acres (highest) of fox sparrow shrubland habitat under Alternative 1 and 0 acres (lowest) under Alternatives 3 and 4. Based on the acres affected, which range from 0% to 1% of the total Sierra Nevada-wide, the Tahoe NF Motorized Travel Management Project would not change the existing trend in the habitat, nor would it lead to a change in the distribution fox sparrows across the Sierra Nevada bioregion.

Mountain Quail (Early- and Mid-seral Coniferous Forest Associated Species): Affected Environment

The mountain quail was selected as the Management Indicator Species for early- and mid-seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat on the Tahoe NF, as amended by in the Sierra Nevada Forests Bioregional EIS. Early-seral coniferous forest habitat is

comprised primarily of seedlings less than 1 inch diameter at breast height (dbh), saplings (1”-5.9” dbh), and pole-sized trees (6”-10.9” dbh). Mid-seral coniferous forest habitat is comprised primarily of small-sized trees (11”-23.9” dbh). The mountain quail is found particularly on steep slopes, in open, brushy stands of conifer and deciduous forest and woodland, and chaparral; it may gather at water sources in the summer, and broods are seldom found more that 0.8 km (0.5 mi) from water (CDFG 2005).

The Tahoe NF Motorized Travel Management project area boundary currently has 89,863 acres of early-seral coniferous forest habitat and 402,539 acres of mid-seral coniferous forest habitat. Habitat is comprised of various age classes ranging from sparse seeding coniferous forest (1S) to pole size trees with dense canopy cover (3D) within the early-seral habitat, and from small tree sizes with sparse cover (4S) to small tree sizes with dense cover (4D) in the mid-seral habitat type. Motorized routes within mountain quail habitat may lead to changes in behavior and may ultimately result in reduced reproductive success for mountain quail.

Mountain quail have the potential to be affected by road and trail-associated factors. The relationship between roads and trails associated factors to population trends of the mountain quail is unknown.

Mortality from hunting or trapping: In general, roads facilitate access to hunting of mountain quail.

Fragmentation, Edge and Microclimate Effects: Roads and motorized trails can also create edge effects which may alter microclimates near roads which may enhance habitat for these species or may have negligible impacts to their habitat overall.

Disturbance and changes in behavior: Mountain quail may be sensitive to human disturbance. If quail roost sites are disturbed by motorized route associated factors, local mountain quail populations may be negatively impacted.

Summary of Route associated impacts to mountain quail:

- Mortality from hunting or trapping as facilitated by road and trail access
- Changes to habitat microclimate associated with the edge induced by roads or motorized trails
- Changes in behavior that may lead to loss of reproductive success due to trail and road associated factors.

Mountain Quail: Environmental Consequences

Mountain Quail: Indicators used to Measure Effects

The habitat factor used in this analysis for the action alternatives was the amount of early- and mid-seral coniferous forest habitat that fell within the 200-meter Zone of Influence of proposed motorized route additions to the NFTS. For Alternative 1, no action, the amount of early- and mid-seral coniferous forest habitat that fell within the 200-meter Zone of Influence of existing unauthorized routes was determined. Each alternative was compared to determine the proportion of habitat directly and indirectly affected in relation to the amount of early- and mid-seral coniferous forest habitat available at the Sierra Nevada-wide scale.

The Tahoe NF Motorized Travel Management project area boundary currently has 89,863 acres of early-seral coniferous forest habitat and 402,539 acres of mid-seral coniferous forest habitat. Habitat is comprised of various age classes ranging from sparse seeding coniferous forest (1S) to pole size trees

with dense canopy cover (3D) within the early-seral habitat, and from small tree sizes with sparse cover (4S) to small tree sizes with dense cover (4D) in the mid-seral habitat type. Motorized routes within mountain quail habitat may lead to changes in behavior and may ultimately result in reduced reproductive success for mountain quail.

Mountain Quail: Direct and Indirect Effects

Cross Country Travel: Under Alternative 1, cross country travel would continue, affecting 344,961 acres of early-seral and mid-seral coniferous forest habitats combined, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the mountain quail. For the action alternatives, cross country travel would be prohibited on 344,961 early- and mid-seral coniferous forest acres, where disturbance, avoidance, abandonment would be reduced or eliminated.

Additions to the NFTS: Tables 3.03-38 and 3.03-39 display the proportion of early- and mid-seral coniferous forest affected by the alternatives within a 200-meter Zone of Influence of motorized routes. Based on the amount of early- and mid-seral coniferous forest habitat affected within a 200-meter Zone of Influence of motorized routes, Alternative 1, no action, results in the greatest amount of both early-seral (26,989 acres or about 5% of Sierra Nevada-wide habitat) and mid-seral (76,482 acres or about 3% of Sierra Nevada-wide habitat) coniferous habitat affected. At the scale of the Tahoe NF, Alternative 1 results in a moderate risk (30%) to habitat security within early-seral habitat, and a low risk (19%) to habitat security for the mountain quail within mid-seral habitat.

For the action alternatives, Alternative 5 result in the next greatest amount of both early- and mid-seral habitat affected by proposed motorized route additions, which affects 1,797 acres (0.3% of Sierra Nevada-wide habitat) and 5,325 acres (0.2% of Sierra Nevada-wide habitat), respectively. The remaining action alternatives affect between 0 acres to 1,797 acres of early-seral habitat; and between 0 acres to 5,325 acres of mid-seral conifer habitat. For all the action alternatives, early- and mid-seral habitat affected by motorized routes results in a low risk to habitat security for mountain quail at the Sierra-wide scale and at the Tahoe NF scale.

Table 3.03-38. Proportion of Mountain Quail Early-seral Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Proposed Motorized route additions to the NFTS

Mountain Quail MIS Habitat	Total Habitat Acres	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Early-seral Coniferous Forest		26,989	899	0	719	1,797	1,797	0
Proportion of Sierra Nevada Habitat	546,000	5%	0.2%	0%	0.1%	0.3%	0.3%	0%
Habitat Security Risk in Sierra Nevada		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Proportion of Tahoe NF Habitat[2]	89,863	30%	1%	0%	0.8%	2%	2%	0%
Habitat Security Risk in Tahoe NF		**Moderate**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

*Alternative 1 includes existing unauthorized routes with continued cross country travel.

Table 3.03-39. Proportion of Mountain Quail Mid-seral Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Proposed Motorized route Additions to the NFTS

Mountain Quail MIS Habitat	Total Habitat Acres	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Mid-seral Coniferous Forest		76,482	5,325	0	2,662	5,325	0	2,662
Proportion of Sierra Nevada Habitat	2,766,000	2.8%	0.2%	0%	0.1%	0.2%	0%	0.1%
Habitat Security Risk in Sierra Nevada		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Proportion of Tahoe NF Habitat	402,539	19%	1.3%	0%	0.7%	1.3%	0%	0.7%
Habitat Security Risk in Tahoe NF		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

*Alternative 1 includes existing unauthorized routes with continued cross country travel.

Changes to the NFTS: Tables 3.03-40 and 3.03-41 displays the proportion of early- and mid-seral coniferous forest affected by the alternatives within a 200-meter Zone of Influence of reopened Maintenance Level 1 (ML 1) roads. Alternative 5 results in the greatest amount of both early-seral (2,696 acres or about 0.5% of Sierra Nevada-wide habitat) and mid-seral (4,025 acres or about 0.1% of Sierra Nevada-wide habitat) coniferous habitat reduced habitat effectiveness from reopened ML 1 roads. Alternative 6 follows Alternative 5, and affects 899 acres (0.2% Sierra-wide habitat) of early-seral habitat and does not affect any mid-seral habitat. Both Alternatives 5 and 6 would result in a low risk to habitat security for mountain quail at the bioregional and at the Forest scale. The remaining alternatives do not propose to reopen any ML 1 roads, and therefore would not affect early- and mid-seral habitat suitable for the mountain quail. The changes in class of vehicle and changes in wet weather seasonal restrictions are analyzed under "Summary of Effects Common to All Species."

Table 3.03-40. Proportion of Mountain Quail Early-seral Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Reopened Maintenance Level 1 Roads

Mountain Quail MIS Habitat	Total Habitat Acres	Alternatives 1*, 2, 3, 4, 7	Alt 5	Alt 6
Acres Early-seral Coniferous Forest within ZOI		0	2,696	899
Proportion of Sierra Nevada Habitat	546,000	0%	0.5%	0.2%
Habitat Security Risk in Sierra Nevada		**No Risk**	**Low**	**Low**
Proportion of Tahoe NF Habitat[2]	89,863	0%	3%	1%
Habitat Security Risk in Tahoe NF		**No Risk**	**Low**	**Low**

*Alternative 1 includes existing unauthorized routes with continued cross country travel.

Table 3.03-41. Proportion of Mountain Quail Mid-seral Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Reopened Maintenance Level 1 Roads

Mountain Quail MIS Habitat	Total Habitat Acres[2]	Alternatives 1[1], 2 3, 4, 6, 7	Alt 5
Acres Mid-seral Coniferous Forest within ZOI[2]		0	4,025
Proportion of Sierra Nevada Habitat	2,766,000	0%	0.1%
Habitat Security Risk in Sierra Nevada		**No Risk**	**Low**
Proportion of Tahoe NF Habitat	402,539	0%	1%
Habitat Security Risk in Tahoe NF		**No Risk**	**Low**

[1]Alternative 1 includes existing unauthorized routes with continued cross country travel.

[2] The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the TNF due to the complex checkerboard pattern. The proportion of habitat affected likley over-represents the actual amount of habitatat affected on NFS lands.

Mountain Quail: Summary of Direct and Indirect Effects

Table 3.03-42 summarizes the overall net effect to mountain quail early- and mid-seral habitat from the proposed actions from cross country travel, motorized route additions to the NFTS, and changes to the NFTS.

Table 3.03-42. Mountain Quail - Summary of Overall Net Direct and Indirect Effects

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Trend of Effect		Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Habitat affected by Motorized Cross Country Travel		344,961	0	0	0	0	0	0
Proposed Motorized Route Additions to the NFTS								
Trend of Effect		Negative, most impactive	Negative, 3rd most impactive	No Effect	Negative, impacts similar to Alternatives 6 & 7	Negative, next most impactive following Alt 1.	Negative, impacts similar to Alternative 2 & 7.	Negative, impacts similar to Alternatives 4 & 6.
ZOI (early-seral habitat		30%	1%	0%	<1%%	2%	1%	0%
ZOI (mid-seral habitat)		19%	1%	0%	1%	1%	0%	1%
Changes to NFTS								
Wet Weather Restrictions		No Effect	No Effect	No Effect	Beneficial from reduced disturbance	Beneficial from reduced disturbance	Beneficial from reduced disturbance	No Effect
Change in Class of Vehicles		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Reopened ML 1 Roads	**Trend of Effect**	No Effect	No Effect	No Effect	No Effect	Negative, most impactive	Negative, 2nd most impactive	No Effect
	ZOI (early-seral)	**0%**	0%	0%	0%	3%	1%	0%
	ZOI (mid-seral)	**0%**	0%	0%	0%	1%	0%	0%
Overall Net Effect of Proposed Actions		Most impactive of all alternatives. Negatively affects 19 to 30% mountain quail habitat primarily from continued cross country travel on existing unauthorized routes within 344,961 acres.	Benefits mountain quail habitat from the ban of cross country travel on 344,961 acres; slight habitat impacts (1% each early- and mid-seral) from the addition of motorized routes.	Benefits mountain quail habitat from the ban of cross country travel on 344,961 acres.	Benefits mountain quail habitat from the ban of cross country travel on 344,961 acres; slight negative impacts (1%) to mid-seral habitat from motorized route additions.	Benefits mountain quail habitat from the ban of cross country travel on approx. 344,961 acres, 2nd most impactive following Alt 1 affecting between 2 to 5% habitat from both motorized additions and reopening ML 1 roads.	Benefits mountain quail habitat from the ban of cross country travel on 344,961 acres; slight habitat impacts (2%) from motorized route additions and reopened ML 1 roads.	Benefits mountain quail habitat from the ban of cross country travel on 344,961 acres, slight impacts (1%) to mid-seral habitat from motorized route additions.

*Alternative 1 includes existing unauthorized routes with continued cross country travel, while all the action alternatives include proposed route additions.

Mountain Quail: Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to mountain quail includes mid and early-seral coniferous forest habitat within the boundary of the Tahoe NF. Past and current cumulative effects to mountain quail include current and historic grazing of mountain quail habitat; loss of early- and mid-seral conifer forest habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 22 active livestock grazing allotments on the west side of the Tahoe NF, including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on NFS and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the mountain quail habitat within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to mountain quail habitats. Between 2001 and 2008, approximately 17,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally do not increase forage conditions for quail because they do not usually result in reducing the canopy cover below 40%, except for group selection harvest treatments on the Sierraville RD. Group selection harvests are expected to increase forage condition and increase forest structural diversity. These thinning treatments may result in the short-term reduction in cover for mountain quail, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Between 1994 and 2008, approximately 95,000 acres burned on the Tahoe NF, some of which have removed mountain quail habitat.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increase in negative interactions between humans and mountain quail. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased disturbance to mountain quail would be expected, particularly during the summer months. Table 3.03-43

summarizes a list of the reasonably foreseeable future projects and their potential direct, indirect, and cumulative impacts.

Table 3.03-43. Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction projects – thinning, group select,	~30	• Short-term disturbance from harvest activities, • changes in cover, foraging habitat enhancement in oak habitats.	• Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Aspen enhancement	8	• Cover and forage habitat enhancement • Short-term adverse impacts during implemtation	• Long-term beneficial cumulative effects through improved forage and cover production
Hazard tree removal	4	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Salvage Fire Burned Trees	2	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact
Mastication, site prep and release of small trees, and prescribed burns	~20	• Short-term disturbance during project implementation • Various site-specific effects.	• Long-term beneficial cumulative beneficial effects depending on site-specific conditions
Watershed Restoration (Carman II and Perazzo)	2	• Short-term disturbance during implementation. • Improve foraging habitat adjacent to early- and mid-seral coniferous forest habitat.	Beneficial cumulative impact by improving long-term forage quality.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance.	Slight increase in cumulative impact.
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

Alternative 1 adds the greatest amount to existing cumulative impacts by affecting 30% early-seral coniferous forest habitat (26,989 acres out of 89,863 TNF habitat acres) and 19% mid-seral coniferous forest habitat (76,482 out of 402,539 TNF habitat acres on the Tahoe NF. Alternative 5 follows, by affecting 2% early-seral and 1% mid-seral coniferous forest habitats, from proposed motorized route additions to the NFTS within a 200-meter Zone of Influence. The remaining action alternatives affect between 0 and 1% early- and mid-seral coniferous forest habitat combined. Based on the small percentage of habitat affected by the action alternatives, the Tahoe NF Motorized Travel Management Project would not alter the existing trend in early- and mid-seral coniferous forest habitat important for the mountain

quail. Alternative 1 may cause a downward trend in mountain quail habitat and may affect the distribution of the species on the Tahoe NF.

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where mountain quail habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted during the wet weather season. The change in the class of vehicles would not affect mountain quail habitat for all of the proposed alternatives. Finally, all the action alternatives would prohibit motorized cross country travel on 34,961 acres of early- and mid-seral coniferous forest habitat, where mountain quail habitat effectiveness would be enhanced through reduced disturbance and avoidance.

Summary of Mountain Quail Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mountain quail; hence, the early- and mid-seral coniferous forest effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the mountain quail. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 546,000 acres of early-seral and 2,766,000 acres of mid-seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on NFS lands in the Sierra Nevada. Within the last decade, the trend for early-seral is slightly decreasing (from 9% to 5% of the acres on NFS lands) and the trend for mid-seral is slightly increasing (from 21% to 25% of the acres on NFS lands).

Population Status and Trend. The mountain quail has been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling, and breeding bird survey protocols, including California Department of Fish and Game hunter survey, modeling, and hunting regulations assessment (CDFG 2004a, CDFG 2004b) and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that mountain quail continue to be present across the Sierra Nevada, and current data at the range wide, California, and Sierra Nevada scales indicate that the distribution of mountain quail populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mountain Quail Trend. The Tahoe NF Motorized Travel Management Project would affect 26,989 acres (5% of Sierra Nevada wide habitat) of early-seral coniferous forest and 76,482 acres (3% of Sierra Nevada-wide habitat) of mid-seral coniferous forest habitat important to mountain quail under Alternative 1 from the combined addition of motorized routes and reopened ML 1 roads. The action alternatives would affect between 0 acres and 4,493 acres (Alternatives 3 and 7- lowest to Alternative 5 - highest) of early-seral coniferous habitat, and between 0 acres and 9,350 acres (Alt 3- lowest to Alt 5 – highest) of mid-seral coniferous forest habitat from the total motorized routes added and reopened ML 1 roads. All the action alternatives result in a low percentage of total early- and mid-seral habitat (less than 1 % of Sierra Nevada-wide mid and early-seral habitat) affected by the addition motorized routes and reopened ML 1 roads combined. Alternative 1 does

not prohibit cross country travel, including continued use of unauthorized routes, where approximately 3-5% early- and mid-seral coniferous forest combined would be affected at the Sierra Nevada-wide scale. Based upon the low amount of habitat affected, the Tahoe NF Motorized Travel Management Project would not alter the existing trend in early-seral and mid-seral coniferous habitats, nor would it lead to a change in the distribution of mountain quail across the Sierra Nevada bioregion.

Sooty (Blue) Grouse (Late-Seral Open Canopy Coniferous Forest): Affected Environment

Habitat/Species Relationship

The sooty grouse was selected as the MIS for late-seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures less than 40%. Sooty grouse occurs in open, medium to mature-aged stands of fir, Douglas-fir, and other conifer habitats, interspersed with medium to large openings, and available water, and occupies a mixture of mature habitat types, shrubs, forbs, grasses, and conifer stands (CDFG 2005). Empirical data from the Sierra Nevada indicate that sooty Grouse hooting sites are located in open, mature, fir-dominated forest, where particularly large trees are present (Bland 2006).

Blue grouse have the potential to be affected by road and motorized trail-associated factors. The relationship between road and motorized trail associated factors to population trends of the blue grouse is unknown.

Mortality from hunting or trapping: In general, roads facilitate access to hunting of blue grouse.

Fragmentation, Edge and Microclimate Effects: Roads and motorized trails can also create edge effects which may alter microclimates near roads which may enhance habitat for these species or may have negligible impacts to their habitat overall.

Disturbance and changes in behavior: Blue grouse may be sensitive to human disturbance. If blue grouse roost sites are disturbed by route associated factors, local blue grouse populations may be negatively impacted.

Summary of Route associated factors to blue grouse:

- Mortality from hunting or trapping as facilitated by road and motorized trail access
- Changes to habitat microclimate associated with the edge induced by roads or motorized trails
- Changes in behavior that may lead to loss of reproductive success due to trail and road associated factors.

The project area (Tahoe NF boundary NFS and non-NFS lands) currently has 35,389 acres of late-seral open canopy coniferous forest habitat. This habitat is comprised of size classes 5S (medium/large trees with sparse canopy cover and 5 (medium/large trees with open canopy cover).

Sooty Grouse (Blue Grouse): Environmental Consequences

Indicators used to Measure Effects

Cross Country Travel: The acres of cross country travel that would be prohibited within late-seral open canopy coniferous forest habitats are determined for each of the alternatives.

Additions to the NFTS: For the proposed alternatives, the Zone of Influence of disturbance used in this analysis was the amount of late-seral open canopy coniferous forest that fell within a 200 meter Zone of Influence of proposed motorized routes. The No Action Alternative (Alternative 1) was analyzed by determining the amount of late-seral open canopy coniferous forest that fell within a 200 meter Zone of Influence of existing unauthorized routes. Each alternative was compared to determine the proportion of habitat directly and indirectly affected in relation to the amount of late-seral coniferous open canopy forest habitat available at the Sierra Nevada-wide scale.

Establishment of "Open Areas": Establishment of "Open Areas" is discussed under "Summary of Effects Common to All Species."

Changes to the NFTS: The Zone of Influence of reopened Maintenance Level 1 roads is determined for each alternative within late-seral open canopy coniferous forest. The changes in class of vehicle and changes in seasonal restrictions are analyzed under "Summary of Effects Common to All Species."

Direct and Indirect Effects to Habitat

Cross Country Travel. Under Alternative 1, cross country travel would not be prohibited, potentially affecting 17,178 acres of sooty grouse habitat within late-seral open canopy coniferous forest, potentially causing disturbance and reducing sooty grouse habitat effectiveness. For the action alternatives, cross country travel would be prohibited on 17,178 acres, where disturbance, avoidance, and disruption would be reduced or eliminated for the sooty grouse.

Additions to the NFTS. Alternative 1 affects the greatest amount of late-seral open canopy coniferous forest with a 200-meter Zone of Influence of existing motorized unauthorized routes, which would continue in association with cross country travel. Alternative 1 affects 4,247 acres (6% of Sierra Nevada-wide habitat, 12% Tahoe NF habitat) of sooty grouse habitat (Table 3.03-44) where sooty grouse habitat security risk would be greatest from disturbance or reduced habitat quality from motorized activities. Alternative 5 would result in the next greatest amount of sooty grouse habitat affected by the addition of motorized routes (708 acres or 1% of Sierra-wide habitat, 2% Tahoe NF habitat). Alternatives 2 and 6 would similarly affect 354 acres of sooty grouse habitat (0.5% of Sierra Nevada-wide habitat, 1% Tahoe NF habitat) from additions to the NFTS. Alternatives 4 and 7 would affect approximately 194 suitable sooty grouse habitat acres (0.3% Sierra Nevada habitat, 0.6% Tahoe NF habitat). Alternative 3 does not propose to add any motorized routes to the NFTS, therefore, sooty grouse habitat on the Tahoe NF would not be affected by this project.

Table 3.03-44. Proportion of Sooty (Blue) Grouse Late-seral Open Canopy Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Proposed Motorized route Additions to the NFTS

Sooty Grouse MIS Habitat		Alt 1*	Alts 2, 6,	Alt 3	Alt 4, 7	Alt 5
Acres Sooty Grouse Habitat - Late-seral Open Coniferous Forest within ZOI		4,247	354	0	194	708
Proportion of Sierra Nevada Habitat	75,000	6%	0.5%	0%	0.3%	1%
Habitat Security Risk in Sierra Nevada		**Low**	**Low**	**No Risk**	**Low**	
Proportion of Tahoe NF Habitat[2]	35,389	12%	1%	0%	0.6%	2%
Habitat Security Risk in Tahoe NF		**Low**	**Low**	**Low**	**Low**	

* Alternative 1 includes the Zone of Influence within 200 meters of existing motorized unauthorized routes with continued cross country travel, while all the action alternatives include the Zone of Influence of motorized route additions.

Reopened Maintenance Level 1 Roads: Alternative 5 affects the greatest amount of late-seral open canopy coniferous forest with a 200-meter Zone of Influence of reopened Maintenance Level 1 roads. Alternative 5 affects 197 acres (0.3% of Sierra Nevada-wide habitat, 0.6% Tahoe NF habitat) of sooty grouse habitat (Table 3.03-45). The remaining alternatives do not propose to reopen any ML 1 roads and therefore, sooty grouse habitat on the Tahoe NF would not be affected by implementing Alternatives 1, 2, 3, 4, 6, or 7.

Table 3.03-45. Proportion of Sooty (Blue) Grouse Late-seral Open Canopy Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Reopened Maintenance Level 1 Roads

Sooty Grouse MIS Habitat		Alternatives 1*, 2, 3, 4, 6, 7	Alt 5
Acres Sooty Grouse Habitat - Late-seral Open Coniferous Forest within ZOI		0	197
Proportion of Sierra Nevada Habitat	75,000	0%	0.3%
Habitat Security Risk in Sierra Nevada		**No Risk**	**Low**
Proportion of Tahoe NF Habitat within ZOI	35,389	0%	0.6%
Habitat Security Risk in Tahoe NF		**No Risk**	**Low**

* Alternative 1 includes the Zone of Influence within 200 meters of existing motorized unauthorized routes with continued cross country travel, while all the action alternatives include the Zone of Influence of reopened ML 1 roads.

Summary of Direct and Indirect Effects

Table 3.03-46 summarizes the overall net effect to sooty grouse habitat from the proposed actions from motorized route additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-46. Sooty Grouse- Summary of Overall Net Direct and Indirect Effects

			Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel	**Trend of Effect**		Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Acres Cross Country Travel Prohibited		0	17,178	17,178	17,178	17,178	17,178	17,178
Establishment of "Open Areas"			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Motorized Route Additions to the NFTS	**Trend of Effect**		Negative, most impactive	Negative, 3rd most impactive	No Effect	Negative, impacts similar to Alternative 6 & 7	Negative, next most impactive following Alt 1.	Negative, impacts similar to Alternative 2 & 7.	Negative, impacts similar to Alts 4 & 6.
	Acres Affected in ZOI		4,247	353	0	194	708	353	194
	Percentage Habitat Affected in ZOI		12%	1%	0%	<1%	2%	1%	<1%
Change to the NFTS	**Change in Season of Use**		No Effect	No Effect	No Effect	Beneficial from reduced disturbance	Beneficial from reduced disturbance	Beneficial from reduced disturbance	No Effect
	Change in Class of Vehicle		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Reopened ML 1 Roads	**Trend of Effect**	No Effect	No Effect	No Effect	No Effect	Negative, most impactive	No Effect	No Effect
		ZOI	0%	0%	0%	0%	<1%	0%	0%
Amendment to Forest Plan			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Overall Net Effect of Proposed Actions			Most impactive of all alternatives Negatively affects 12% sooty grouse habitat primarily from continued cross country travel on existing unauthorized routes within 17,178 acres..	Benefits habitat from the ban of cross country travel on 17,178 acres; slight habitat impacts (1%) from motorized route additions; shares 3rd most impacts with Alt 6; overall reduces habitat fragmentation..	Benefits habitat the most from the ban of cross country travel on 17,178 acres; and no motorized additions or reopened ML 1 roads; overall reduces habitat fragmentation..	Benefits habitat from the ban of cross country travel on 17,178 acres; minimal negative impacts (<1%) to sooty grouse habitat from motorized route additions, shares 4th most impacts with Alt 7; overall reduces habitat fragmentation..	Benefits habitat from the ban of cross country travel on approx. 17,178 acres, 2nd most impactive following Alt 1 affecting 2% habitat from motorized additions; overall reduces habitat fragmentation..	Benefits habitat from the ban of cross country travel on 17,178 acres; slight habitat impacts (1%) from motorized route additions, hsares 3rd most impacts with Alt 2; overall reduces habitat fragmentation..	Benefits habitat from the ban of cross country travel on 17,178 acres; minimal negative impacts (<1%) to sooty grouse habitat from motorized route additions, shares 4th most impacts with Alt 4; overall reduces habitat fragmentation..

*Alternative 1 includes existing unauthorized routes with continued cross country travel, while all the action alternatives, while all the action alternatives include the Zone of Influence of motorized route additions.

Cumulative Effects to Sooty Grouse Habitat

The spatial boundary for analyzing cumulative effects to blue grouse includes all late-seral open canopy coniferous forest habitat within the boundary of the Tahoe NF. Past and current cumulative effects to blue grouse include current and historic grazing of sooty grouse habitat; loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on NFS and private lands within the Tahoe NF boundary. Some, but not all, of these activities would contribute to impacts to the sooty grouse within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to blue grouse habitats. Between 2001 and 2008, approximately 17,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments may not affect habitat for sooty grouse because they generally retain at least 40% canopy cover, except for group selection harvest treatments for HFQLG projects on the Sierraville RD. Group selection harvests are expected to increase forage condition and increase forest structural diversity. Some thinning treatments may result in the short-term reduction in cover for sooty grouse, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Many recent, current, and future vegetation and fuels reduction projects are improving blue grouse habitat within aspen habitats which are designed to enhance wildlife habitat diversity and foraging condition. Aspen habitats are important for sooty grouse. Between 1994 and 2008, approximately 95,000 acres burned on the Tahoe NF, some of which have removed sooty grouse habitat.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Increases in recreational use in the near future are expected, and therefore, increased disturbance, displacement, avoidance, or illegal poaching to sooty grouse could be expected, particularly during the summer months. Table 3.03-47 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment

plans, non-motorized trail development, and special use permit re-issuances, and summarizes cumulative impacts to sooty grouse.

Table 3.03-47. Sooty Grouse Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impacts to Sooty Grouse	Overall Cumulative Impacts
Vegetation management/ fuels reduction – thinning, group select, and aspen enhancement	~30	Short-term disturbance from harvest activities, changes in cover, foraging and reproductive habitat enhancement in aspen and oak habitats.	Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Aspen enhancement	8	Short-term disturbance during implementation. Long-term cover and forage habitat improvement	Long-term beneficial cumulative effects from improved habitat conditions
Mastication, site prep, and release of small trees, and prescribed burning.	~20	Short-term disturbance during implementation. Site-specific effects vary from beneficial to negative.	Cumulative impacts vary from no cumulative impact to slight increase in cumulative impact.
Hazard tree removal	4	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve riparian and meadow habitat quality used for forage and reproduction.	Beneficial cumulative impact by improving long-term forage quality.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance.	Slight increase in cumulative impact.
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

Alternative 1 poses the greatest cumulative effects to sooty grouse MIS late-seral open canopy coniferous habitat on the Tahoe NF where 12% (4,247 acres out of 35,389 Tahoe NF habitat acres) sooty grouse habitat would be affected within a 200-meter Zone of Influence of existing unauthorized motorized routes that would continue with cross country travel. Alternative 5 would cumulatively add impacts on approximately 708 acres out of 35,389 acres sooty grouse habitat or approximately 2% of the Tahoe NF late-seral open canopy coniferous habitat from the addition of motorized routes and from reopened ML 1 roads. Alternatives 2, 4, 6, and 7 would negatively add 1% or less (194 to 353 acres out of 35, 389 acres Tahoe NF habitat) to existing cumulative impacts from the addition of motorized routes. Alternative 3 does not directly or indirectly affect sooty grouse habitat, and therefore no cumulative impacts would be

added under this alternative. None of the action alternatives would alter the existing trend in late-seral open canopy coniferous forest habitat.

The change is the class of vehicles would have no effect to sooty grouse habitat, since the change in class of vehicles on existing motorized routes would generally not alter sooty grouse habitat condition. Wet weather seasonal restrictions under Alternatives 4, 5, and 6 on all native surfaced roads and motorized trails would benefit sooty grouse habitat effectiveness through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted. Finally cross country travel would be prohibited on 17,178 acres of sooty grouse habitat with the implementation of the action alternatives where disturbance, avoidance, and abandonment by sooty grouse would be reduced or eliminated. Alternative 1 would have the greatest cumulative impact to sooty grouse habitats, where cross country travel would continue and increase, affecting 17,178 acres of late-seral open canopy coniferous forest habitat.

Summary of Sooty Grouse Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the sooty grouse; hence, the late-seral open canopy coniferous forest effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the sooty grouse. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 75,000 acres of late-seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat on NFS lands in the Sierra Nevada. The trend is slightly decreasing (from 3% to 1% within the last decade on NFS lands).

Population Status and Trend. The sooty grouse has been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling, point counts, and breeding bird survey protocols, including California Department of Fish and Game Blue (Sooty) Grouse Surveys (Bland 1993, 1997, 2002, 2006); California Department of Fish and Game hunter survey, modeling, and hunting regulations assessment (CDFG 2004a, CDFG 2004b); Multi-species inventory and monitoring on the Lake Tahoe Basin Management Unit (LTBMU 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that sooty grouse continue to be present across the Sierra Nevada, except in the area south of the Kern Gap, and current data at the range wide, California, and Sierra Nevada scales indicate that the distribution of sooty grouse populations in the Sierra Nevada north of the Kern Gap is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Sooty Grouse Trend. Under Alternative 1, 4,247 acres (6% of Sierra Nevada habitat) of late-seral open canopy coniferous forest would be directly or indirectly affected, which could substantially disturb, displace, or cause avoidance to sooty grouse from cross country motorized travel, including on existing unauthorized motorized routes. Alternative 1 could result in a downward habitat trend for the sooty grouse.

The action alternatives all result in a low risk to blue grouse security habitat, where between 0 acres and 708 acres (0 to 1% of Sierra Nevada-wide habitat) are influenced by proposed motorized route additions and/or reopened ML 1 roads. The Tahoe NF Motorized Travel Management Project action alternatives would not alter the existing trend in the habitat, nor would it lead to a change in the distribution of sooty grouse across the Sierra Nevada bioregion.

Old Forest Conifer Associated Species: Affected Environment

The old forest conifer associated species group is comprised of the California spotted owl (*Strix occidentalis occidentalis)*, northern goshawk (*Accipiter gentilis*), great gray owl (*Strix nebulosa*), American marten (*Martes americana*), Pacific fisher (*Martes pennanti*), and coniferous forest birds brown creeper (*Certhia americana*). These species are associated with old forests (moderate to closed canopy) that can be impacted by activities associated with motorized trails and roads. Gaines et al. (2003) conducted a literature review where a number of old forest associated wildlife species were identified as being negatively impacted by a variety of road and trail-associated factors. These impacts include habitat loss and fragmentation, road avoidance or displacement, harassment, and others. Growing concern over habitat fragmentation for old forest associated species has been expressed by individuals, environmental groups, and agency biologists. In addition, studies have shown that species within this group are sensitive to disturbance.

According to the Sierra Nevada Forest Plan Amendment (2004), which amends the Tahoe NF Land and Resource Management Plan (1990), habitat types that are important for old coniferous forest associated species (spotted owl, goshawk, marten, and fisher.) are California Wildlife Habitat Relationship (CWHR) 4M, 4D, 5M, 5D, and 6 vegetation types (stands of trees $\geq$11” dbh with >40% canopy cover). In addition, the Sierra Nevada Forest Plan Amendment provides broad management direction for Old Forest Emphasis Areas (OFEAS) where they are “managed to maintain or develop old forest habitat in areas containing the best remaining large blocks or landscape concentrations of old forest and areas that provide old forest functions (such as connectivity of habitat over a range of elevations to allow migration of wide-ranging old-forest-associated species).” Finally, the Tahoe NF developed a Carnivore Network based on suitable and potential suitable habitat for marten and fisher that provides another way of evaluating impacts to late-seral coniferous forest species and their habitats.

Summary of trail and road associated impacts to late-seral coniferous forest species (Gaines, et al. 2003):

- Mortality or injury resulting from a motorized vehicle running over or colliding with an animal;
- Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities;
- Changes to habitat microclimate associated with the edge induced by roads or trails;
- Reduction in density of snags and down logs due to their removal near roads as facilitated by road and motorized trail access;

- Collection of live animals for use as pets (such as amphibians and reptiles) as facilitated by the physical characteristics of roads or trails or by road or motorized trail access;
- A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise;
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young;
- Increase in heart rate or stress hormones when near a road or trail or network of roads or trails.

Old Forest Conifer Associated Species: Environmental Consequences

Effects Common to All Old Forest Conifer Associated Species

Changes to the NFTS

Changes in Class of Vehicles: Although responses to motorized vehicle use varies by species and depends upon the type of vehicle, in addition to the intensity, timing, speeds, and amount motorized vehicle use, the specific species responses are not well understood. For this analysis, it is assumed that all vehicle types result in the same disturbance to all late-seral coniferous forest species. Therefore, changes in the class of vehicles would not vary in their effects to late-seral coniferous forest associated species for all of the proposed alternatives.

Wet weather seasonal restrictions: Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails within old coniferous forest species habitats where old forest species would benefit through the reduction of noise and disturbance associated with motorized use. Alternatives 1, 2, 3, and 7 do not impose wet weather restrictions on native surfaced motorized routes and therefore, late-seral closed canopied coniferous forest associated species would not benefit from wet weather seasonal restrictions.

Establishment of "Open Areas": Establishment of "Open Areas" is discussed under "Summary of Effects Common to All Species."

Amendments to the Forest Plan: the effects to old forest-conifer species are analyzed by their potential to be affected by the Forest Plan amendments of removing seasonal restrictions for deer as addressed in the Deer Environmental Consequences Section.

Introduction to Indicators used to Measure Effects for Old Forest Conifer Associated Species

Three primary metrics will be used to evaluate the effects of the alternatives to old forest conifer associated species as follows:

Cross Country Travel: The acres of cross country travel within old forest conifer habitats (CWHR 4M, 4D, 5M, 5 D, 6) are determined for each of the alternatives.

Additions to the NFTS: The Zone of Influence and Disturbance at a Specific Site are analyzed for motorized route additions to the NFTS by each alternative, as described below.

Zone of Influence: For motorized additions to the NFTS, the Zone of Influence within old forest CWHR habitats are analyzed for each alternative to measure habitat fragmentation and other zonal effects

associated with motorized roads and trails including noise disturbance, avoidance, edge effects, mortality, etc. The distance from routes used to calculate the Zone of Influence for selected species in the old forest group was determined from a thorough review of available literature. For all species in this group, a Zone of Influence of 60 meters (length of one tree height of snags) along routes is used to determine the effects of habitat fragmentation from removal of snag and logs along routes for public safety. Delaney et al. (1999) found that late-seral coniferous forest associated species, such as the spotted owl, have shown to be sensitive to noise disturbance generated by helicopters within a distance of 100 meters, therefore a 100-meter Zone of Influence was used to represent habitat effectiveness for late-seral forest associated species. A Zone of Influence within 200 meters of OFEAs encompasses a greater array of potential route associated effects to late-seral forest associated species including edge effects, habitat fragmentation, and habitat effectiveness.

Disturbance at a specific site: Disturbance at a specific site was analyzed for California spotted owl and northern goshawk by the determining the number of motorized route miles added within Protected Activity Centers. Also, miles of routes added within ¼ mile of a reproductive site (nest site or nest grove) were evaluated by alternative under the species discussions for California spotted owl and northern goshawk, since disturbances within ¼ mile of a reproductive site have the potential to disrupt or cause reproductive failure to these species.

Changes to the NFTS: The Zone of Influence of reopened Maintenance Level 1 roads and Disturbance to a specific site within old forest CWHR habitats were determined in similar way as motorized route additions were analyzed, as described above. The changes in class of vehicle and changes in seasonal restrictions are analyzed under “Effects Common to All Old Forest Conifer Species” above.

Introduction to Cumulative Effects for Old Forest Conifer Associated Species

Indicators used to Measure Cumulative Effects of Motorized Routes

Cross Country Travel: The cumulative effects of motorized cross country travel are described for both current LMP motorized restrictions as well as proposed motorized restrictions for the alternatives.

Motorized Route Density: Motorized route density is used as an indicator to measure cumulative effects of all the motorized routes at the Forest-wide scale. The Forest-wide scale gives an approximate coarse measure of habitat effectiveness for old forest associated species represented in this group. Motorized route density is presented at two scales, within mature and late-seral coniferous forest habitats (CWHR vegetation types 4M, 4D, 5M, 5D, and 6) and Old Forest Emphasis Areas (OFEAs). The type of impacts to old forest associated species depends on the type of motorized route, amount and type of use, and season of use. Although motorized route density thresholds for late-seral coniferous forest associated species are not well understood, route densities are presented to compare relative effects between the alternatives.

Zone of Influence of Motorized and Non-motorized Routes: The analysis of cumulative effects for old forest species focuses on the cumulative effects associated with roads and trails, including motorized and non-motorized use, and includes roads and trails on both NFS lands and non-NFS lands (private).

For this analysis, cumulative effects are simply the sum total of direct and indirect effects of the alternatives plus the past, and reasonably foreseeable future impacts of routes. Adverse cumulative impacts includes proposed motorized route additions, reopened ML 1 routes, existing motorized routes on both NFS lands and non-NFS lands (private), and non-motorized routes. Non-motorized routes are considered to have some impact on old forest species, though they may or may not have similar impacts as motorized routes depending upon the intensity and level of use. Although, all motorized routes are not equal, and routes that are Interstate highways have a higher severity of effect than unpaved motorized routes, this analysis assumes all motorized routes have the same negative impact on old forest species. In all cases, existing routes are nearly constant for all the alternatives and would not vary between the alternatives in a significant way. Routes that are either classified as closed or decommissioned are considered positive cumulative effects since disturbance and habitat fragmentation would no longer occur because routes would become overgrown with vegetation over time and noise disturbance from motorized use would not occur. Reasonably foreseeable impacts of motorized routes are considered by assessing the potential for motorized route proliferation for each alternative.

Other cumulative effects to old forest conifer associated species include effects of vegetation management, fuels reduction, catastrophic wildfires, recreation, grazing and others. These cumulative effects are complex and difficult to quantify over space and time, and are qualitatively described.

Cumulative Effects Boundary in Space and Time

The boundary of the Tahoe NF (including NFS lands and non-NFS lands) is the geographic boundary used for analyzing cumulative effects of motorized vehicle routes on old forest associated species. This area is sufficiently large enough to include home ranges for the species occurring within this group and includes an array of forest vegetation types important to old forest species from low elevations to high elevations including mixed conifer types, true fir types, yellow pine types, lodgepole pine, and subalpine conifer types. The temporal scale used for analyzing is all past and present routes which comprise the current motorized route situation and future routes that may develop within the next 20 years out into the future. This timeframe sufficiently analyzes any foreseeable future routes on the Tahoe NF.

Old Forest Conifer Habitat (CWHR types 4M, 4D, 5M, 5D, and 6)

Indicators used to Measure Effects

Additions to the NFTS (Zone of Influence): For each of the proposed alternatives, the Zone of Influence within old forest habitat (CWHR 4M, 4D, 5M, 5D, 6) was determined at three scales - within 60 meters, 100 meters, and 200 meters of motorized route additions. The three different scales were used to represent the array of route-associated factors for various species represented in the group. In general, a 60 meter Zone of Influence represents habitat fragmentation to old forest species as it relates to habitat components, such as snag and down log removal along routes for public fuelwood and public safety hazards. Sixty meters represents the maximum height of a tree potentially removed as a hazard tree. Delaney et al. (1999) found that old forest species, such as the spotted owl, have shown to be sensitive to noise disturbance generated by helicopters within a distance of 100 meters, therefore a 100-meter Zone of

Influence was used to represent habitat effectiveness for old forest species. Gaines et al. (2003) reported that brown creepers and other forest interior bird species avoided an area within 200 meters of motorized routes. Potential impacts within a 200-meter Zone of Influence to old forest conifer associated species includes potential negative impacts including avoidance due to noise disturbance or edge effects, habitat fragmentation, introduction of invasive species (i.e. brown-headed cowbirds), microclimate changes, and others.

The Zone of Influence may vary by species and by species responses to route type, level of use and intensity. Since absolute thresholds of concern thresholds for any given species are difficult to determine due to limited research on effects of routes, various zones of influence were selected that would represent the array of responses that route associated factors might influence fitness or distribution of species in the group. Species-specific discussion in relation to the various zones of influence will be discussed in detail.

The analysis for these three Zones of Influence was calculated for the DEIS and the results showed maximum percentage differences among all alternatives of 2-3%. Further, the largest ZOI, 200 m, incorporates all of the impacts intended to be measured by the results of the other two distances. Therefore, in this analysis, only 200 m ZOI was used.

Changes to the NFTS (Reopened ML 1 Roads - Zone of Influence): The 200 meter Zone of Influence was determined for all reopened ML 1 roads as it was completed for motorized route additions.

Direct and Indirect Effects

Cross Country Travel: Cross country motorized travel would continue on at 268,895 acres of old forest habitat under Alternative 1, and would be prohibited under all the action alternatives. Habitat fragmentation, disturbance, and avoidance associated with cross country travel would benefit old forest species since prohibition of cross country travel on nearly 300,000 acres would be significantly reduced under the action alternatives.

Additions to the NFTS (Zone of Influence): Comparing the Zone of Influence at 200 meters of motorized routes to be added to the NFTS within old forest habitat as classified by CWHR types 4M, 4D, 5M, 5D, and 6, provides a relative indication of how the alternatives affect habitat effectiveness for many old forest associated species, such as forest carnivores (i.e. marten and fisher) and forest coniferous songbird species (i.e. brown creeper). As indicated above, a study by Gaines et al. 2003 indicated that brown creepers and other forest interior bird species avoided an area within 200 meters of motorized routes. Potential impacts within a 200-meter Zone of Influence to late-seral coniferous forest associated species includes potential negative impacts including avoidance due to noise disturbance or edge effects, habitat fragmentation, introduction of invasive species (i.e. brown-headed cowbirds), microclimate changes, and others.

Alternative 1 contributes considerably to the reduction in habitat effectiveness for old forest species where 18% of old forest habitat would be negatively influenced by cross country motorized travel, including use of existing unauthorized motorized routes. Alternatives 2, 5, and 6 contribute to a 1% reduction in habitat effectiveness for old forest associated species, followed by Alternatives 4 and 7 where

less than 1% reduction in habitat effectiveness would occur. Alternative 3 would not contribute to a reduction in habitat effectiveness.

Changes to NFTS (Reopened ML 1 Roads-Zone of Influence): Only Alternative 5 would impact old forest habitat, where 1% old forest CWHR habitat would be influenced by motorized activities associated with the reopening of ML 1 roads. Although Alternatives 4, 6, and 7 would open ML 1 roads, there would be less than 1% impact. None of the remaining alternative proposes to reopen ML 1 roads, and would therefore, not affect old forest habitat. Refer to Table 3.03-48.

Table 3.03-48. Proportion of Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, and 6) within 200 Meters of Motorized Route Additions and Reopened ML 1 Roads

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Percent of old forest CWHR habitat in ZOI of Motorized Additions	18%	1%	0%	<1%	1%	1%	<1%
Percent of old forest CWHR habitat in ZOI of Reopened ML 1 Roads	0%	0%	0%	0%	1%	0%	0%

[1]Alternative 1 includes unauthorized routes associated with continued cross country travel

Summary of Direct and Indirect Effects

Table 3.03-49 summarizes the overall net effect to old forest CWHR habitat from the proposed actions from motorized route additions to the NFTS, prohibition of cross country travel, and changes to NFTS.

Table 3.03-49. Old Forest CWHR Habitat- Summary of Overall Net Direct and Indirect Effects

Indicator		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Trend of Effect		Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres of Habitat Where Cross Country Travel is Prohibited		0	267,952	267,952	267,952	267,952	267,952	267,952
Motorized Route Additions to NFTS*								
Trend of Effect		Negative (most impactive alternative)	Negative (shares 2nd most impactive alternative with Alts 5 & 6)	No Effect	Negative (shares 3rd most impactive alternative with 7)	Negative (shares 2nd most impactive with alternatives 2 & 6)	Negative (shares 2nd most impactive with alternatives 2 & 5)	Negative (shares 3re most impactive alternative with alternative4)
Percent Habitat Affected in ZOI		18%	1%	0%	<1%	1%	1%	<1%
Establishment of Motorized "Open Areas"		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Changes to the NFTS	**Change in Season of Use (wet weather restrictions)**	No Effect	No Effect	No Effect	Beneficial from reduced disturbance	Beneficial from reduced disturbance	Beneficial from reduced disturbance	No Effect
	Change in Class of Vehicles	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Reopened Maintenance Level 1 (ML 1) Roads							
	Trend of Effect	No Effect	No Effect	No Effect	No Effect	Negative	No Effect	No Effect
	Percent Habitat Affected in ZOI	0%	0%	0%	0%	1%	0%	0%
Amendments to the Forest Plan		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Overall Net Effect of Proposed Actions		Negative effects from unauthorized cross country travel; Increases habitat fragmentation.	Beneficial effect from prohibited cross country travel, reduces habitat fragmentation	Beneficial effect from prohibited cross country travel, reduces habitat fragmentation.	Beneficial effect from prohibited cross country travel; reduces habitat fragmentation.	Beneficial effect from prohibited cross; reduces habitat fragmentation.	Beneficial effect from prohibited cross country travel; reduces habitat fragmentation.	Beneficial effect from prohibited cross country travel; reduces habitat fragmentation.

* Alternative 1 includes existing unauthorized routes that would continue with cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects

Cumulative Effects of All Motorized Routes

Motorized Route Density in Old Forest Coniferous Habitat (CWHR types 4M, 4D, 5M, 5D, and 6)

The average route density of all motorized routes within old forest CWHR habitat types was determined within 7th field watersheds for each alternative (Table 3.03-50). In general, lower motorized route densities correlate with higher habitat connectivity or conversely, higher motorized route densities equate to greater habitat fragmentation within old forest habitat.

Alternative 1 would contribute to the greatest cumulative effects within old forest CWHR habitat due to the continuance of unmanaged cross country travel, where the lowest proportion of old forest CWHR habitat (14%) is within route densities of less than 2 miles/square mile as compared to the action alternatives (22-25%). Alternatively, Alternative 1 has the greatest amount of old forest CWHR habitat (34%) that have relatively high motorized route densities of 4-6 mi/mi^2, where the least amount of habitat connectivity for old forest associated species is provided compared to all the action alternatives (10-11% habitat with route densities of 4-6 mi/mi^2).

For all the action alternatives, the cumulative motorized route density would be similar since cross country travel would be prohibited, including the majority of existing unauthorized routes. Alternative 5 would have slightly greater cumulative effects compared to alternatives the remaining action alternatives. High motorized route densities, such as would occur under Alternative 1, could be a limiting factor in the distribution and abundance for some old forest conifer associated species. Therefore, Alternative 1 poses the greatest risk to old forest conifer species' abundance and distribution, especially for species that require large patches of undisturbed habitat.

Table 3.03-50. Proportion of Late-seral Coniferous Forest Habitat (CWHR types 4M, 4D, 5M, 5D, and 6) with motorized route densities between 0 and 6 miles/square mile (Average motorized route densities within 7th Field Watersheds)

Motorized Route Density (miles/square mile)	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
0 Miles/Square mile	<1%	<1%	<1%	<1%	<1%	<1%	<1%
0-2 Miles/Square mile	14%	25%	25%	25%	22%	25%	25%
2-4 Miles/Square mile	47%	63%	63%	63%	65%	64%	63%
4-6 Miles/Square mile	34%	10%	10%	10%	11%	10%	10%
>6 Miles/Square mile	4%	2%	1%	2%	2%	2%	2%

Zone of Influence at 200 meters. The cumulative effects to mature/forest forests (CWHR types 4M, 4D, 5M, 5D, 6 within a 200 meter Zone of Influence are compared for the proposed alternatives (Tables 3.03-49). When comparing the relative cumulative effects to late-seral forests within a 200 meter Zone of Influence by adding up all the direct and indirect effects of proposed alternatives plus the cumulative effects of past, present, and future actions, Alternative 1 would have the greatest overall cumulative impact (cumulative impact score = 60%) and poses the greatest risk to habitat connectivity, as well as other negative cumulative impacts associated with motorized activities within old forest habitat as a result

of approximately 18% of old forest habitat that would be directly and indirectly affected by continued cross country motorized travel on 267,952 acres, including continued use of existing unauthorized routes (Table 3.03-51). In addition, Alternative 1 would likely result in uncontrolled proliferation of unauthorized routes since unmanaged cross country travel would likely continue and grow into the future. All the action alternatives are similar in their overall cumulative impact within a 200 meter Zone of Influence that affects between 42 to 44 percent of old forest CWHR habitat. No direct, indirect, or cumulative impacts would occur from implementing Alternatives 3, since no motorized routes would be added to the NFTS or added within old forest CWHR habitat.

Table 3.03-51. Cumulative Effects for Percent of Old Forest Conifer Habitat (CWHR 4M, 4D, 5M, 5D, 6) within 200 meters of All Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of proposed alternatives							
Motorized route additions to the NFTS[1] (negative impact)	18%	1%	0%	<1%	1%	1%	<1%
Reopened ML 1 Roads (negative)	0%	0%	0%	0%	1%	0%	0%
Unauthorized Routes where cross country travel would be prohibited (postive)	0%	17%	18%	17%	16	17%	17%
Cumulative effects of past, present, and proposed actions							
Existing motorized routes- NFS lands (negative impact)	26%	26%	26%	26%	26%	26%	26%
Existing motorized routes on private land - non-NFS lands (negative impact)	12%	12%	12%	12%	12%	12%	12%
Existing non-motorized routes (negative impact)[2]	4%	4%	4%	4%	4%	4%	4%
Decommissioned routes – (positive impact)	1%	1%	1%	1%	1%	1%	1%
Existing Closed ML 1 Roads (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**60%**	**43%**	**42%**	**42%**	**44%**	**43%**	**42%**

[1]Motorized Route additions- Alternative 1 includes unauthorized routes with continued cross country travel, while all the action alternatives includes motorized route additions to the NFTS.

[2]Non-motorized-assumption: non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60 meters

Overall Cumulative Effects from Past, Present and Reasonably Foreseeable Future

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on NFS lands and private lands within the Tahoe NF boundary. Some, but not all, of these activities would contribute to impacts to late-seral coniferous forest associated species within the cumulative effects boundary. See overall cumulative effects for spotted owl for a summary of cumulative effects from past, present, and reasonably foreseeable projects for all species.

Old Forest Emphasis Areas (OFEAs)

Indicators used to Measure Direct and Indirect Effects

Motorized Route Density: Motorized route density analysis is conducted at a Forest-wide scale to give an approximate coarse measure of habitat effectiveness for old forest conifer associated species represented in Old Forest Emphasis Areas (OFEAs). The type of impacts to old forest associated species depends on the type of motorized route, amount and type of use, and season of use.

Zone of Influence: The Zone of Influence is analyzed for each alternative to measure habitat fragmentation and other zonal effects associated with motorized routes and trails including noise disturbance, avoidance, edge effects, mortality, etc. The distance from motorized routes used to calculate the Zone of Influence for OFEAs was determined from a thorough review of available literature. A Zone of Influence of 60 meters (length of one tree height of snags) along motorized routes is used to determine the effects of habitat fragmentation from removal of snag and logs along motorized routes for public safety. Zone of Influence within 200 meters of OFEAs provides encompasses a greater array of potential route associated effects to old forest species including edge effects, habitat fragmentation, and habitat effectiveness. The results of the 60-meter ZOI calculation are available in the project record; however, because the results of the 200-meter ZOI display all the impacts also displayed by the 60 m ZOI, this analysis refers only to the 200-meter analysis.

Direct and Indirect Effects

Cross Country Travel. The ban of motorized cross country travel on 394, 847 acres within OFEAs would benefit old forest associated species and reduce disturbance and habitat fragmentation. Under Alternative 1 cross country motorized travel would continue where disturbance to old forest associated species and habitat fragmentation on 394,847 acres within OFEAs would continue.

Additions to the NFTS (Zone of Influence at 200 meters in OFEAs). The zones of influence within OFEAs are analyzed for the proposed alternatives within 200 meters of proposed additions of motorized routes to the NFTS (Table 3.03-52). Comparing the Zone of Influence at 200 meters of proposed unauthorized routes provides a relative indication of how the alternatives affect habitat effectiveness for late-seral coniferous forest associated species within OFEAs. Potential negative impacts within a 200-meter Zone of Influence to late-seral coniferous associated species includes avoidance due to noise disturbance or edge effects, habitat fragmentation, introduction of invasive species (i.e. brown-headed cowbirds), microclimate changes, and others. Alternative 1 contributes considerably to reduced habitat effectiveness for old forest species where 22% of OFEAs would be negatively influenced by continued cross country travel and the associated continued use of existing unauthorized routes. Alternative 5 contributes to 2% reduction in habitat effectiveness for old forest associated species, followed by Alternatives 2 and 6 at 1% reduction in habitat effectiveness. Alternative 7 contributes to less than 1% reduction in habitat effectiveness for old forest associated species. Alternatives 3 and 4 would not affect overall habitat effectiveness for old forest species within OFEAs.

Summary of Direct and Indirect Effects

Table 3.03-52 summarizes the overall net effect to Old Forest Emphasis Areas (OFEAs) from the proposed actions from motorized route additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-52. Old Forest Emphasis Areas (OFEAs) - Summary of Overall Net Direct and Indirect Effects

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Trend of Effect		Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres prohibited		0	394,847	394,847	394,847	394,847	394,847	394,847
ZOI percent OFEAs prohibited		0%	17%	18%	17%	16%	17%	17%
Establishment of "Open Areas"		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Motorized Route Additions to NFTS								
Trend of Effect		Negative	Slight Negative	No Effect	Slight Negative	Slight Negative	Slight Negative	Slight Negative
ZOI Percent OFEAs Affected		18%	1%	0%	<1%	1%	1%	<1%
Changes to the NFTS	**Wet Weather Restrictions**	No Effect	No Effect	No Effect	Beneficial from reduced disturbance	Beneficial from reduced disturbance	Beneficial from reduced disturbance	No Effect
	Change in Class of Vehicles	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Reopened ML 1 Roads	0%	0%	0%	0%	1%	0%	0%
Amendments to Forest Plan		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Overall Net Effect of Proposed Actions		Negative, continued cross country travel on 394,847 acres. Increases fragmentation within OFEAs.	3rd most beneficial alternative, shared with Alt 6. Reduces fragmentation from cross country travel prohibitions.	Most beneficial alternative-- no motorized route additions. Reduces fragmentationfrom cross country travel prohibitions.	2nd most beneficial alternative shared with Alt 7. Reduces fragmentation from cross country travel prohibitions.	Least beneficial alternative-- 2% ZOI affected from route additions and reopened ML 1 roads. Reduces fragmentation from cross country travel prohibitions.	3rd most beneficial alernative, shared with Alt 2. Reduces fragmentation from cross country travel prohibitions.	2nd most beneficial alternative shared with Alt 4. Reduces fragmentation. from cross country travel prohibitions.

* Alternative 1 includes existing unauthorized routes that would continue with cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects Old Forest Emphasis Areas (OFEAs)

Cumulative Motorized Route Density in OFEAs

The average motorized route densities (all motorized routes including existing routes, added routes, and reopened ML 1 roads) within the Old Forest Emphasis Areas (OFEAs) land allocation were determined within 7th field watersheds for each alternative (Table 3.03-53). In general, lower motorized route densities correlate with higher habitat connectivity or conversely, higher motorized route densities equate to greater habitat fragmentation of OFEAs.

Alternative 1 provides the least amount of habitat connectivity within OFEAs, where approximately 35% of OFEAs have route densities in the highest route density categories (4-6 mi/mi^2), and the lowest amount of OFEAs in the lowest route density categories (0-2 mi/mi^2).

When comparing the action alternatives, Alternative 5 would result in next greatest proportion of OFEAs (9%) within the 4-6 mi/mi^2 route density category, followed by the remaining action alternatives which have slightly lower route densities within OFEAs. The remaining action alternatives would result in approximately 5-6% of the OFEAs within the 4-6 mi/mi^2 route density category. Therefore, the cumulative route density of motorized routes for action alternatives would similarly result in the least amount of habitat fragmentation within OFEAs as compared to Alternative 1, followed by Alternative.

Table 3.03-53. Proportion of Old Forest Emphasis Areas with motorized route densities between 0 miles per square mile and greater than 6 miles per square mile (average motorized route densities within 7th field watersheds)

Route Density (miles/mi^2)	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
0 Miles/Square Mile	<1%	<1%	<1%	<1%	<1%	<1%	<1%
0-2 Miles/Square Mile	11%	23%	24%	24%	19%	22%	23%
2-4 Miles/Square Mile	53%	71%	71%	71%	72%	72%	71%
4-6 Miles/Square Mile	35%	5%	6%	5%	9%	5%	5%
>6 Miles/Square Mile	1%	1%	0%	1%	1%	1%	1%

Cumulative Effects from All Motorized Routes

200-Meter Zone of Influence. The cumulative effects to OFEAs within a 200-meter Zone of Influence are compared for the proposed alternatives (Table 3.03-54). When comparing the relative cumulative effects to OFEAs within a 200-meter Zone of Influence by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions, Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 55%) that poses the greatest risk to habitat connectivity and other negative cumulative impacts associated with motorized routes within OFEAs due to approximately 17% of OFEAs that are influenced by motorized cross country travel, including continued use of existing unauthorized routes. In addition, Alternative 1 would contribute significantly to the continued proliferation of unauthorized routes because unmanaged cross country motorized travel would continue into the future and would have a high likelihood of increasing.

The action alternatives would directly and indirectly affect either none or only a very small amount of Tahoe NF OFEAs (0-2%) from the addition of motorized route additions and reopened ML 1 roads. Only Alternative 5 proposes to reopen ML 1 roads. Therefore, habitat fragmentation within OFEAs for the action alternatives would be reduced compared to Alternative 1. Cumulative effects would be slightly increased for Alternatives 2, 5, 6, and 7. Alternatives 3 and 4 would not contribute to cumulative impacts since motorized route additions nor would reopening of ML roads be proposed. Overall cumulative impacts for the action alternatives would be beneficial compared to Alternative 1, where 15-17% of OFEAs would have reduced habitat fragmentation from the prohibition of motorized cross country travel, including on existing unauthorized routes.

Table 3.03-54. Cumulative Effects to Old Forest Emphasis Areas within a 200-meter Zone of Influence of All Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of proposed alternatives							
Proposed Motorized route additions to NFTS (negative impact)[1]	17%	1%	0%	0%	1%	1%	<1%
Reopened ML 1 Roads (negative)	0%	0%	0%	0%	1%	0%	0%
Unauthorized Routes where cross country travel would be prohibited (positive)	0%	16%	17%	17%	16%	16%	17%
Cumulative Effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	24%	24%	24%	24%	24%	24%	24%
Existing routes on non-NFS lands (private) (negative impact)	10%	10%	10%	10%	10%	10%	10%
Existing non-motorized routes (negative impact)[2]	4%	4%	4%	4%	4%	4%	4%
Decommissioned routes (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**55%**	**39%**	**38%**	**38%**	**40%**	**39%**	**38%**

[1]Motorized Route additions- Alternative 1 includes unauthorized routes with continued cross country travel, while all the action alternatives includes motorized route additions to the NFTS.

[2]Non-motorized-assumption: non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60 meters

Overall Cumulative Effects from Past, Present and Reasonably Foreseeable Future

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on NFS lands and private lands within the Tahoe NF boundary. Some, but not all, of these activities would contribute to impacts to late-seral coniferous forest associated species within the cumulative effects boundary. See overall cumulative effects for spotted owl for a summary of cumulative effects from past, present, and reasonably foreseeable projects for all late-seral coniferous forest species.

Compliance with the Forest Plan and Other Direction

The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified the following standards and guidelines applicable to habitat connectivity for old forest associated species, including the California spotted owl, Northern goshawk, American marten, and Pacific fisher.

1. Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest-associated species (particularly fisher and marten) in biological evaluations (standard and guideline 27).

   All of the action alternatives reduce fragmentation of old forest habitat. The Biological Evaluation for old forest (late-seral) - associated species, including the California spotted owl, Northern goshawk, American marten, and the Pacific fisher determined that the action alternatives for the Tahoe NF Travel Management Project may affect individual species, but would not lead to a downward trend toward federal listing.

2. Assess the potential impact of projects on the connectivity of habitat for old forest associated species standard and guideline 28).

The analysis conducted as described in the above sections, indicated that the action alternatives all reduce habitat fragmentation for old forest (late-seral) – associated species, by prohibiting motorized cross country travel on 394,847 acres within Old Forest Emphasis Areas, 267,952 acres within CWHR 4M, 4D, 5M, 5D, and 6 habitat types, and 396,602 acres within the Tahoe NF Forest Carnivore Network; all which are important habitats for old forest (late-seral) associated species.

Alternative 1 complies the least with the LRMP direction for minimizing habitat fragmentation, by allowing the continuance of cross country travel within OFEAs, CWHR 4M, 4D, 5M, 5D, and 6 habitat types, and the Tahoe NF Forest Carnivore Network on over 250,000 acres. In addition, Alternative 1 directly, indirectly, and cumulatively affects the greatest amount of habitat for old forest-associated species from the continuance of cross country travel, including on unauthorized routes. Alternative 3 minimizes fragmentation of old forest habitat the most of all the action alternatives since no motorized route additions to the NFTS are proposed within old forest habitats, and therefore minimizes habitat fragmentation the most of all the action alternatives.

Spotted Owl: Affected Environment

The California spotted owl is designated by the Regional Forester as a Sensitive Species and is identified as a Management Indicator Species on the Tahoe NF. The Tahoe NF has 181 designated California spotted owl Protected Activity Centers. Protected Activity Centers (PACs) are delineated around spotted owl territorial pairs or territorial individuals. Within the polygons of PACs are point locations of known nests or roosts called Activity Centers. The Sierra Nevada Forest Plan Amendment (2004) provides direction to designate Protected Activity Centers and Home Range Core Areas (HRCAs) by using CWHR types 6, 5D, 5M, 4D, and 4M. These CWHR types are in essence considered suitable habitat (nesting and foraging) for California spotted owls. Pure eastside pine types are not considered suitable for California

spotted owls. Currently, there are 294,487 acres suitable spotted owl habitat with CWHR types 6, 5D, 5M, 4D, and 4M on the Tahoe NF (excluding pure eastside pine type).

The Tahoe NF has conducted surveys for spotted owl presence and reproductive status across the forest since the early 1980s. Approximately 85% of suitable habitat has been surveyed on the Tahoe National Forest following R-5 USDA Forest Service Protocol. Based on survey results to date, 181 Protected Activity Centers (PACs) and Home Range Core Areas (HRCA) have been designated covering 184,000 acres within the Tahoe NF administrative boundary. PACs and HRCAs are comprised of the best available habitat encompassing approximately 300 and 700 acres, respectively.

Spotted Owl: Environmental Consequences

Introduction

Gaines et al. (2003) reviewed studies on the northern spotted owl and determined that road and trail associated factors that were likely to affect spotted owls were collisions, disturbance at a specific site, physiological response, edge effects, and snag reduction. These same factors are expected to affect the California spotted owl in a similar way based upon available literature (Verner et al. 1992, Seamans 2005, Blakesley 2003). Since the California spotted owl is the same species as the Northern spotted owl and have similar biological and ecological requirements, both subspecies of spotted owls are expected to behave and respond to disturbance similarly.

Collisions: Collisions with vehicles are known to be a source of mortality for spotted owls. The degree to which this occurs on the Tahoe NF is unknown. However, at least one spotted owl was killed by a vehicle collision on a highway on the Eldorado NF.

Disturbance at a Specific Site: The Forest Service considers activities greater than 0.25 miles (~400 meters) from a spotted owl nest site to have little potential to affect spotted owl nesting. In addition, Delaney et al. (1999) found that Mexican spotted owls were found to show an alert response to chainsaws at distances less than 0.25 miles. 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 impacts of motorcycle noise are not conclusive at this point.

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 0.41 km from a major logging road compared to spotted owls in areas greater than 0.41 km from a major logging road. It is not well understood how elevated stress hormones affect spotted populations. However, Marra and Holberton (1998) reported that chronic high levels of stress hormones (corticosterone) may have negative effects on reproduction or physical condition of individual owls. Swarthout and Steidl (2001) found hikers caused

juvenile and adult spotted owls to flush at less than 12meters and less than 24 meters, respectively. Mexican spotted owls did not elicit any response from hikers that exceeded a distance of 55 meters.

Habitat Loss, Fragmentation and Edge Effects: California spotted owls may be affected by edge effects from roads when roads and motorized trails fragment suitable habitat. Several studies indicate the California spotted owl is sensitive to changes in forest canopy closure and habitat fragmentation (Seamans 2005, Blakesley 2003) that could result from a network of roads. Roads and motorized 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 old forest conifer associated species such as the spotted owl.

Snags and down logs are important habitat components for spotted owls, as well as many other species associated with old forest conditions. Forest system roads and motorized trails can contribute to the fragmentation of old forest habitat components through the reduction of snags and logs. Hazard trees are those trees that pose a risk of falling on a road or facility including recreational facilities such as campgrounds, trailheads, etc. Snags along roads used by the public that are considered to be hazard trees would be expected to be removed for public safety. In addition, the amount of logs and snags along roadsides are expected to be reduced from public fuelwood gathering

Spotted Owl Motorized Impact Factors for Analysis

The effects of the alternatives on spotted owls are analyzed for two road and trail associated factors:

- Effects to spotted owls from disturbance at a specific site (nesting habitat within PACs and nest locations).
- Effects to spotted owls from habitat fragmentation and edge effects within a Zone of Influence of motorized routes.

Assumptions for Determining Effects to Spotted Owl

Although the type and amount of use along the different types of routes may result in different effects to spotted owls, all motorized routes are treated equally in this analysis because the relationship between effects and motorized route type and intensity of use is complex and not well understood. For example, the type of motorized road or trail likely varies in how roads and motorized trails contribute to spotted owl disturbance and habitat fragmentation: high clearance roads generally receive less use than roads used by passenger vehicles, which would equate to less noise disturbance to owls, and single track motorcycle trails would likely fragment habitat less than would a passenger road due to the narrower width of the single track motorcycle routes that would result in removing less habitat. However, noise generated from motorcycles along trails may contribute to greater noise disturbance to spotted owls than would a 4x4 jeep. Since impacts to spotted owls are not well understood, impacts from all motorized routes, regardless of motorized route type and intensity of use, are treated the same.

Spotted Owl: Disturbance at a Specific Site

Indicators used to Measure Effects

Cross Country Travel: The acres of cross country travel within spotted owl Protected Activity Centers (PACs) and within 0.25 mile radius of spotted owl nest sites or nest stands are determined for each of the alternatives.

Additions to the NFTS and Changes to the NFTS--Reopened ML 1 Roads: Motorized route additions to the NFTS and Changes to the NFTS from Reopened ML 1 Roads are analyzed to determine how they would impact spotted owl "disturbance to a specific site. Disturbance to spotted owl PACs and nest sites is analyzed for the alternatives at three scales - within 0.25 miles of spotted owl Activity Centers (nest sites or nest groves), within PACs and, and within HRCAs.

- **Nest or Nest Stand (Within a 0.25 miles radius of spotted owl Activity Centers)**: Activity Centers represent known spotted owl nesting locations that may include most recently known nest site or nest stand. The miles of proposed motorized route additions and the miles of reopened ML 1 roads within a 0.25 mile radius of spotted owl Activity Centers are compared by each of the alternatives to display the potential impact to spotted owl breeding sites from noise disturbance and other factors associated with motorized use.
- **Protected Activity Centers (PACs)**: PACs are delineated surrounding each territorial spotted owl activity center detected since 1986. PACs are delineated to include known and suspected nest stands and encompass the best available 300 acres of habitat (2 or more canopy layers, trees in the dominant and co-dominant crown classes averaging 24" dbh or greater, at least 70 percent tree canopy cover, and in descending order of priority, CWHR classes 6, 5D, 5M, 4D, and 4M and other stands with at least 50% canopy cover). The miles of proposed additions to the NFTS and the miles of reopened ML 1 roads within spotted owl PACs are compared to determine how the various alternatives have the potential to impact nesting spotted owls from noise disturbance and other factors associated with motorized use.
- **Home Range Core Areas (HRCAs)**: Delineated California spotted owl Home Range Core Areas (HRCAs) are comprised of approximately 1,000 acres (including the PAC) of the best available spotted owl habitat (SNFPA 2004). For this analysis, the Home Range Core Area is the approximately 700 acres surrounding the ~300 acre core nest area (PAC). HRCAs are delineated to represent spotted owl foraging habitat, whereas, PACs are delineated as spotted owl nesting habitat. The miles of proposed additions to the NFTS and the miles of reopened ML 1 roads within spotted owl HRCAs are compared to determine how the various alternatives have the potential to impact foraging spotted owls from noise disturbance and other factors associated with motorized use.

Spotted Owl: Direct and Indirect Effects (Disturbance at a Specific Site)

Nest Site or Nest Stand (Within 0.25 Mile Radius Circle of Activity Centers)

Cross Country Travel: Nesting spotted owls would considerably benefit from all the action alternatives where 18,535 acres within a ¼ miles radius of a spotted owl activity center (nest site or nest stand) would

be banned from motorized cross country travel, and would have reduced disturbance from motorized activities associated with unmanaged, cross country travel. Under Alternative 1, cross country travel would be allowed to continue on 18,535 acres (within ¼ mile of spotted owl nest locations), where disturbance to spotted owl nesting could occur, potentially altering behavior, causing nest abandonment, and resulting in reproductive failure.

Additions to the NFTS: Table 3.03-55 displays the miles of motorized route additions to the NFTS within 0.25 of spotted owl activity centers (nest site or nest stand) by spotted owl PAC number and route identification number for the action alternatives. The analysis indicates that when considering motorized route additions within proximity to known spotted owl nest sites or nest stands, there are far fewer actual route miles that would potentially affect nesting owls when compared to looking at motorized route additions within the designated spotted owl PAC boundary. The PAC is an administrative boundary that was delineated based on the best available 300 acres of habitat surrounding a known spotted owl nest site or nest stand.

Alternative 1 clearly poses the greatest risk from noise disturbance to breeding owls by allowing motorized cross country travel to continue, including on approximately 41 miles of existing unauthorized motorized routes. When looking at the immediate area around the actual known nest site, it appears direct impacts of disturbance motorized route additions for all the action alternatives are actually quite low. Alternatives 2, 5, 6, and 7 would result in adding between 0.2 and 0.4 miles motorized routes within 0.25 miles of a known spotted owl nest site location affecting only 3 PACs (PC138, SI060, and SI030). Alternatives 3 and 4 would not add motorized routes near nest sites, and therefore no additional disturbance to spotted owl nest site locations would occur. One route (D_49-27_a) is a short spur that provides access to a dispersed recreation site. Depending upon the type of dispersed recreational activity that occurs in association with this route, increased disturbance to the spotted owl nest site for SI030 has the potential to occur.

Table 3.03-55. Miles of Motorized Route Additions within 0.25 miles of Spotted Owl Activity Centers (Nest Site or Nest Stand) by PAC Number and Route ID

PAC Number	Route ID Number	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Numerous PACs	Existing Unauthorized routes	41.1	0	0	0	0	0	0
PC138	ARM-90	0	0	0	0	0	0.2	0
SI060	YRN-2	0	0.2	0	0	0.2	0.2	0.2
SI030	D_49-27_a	0	0.02	0	0	0.02	0.02	0
	Total Miles	**41.1**	**0.22**	**0**	**0**	**0.22**	**0.42**	**0.20**

Reopened ML 1 Roads: As shown in Table 3.03-56, only Alternative 5 proposes to reopen 2.5 miles of ML 1 roads within 0.25 miles of known spotted owl nest sites or nest stands. Only Alternative 5 has the potential to disrupt or disturb spotted owl nesting from activities associated with motorized use on reopened ML 1 roads. The remaining alternatives would not affect nesting spotted owls since they do not propose to reopen any ML 1 roads near nesting areas. The amount of disturbance to nesting owls would depend on the amount and intensity of use and the type of vehicles used.

Table 3.03-56. Miles of Reopened ML 1 Roads within 0.25 Miles of Spotted Owl Activity Center by PAC Number and Road Number

PAC Number	ML 1 Road Number	Alt 1, 2, 3, 4, 6, 7	Alt 5
NV011	H20-8-5	0	0.1
SI019	N25-18-1	0	0.7
SI032	N33-8	0	0.9
SI033	N39-5	0	0.6
SI033	N39-5-1	0	0.2
	Total Miles	**0**	**2.5**

Protected Activity Centers

Cross Country Travel: Spotted owl PACs would considerably benefit from all the action alternatives where 50,712 acres within PACs would be banned from motorized cross country travel, and thereby would have reduced disturbance to nesting spotted owls from motorized activities associated with unmanaged, cross country travel. Under Alternative 1, cross country travel on 50,712 acres within PACs would continue where disturbance to spotted owl nesting could occur, potentially altering behavior, causing nest abandonment, and resulting in reproductive failure.

Additions to the NFTS: Table 3.03-57 displays the miles of motorized route additions to the NFTS within PACs by route identification number, and miles of route additions for the action alternatives. The proposed additions to the NFTS indicate that Alternatives 2, 5, 6, and 7 would affect between 3 and 6 PACs, ranging from 0.1 mile to nearly 1 mile. Alternatives 3 and 4 would not affect any PACs since no routes within PACs are proposed under these alternatives.

Twelve routes that provide access to dispersed recreation sites potentially affect between 5 and 11 additional PACS (Alternatives 2 and 5 – the least, Alternative 6 – the most). However, the length of these dispersed recreation access routes are generally short spurs that range from less than 0.01 mile to 0.05 mile. In sum, the dispersed recreation access routes total approximately 0.15 mile for Alternatives 2 and 5, and total 0.25 mile for Alternative 6.

Table 3.03-57. Miles of Motorized Route Additions by Spotted Owl PAC and Route ID

PAC Number	Route ID Number	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Primary Routes								
Intersects 140 PACs	Unauthorized routes	98						
NV034	H29-11	0	0	0	0	0.1	0	0
PC116	ARM-2	0	0.3	0	0	0.3	0.3	0.3
PC138	ARM-90	0	0	0	0	0	0.5	0
SI015	YRN-M3b	0	0.3	0	0	0.3	0	0.3
SI019	H25-18	0	0	0	0	0.3	0	0
SI050	YRN-M2	0	0.1	0	0	0.1	0	0
SI060	YRN-2	0	0.9	0	0	0.9	0.9	0.9
	Subtotal	**98.1**	**1.6**	**0**	**0**	**2.0**	**1.7**	**1.5**

PAC Number	Route ID Number	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Routes Used to Access Dispersed Recreation Sites								
NV003	D_20-12_c	0	0	0	0	0	0.02	0
NV009	D_14_e	0	0	0	0	0	0.01	0
NV009	D_18-14e	0	0	0	0	0	0.02	0
NV010	D_CA-20_a	0	0	0	0	0	0.02	0
NV024	D_20-13	0	0	0	0	0	0.01	0
NV057	D_20-12_g	0	0	0	0	0	0.01	0
NV062	D_843-9_a	0	<0.01	0	0	<0.01	<0.01	0
PC026	D_96-54	0	0.02	0	0	0.02	0.02	0
PC029	D_96_b	0	0	0	0	0	0.02	0
PC044	D_P-6001_b	0	0.05	0	0	0.05	0.05	0
SI030	D_49-27_a	0	0.02	0	0	0.02	0.02	0
YU001	D_Y-125_a	0	0.05	0	0	0.05	0.05	0
	Subtotal	**0**	**0.15**	**0**	**0**	**0.15**	**0.25**	**0**
	Total Miles	**98.1**	**1.8**	**0**	**0**	**2.2**	**2.0**	**1.5**

Table 3.03-58 displays the total miles of motorized route additions to the NFTS within spotted owl Protected Activity Centers (PACs), and the number and percentage of PACs affected for each of the alternatives. Alternative 1 is clearly a worst case scenario, where cross country motorized travel, including use on approximately 98 miles of existing unauthorized routes, would continue to contribute to direct and indirect impacts to 140 (77%) spotted owl Protected Activity Centers. Alternative 1 could potentially directly and indirectly disturb nesting spotted owls from motorized use on unauthorized routes.

Alternative 6 would affect the next greatest number of PACs (14 of 181 or 8%) from motorized route additions, followed by Alternative 5. Alternatives 5 and 6 each adds approximately 2 miles of motorized routes to the NFTS that could contribute to direct and indirect adverse effects to nesting spotted owls from disturbance associated with motorized vehicle activities. Alternative 2 proposes approximately 2 miles of motorized route additions to the NFTS within 9 PACs (5%).

Alternative 7 would potentially affect 2% or 3 out of 181 Tahoe NF PACs, where less than 2 miles of motorized routes would be added to the NFTS.

Alternatives 3 and 4 do not propose any motorized route additions to the NFTS within spotted owl PACs, and therefore, no direct or indirect effects to nesting spotted owls would occur with the implementation of Alternatives 3 or 4.

Table 3.03-58. Miles of Proposed Motorized route additions to the NFTS within Spotted Owl Protected Activity Centers on the Tahoe NF

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of Proposed motorized route additions	98.1	1.8	0	0	2.2	2.0	1.5
Number of Spotted Owl PACs Intersected by motorized route additions to the NFTS	140	9	0	0	11	14	3
Percent of PACs Affected by motorized route additions to the NFTS (Total Tahoe NF PACs = 181)	77%	5%	0%	0%	6%	8%	2%

Changes to the NFTS-Reopened ML 1 Roads: The miles of reopened ML 1 roads are shown in Table 3.03-59 by PAC Number and ML 1 Road number for each of the alternatives. Alternative 5 would potentially adversely affect the greatest number of spotted owl PACs (12 of 181 or 7%) from approximately 6 miles of reopened ML 1 roads where disturbance to nesting spotted owls has the potential to alter behavior, disrupt nesting, and result in reproductive failure. Alternatives 2, 6, and 7 would be similar in their impacts to nesting spotted owls from reopened ML 1 roads affecting one spotted owl PAC (PC096), totaling approximately one mile. Alternatives 1, 3, and 4 would not affect any spotted owl PACs, since none of the ML 1 roads are proposed for reopening to motorized use.

Table 3.03-59. Miles of Reopened ML 1 Roads within PACs by Spotted Owl PAC Number and Road Number

PAC Number	ML 1 Road Number	Alt 1, 3, 4	Alt 2	Alt 5	Alt 6	Alt 7
NV007	H20-3-5-2-3	0	0	0.1	0	0
NV011	H20-8-5	0	0	0.37	0	0
NV060	H613-8	0	0	0.1	0	0
NV064	H20-2	0	0	0.3	0	0
PC031	N33-6	0	0	1.0	0	0
PC031	N96-12c	0	0	0.7	0	0
PC091	H38	0	0	0.1	0	0
PC096	ARM-13	0	0.9	0.9	1.3	0.9
PC114	H45-2	0	0	0.5	0	0
SI019	N25-18-1	0	0	0.6	0	0
SI029	N39-5	0	0	0.1	0	0
SI032	N27-3	0	0	0.2	0	0
SI033	N39-5	0	0	1.2	0	0
SI033	N39-5-3	0	0	0.1	0	0
	Totals	**0**	**0.9**	**6.1**	**1.3**	**0.9**

Effects to Individual PACs from Route Additions and Reopened ML 1 Roads. The routes proposed to be added to the NFTS and the reopened ML 1 roads (converted from closed to open) contribute a certain amount of disturbance to the activity center on which each PAC is based. Disturbance could result in flushing from nests, roosts, or perches, in alarm responses, and in increased stress hormone levels in individual spotted owls. In the absence of further research, it is assumed that motorized use

along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting owls. Based on that assumption, approximately 2-12% of activity centers would receive some disturbance from routes added to the NFTS and/or routes that would be reopened. Without further research, this analysis assumes that effects within 60 meters (approximately 60 meters) of an activity center will result in negative effects to reproduction over the short term. Therefore, if all the routes proposed to be added to the NFTS or proposed to be reopened are further than 400 meters from the activity center on which a given PAC is based, it is assumed that the routes under this alternative in that PAC would contribute a low level of disturbance to the owls at that activity center. If any of the routes proposed to be added or reopened are between 60 and 400 meters from the activity center on which the PAC is based, it is generally assumed that the routes in that PAC would contribute a moderate level of disturbance to the owls at that activity center. Within certain PACs meeting that criterion, the contribution to disturbance was rated as low for the reasons given below. If any of the routes proposed to be added or reopened are within 60 meters of the activity center, it is assumed that the routes under this alternative in that PAC would contribute a high level of disturbance to the owls at that activity center.

For each of the proposed route additions and reopened ML 1 roads, the relative “LEVEL OF CONTRIBUTION TO DISTURBANCE” to each PACs “activity center” and supporting rationale is shown in Table 3.03-60.

Table 3.03-60 Level of Contribution to Disturbance to Spotted Owl by Specific PAC for Route Additions and Reopened ML 1 Roads

PAC Number	Route	Route Addition	Reopened ML 1 Road	Length (miles)	Alternatives	Level of Contribution to Disturbance	Rationale
PC116	ARM-2	X		0.3	Alts 2, 5, 6, 7	Low	Proposed ATV trail located >400 meters (0.54 miles) from Activity Center, Owls last observed in 2007
PC138	ARM-90	X		0.5	Alts 2, 5, 7	Moderate	Activity Center (2002 pair + fledgling) located <400 meters (0.1 mi) from north end of route ARM-90. 2007 surveys showed pair detection ~ ½ mile north of proposed route.
SI015	YRN-M3b	X		0.3	Alts 2, 5, 7	Low	Proposed motorcycle route addition located >400 meters (0.5 mi) east of 1991 Activity Center (pair detection). No recent surveys. Route parallels eastern boundary of the PAC near the ridge and noise would carry across the canyon where owl detection located. However, vegetation is dense and AC is >400 meters away.
SI019	H25-18	X		0.26 mi	Alt 5	Moderate	Proposed trail located along southwest boundary of PAC, 0.2 mi south of 2007 AC, 2 fledglings in 2007.
SI019	N25-18-1		X		Alt 5	Low	2007 surveys indicated Activity Center (adult + 2 fledglings) located >400 meters (at 0.6 miles) south of southern end of route. Historic 1989 Activity Center <60 meters of route.
SI029	N39-5		X	1.2	Alt 5	High	Route bisects PAC at lower 1/3 and then follows eastern PAC boundary. Majority of route located less than 60 meters from the Activity Center.
SI030	D_49-27_a	X		0.02	Alt 2, 5, 6	Low	Short route (0.02 mi) off of existing NFTS road, located 0.2 mi. west of Activity Center (single male roost site), no documented reproduction.
SI032	N27-3		X	0.2	Alt 5	Low	Route located along western PAC boundary, >400 meters away from Activity Center (Activity Center 0.3 mi from route). Owls last detected in 2007.
SI033	N39-5		X	1.2	Alt 5	Moderate	Route (1 mi) surrounds Activity Center along 3 sides and is less than 400 meters away, with risk of moderate disturbance due to length of route and proximity to Activity Center. Also, increases fragmentation to PAC.

PAC Number	Route	Route Addition	Reopened ML 1 Road	Length (miles)	Alternatives	Level of Contribution to Disturbance	Rationale
SI033	N39-5-3		X	0.1	Alt 5	Low	Short route segment located at southwest edge of PAC is >400 meters from Activity Center.
SI050	YRN-M2	X		0.4 (0.1 mi. within PAC)	Alt 2 & 5	Moderate	Proposed motorcycle trail is located <400 meters (0.2 mi) west of known owl observation. Single male detected in 1990, no recent survey data. Unknown reproductive status and unknown nest location. Route parallels nearly entire western boundary of PAC
SI060	YRN-2	X		0.93	Alt 2, 5, 6, 7	Moderate	~1 mile proposed route located 0.23 miles from known Activity Center, last known reproduction in 1992, surveys conducted in 2008 resulted in finding no owls.
NV003	D-20-12_C	X		0.02	Alt 6	Low	Short route (.02 mi) located >1 mi away from Activity Center and connects 2 existing NFTS roads, nest with young found in 2004.
NV007	H20-3-5-2-3		X	0.1	Alt 5	Moderate	Route located <400 meters (0.2 mi north) from nearest known owl detection
NV009	D_14_e	X		<0.01	Alt 6	Low	Short route (<0.01 mi) off of existing NFTS, located 0.34 mi from known Activity Center.
NV009	D_18-14e	X		0.02	Alt 6	Low	Short route (0.02 mi) off of existing NFTS, 0.7 mi from known Activity Center, successful reproduction documented in 2008
NV010	D_CA-20_a	X		0.02	Alt 6	Low	Short route (0.02 mi) located 0.6 mi. south of Activity Center.
NV011	H20-8-5		X	0.3	Alt 5	Low	Route >400 meters south of Activity Center, however route bisects PAC from one edge of PAC to opposite edge of PAC.
NV024	D_20-13	X		0.01	Alt 6	Low	Short route (0.01 mi) off of existing NFTS road, located >400 meters (0.7 mi north) of AC.
NV034	H29-11	X		0.1	Alt 5	Low	Route located 0.45 mi east of private land Activity Center, owls last observed in 2004
NV057	D_20-12_g	X		0.01	Alt 6	Low	Short route (0.01 mi) located >400 meters of activity center (route is 0.5 mile south of known Activity Center).

PAC Number	Route	Route Addition	Reopened ML 1 Road	Length (miles)	Alternatives	Level of Contribution to Disturbance	Rationale
NV060	H613-8		X	0.06	Alt 5	Low	Over 0.8 mile to south of Activity Center, would not likely increase disturbance, short segment within PAC (0.06 mi).
NV062	D_843-9_a	X		0.002	Alt 2, 5, 6	Low	Short route (0.002 mi) off of existing system road is located 0.4 mi east of Activity Center.
NV064	H20-2		X	0.3	Alt 5	Low	Route > 400 meters (0.5 mile away) from 2008 nest site
PC026	D-96-54	X		0.02	Alt 2, 5, 6	Low	Short route (0.02 mi) off of existing NFTS road located 0.8 mi. east of Activity Center.
PC029	D_96_b	X		0.02	Alt 6	Low	Short route (0.02 mi) located 0.5 mi south of 1992 nest grove (pair w/ fledgling) & 0.7 mi from 1999 nest cavity location).
PC031	N33-6		X	0.1	Alt 5	Low	Route located >400 meters (0.9 mi) from 2007 Activity Center (family group)
PC031	N96-12c		X	0.7	Alt 5	Low	North end of route proposed for reopening located >400 meters (0.36 miles) south of 2007 Activity Center (family group).
PC044	D_P-6001_b	X		0.05	Alt 2, 5, 6	Low	Short route (0.05 mi) comes off of existing NFTS road, located 0.5 miles from Activity Center.
PC091	H38		X	0.1	Alt 5	Low	Route follows southeast edge of PAC boundary, located 0.9 mi from 1991 Activity Center.
PC096	ARM-13		X	0.7	Alt 5, 6, 7	Low	ARM-13 located in portion of PAC that burned in Government Fire of 2008. 2007 pair location is 0.06 mi from route within burned area. Habitat where route and 2007 pair location is no longer suitable.
PC114	H45-2		X	0.4	Alt 5	Moderate	Proposed route (0.4 mi) located at 400 meters away from 1994 Activity Center. Route bisects center of PAC and lies directly parallel to 2 existing system routes. Would increase disturbance in the PAC and increase habitat fragmentation.
YU001	D_Y-125_a	X		0.05	Alt 2, 5, 6	Low	Short route (0.05 mi) comes off of existing NFTS road, located 0.4 mile from Activity Center

Summary of Individual PAC Analysis

Table 3.03-61 summarizes the potential risk of increased disturbance to spotted owl activity centers (181 Total TNF PACS), as a result of motorized route additions and reopened ML 1 roads. Alternatives 3 and 4 would not affect increase disturbance to spotted owls within any PAC, since no routes or reopening of ML 1 road would be proposed. Alternatives 7, 2, 6, and 5 would potentially increase disturbance to spotted owl activity centers within PACs, in increasing order, ranging from approximately 3% to 13%. Only Alternative 5 would add routes or reopen ML 1 roads that would result in a "high" risk of increased disturbance where a route would be added or reopened ML 1 road would occur within 60 meters (200 feet) of a spotted owl activity center. The remaining action alternatives would result in either a low or moderate risk of increased disturbance from the addition of routes or reopening ML 1 roads. In both the low and moderate risk categories, Alternative 5 would result in the most number of PACs (22 of 181 or 12%) potentially affected by increased disturbance (7 of 181 PACs or 3% @moderate risk, 15 of 181 PACs or 8% PACs at low risk), followed by Alternative 6 (1 of 181 PACs or <1% @moderate risk, 14 of 181 PACs or 8% @low risk), Alternative 2 (3 of 181 PACs or 2% @moderate risk, 7 of 181 PACs or 4% @low risk), and Alternative 7 (2 of 181 PACs or 1% @ moderate risk, 3 of 181 PACs or 2% @ low risk).

Table 3.03-61. California spotted owl: summary of risk of increased disturbance to Activity Centers within PACs

		Alt 1		Alt 2		Alt 3, 4		Alt 5		Alt 6		Alt 7	
Risk of increased disturbance effects	**Rationale**	**No. PACs**	**% of Total**	**No. PACs**	**% of Total**	**No. PACs**	**% of Total**	**No. PACs**	**% of Total**	**No. PACs**	**% of Total**	**No. PACs**	**% of Total**
HIGH	Route added or reopened ML 1 road within 60 meters (200 feet) of activity center	0	0	0	0%	0	0%	1	0.6%	0	0%	0	0%
MOD	Routes added or reopened ML 1 roads occurring less than 400 meters (1/4 mi) and more than 200 feet from activity center, and no intervening topography	0	0	3	1.7%	0	0%	7	2.8%	1	0.6%	2	1.1%
LOW	All routes added or reopened ML 1 roads greater than 400 meters from activity center.	0	0	7	3.9%	0	0	15	8.3%	14	7.7%	3	1.7%
HIGH	PACs where cross country travel continued, including on unauthorized routes	175	96.7%	0	0%	0	0%	0	0%	0	0%	0	0%
DECREASE	Total PACs where a decrease in disturbance would occur from the prohibition of cross country travel, including on unauthorized routes	0	0	175	96.7%	175	96.7%	175	96.7%	175	96.7%	175	96.7%
Total PACs in which routes are added and/or being converted from closed ML 1 roads to open		**0**	**0**	**10**	**5.5%**	**0**	**0%**	**23**	**12.7%**	**15**	**8.3%**	**5**	**2.8%**
Total PACs Where cross country travel continued		**175**	**96.7%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
Total PACs with decreased disturbance from the prohibition of cross country travel, including on unauthorized routes		**0**	**0**	**175**	**96.7%**	**175**	**96.7%**	**175**	**96.7%**	**175**	**96.7%**	**175**	**96.7%**

Home Range Core Areas (HRCAs)

Cross Country Travel: Spotted owl HRCAs would considerably benefit from all the action alternatives where 98,806 acres within HRCAs would be banned from motorized cross country travel, and would reduce disturbance to foraging spotted owls from motorized activities associated with motorized cross country travel. Under Alternative 1, cross country travel on 98,806 acres within HRCAs would continue where disturbance to spotted owl foraging could occur, potentially altering behavior, reducing fitness, and potentially affecting reproductive success.

Additions to the NFTS: Table 3.03-62 displays the miles of motorized route additions and the number and percentage of Tahoe NF HRCAs affected by alternative. Clearly Alternative 1 represents a worst case scenario for spotted owls when looking at the motorized route effects at the HRCA scale. Alternative 1 would potentially affect 164 out of 181 HRCAs (91%) from motorized use on approximately 282 miles of existing unauthorized routes. The No Action Alternative definitively could result in significant direct and indirect disturbance to foraging spotted owls from continued use of unauthorized routes.

All the remaining action alternatives would significantly reduce the impacts of existing unauthorized routes. Alternative 3 would not affect any HRCAs since no routes within HRCAs are proposed, and therefore no effects to foraging owls would occur.

The remaining action alternatives would directly and indirectly affect between 5 and 23% spotted owl HRCAs, from 6 to 15 miles of motorized route additions. Alternative 6 would affect the greatest number and percentage of HRCAs. However, Alternative 5 would result in the next greatest number of miles of motorized routes within HRCAs, followed by Alternatives 2, 6, 7, 4, and 3, in descending order.

Table 3.03-63, which displays the motorized miles added by HRCAs and route ID numbers, helps to disclose the subtle differences between the action alternatives. When looking at the total miles of routes added, Alternative 5 results in adding the greatest number of motorized miles that would potentially affect foraging owls within 34 HRCAs, where a total of 15 miles would be added (14 miles added for general motorized opportunities, 1 mile added to access 34 dispersed recreation sites).

Alternative 2 would add the next greatest motorized miles within 31 HRCAs affecting foraging owls, where a total of 13 miles would be added (12 miles general use, 1 mile for dispersed sites).

Under Alternative 6, the majority of motorized route additions which intersect HRCAs are routes that access dispersed sites (25 out of 41 HRCAs intersected) for a total of about 1 mile. Each of the routes accessing these dispersed recreation areas are short spurs that add up to a total over 1 mile. Alternative 6 would affect 16 HRCAs where increased disturbance to foraging owls would occur from adding about 10 miles for general motorized use.

Table 3.03-62. Miles of Motorized Route Additions to the NFTS within Tahoe NF Spotted Owl HRCAs

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of motorized route additions	281.7	13.3	0	6.2	14.8	11.0	7.6
Number of HRCAs Intersected by motorized route additions to the NFTS	164	31	0	15	34	41	9
Percent of HRCAs Affected by motorized route additions (Total Tahoe NF HRCAs = 181)	91%	17%	0%	8%	19%	23%	5%

*Alternative 1 includes existing unauthorized routes with the continuance of cross country travel.

Table 3.03-63. Miles of Motorized Route Additions by HRCAs and Route ID

HRCA ID Number	Route ID	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
General Routes								
Numerous HRCA s	Unauthorized Routes	281.7	0	0	0	0	0	0
NV012	YRS-SF4	0	0	0	0	0.82	0	0
NV012	H20-16-2-7	0	0	0	0	0.21	0	0
NV015	YRS-B10	0	0.26	0	0	0.26	0	0
NV017	YRS-SF6	0	0	0	0	0.26	0	0
NV017	H29-11	0	0	0	0	0.09	0	0
NV017	YRS-SF6	0	0.32	0	0.32	0.32	0.32	0.32
NV017	YRS-SF6b	0	0.86	0	0.86	0.86		0.86
NV017	YRS-66	0	0.22	0	0	0.22	0.22	0
NV019	YRS-SF4	0	0.82	0	0	0.82	0.82	0
NV019	YRS-SF5	0	0.39	0	0	0.39	0.39	0.39
NV024	YRS-B5	0	2.46	0	0	2.46	2.46	0
NV024	YRS-B10	0	0.26	0	0	0.26	0	0
NV034	YRS-SF5	0	1.82	0	1.82	1.82	1.82	1.82
PC020	ARM-2	0	0.32	0	0	0.30	0.32	0.30
PC082	ARM-3r	0	2.71	0	2.71	2.71	2.19	2.71
SI015	YRN-M3b	0	0.81	0	0	0.81	0	0.81
SI029	491-3-2_p	0	0	0	0	0.05	0.05	0
SI030	H34-8-3	0	0	0	0	0.02	0	0
SI033	491-3-2_p	0	0	0	0	0.05	0.05	0
SI049	YRN-M3b	0	0.20	0	0	0.20	0.20	0
SI050	YRN-M2	0	0.46	0	0	0.46	0	0
SI052	YRN-001	0	0.06	0	0	0.06	0.06	0
SI060	YRN-2	0	0.06	0	0	0.01	0.06	0.06
SI093	YRM-M4	0	0.35	0	0	0.345	0.35	0.35
Subtotal for General Routes		**281.7**	**12.4**	**0**	**5.7**	**13.9**	**9.8**	**7.6**

HRCA ID Number	Route ID	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Routes that Access Dispersed Recreation Sites								
NV057	D_20-9_b	0	0	0	0	0	0.02	0
NV064	D_20-3_b	0	0	0	0	0	0.03	0
NV070	D_41-20-10_a	0	0.02	0	0	0.02	0.02	0
NV070	D_41-20-10_b	0	0.02	0	0	0.02	0.02	0
PC027	D_96-54	0	0.02	0	0	0.03	0.02	0
PC028	D_P88_b	0	<0.01	0	<0.01	<0.01	<0.01	0
PC029	D_96_b	0	0	0	0	0	0.02	0
PC088	D_P88_b	0	<0.01	0	<0.01	<0.01	<0.01	0
PC094	D_96_b	0	0	0			0.03	0
PC096	D_P88_c	0	0.03	0	0.03	0.03	0.03	0
PC097	D_P88_b	0	<0.01	0	<0.01	<0.01	<0.01	0
PC118	D_96_b	0	0	0	0	0	0.03	0
PC0125	D_96_b	0	0	0	0	0	0.03	0
PC141	D_96-54	0	0.02	0	0	0.02	0.02	0
SI001	D_S-300_a	0	0.08	0	0.084	0.08	0.08	0
SI001	D_S-300_b	0	0.01	0	0.012	0.01	0.01	0
SI016	D_11E02_a	0	0.04	0	0	0.04	0.04	0
SI016	D_11E02_b	0	0.08	0	0	0.08	0.08	0
SI021	D_S-514_A	0	0.04	0	0	0.04	0.04	0
SI026	D_S-295_c	0	0.01	0	0.009	0.01	0.01	0
SI026	D_S300_b	0	0.10	0	0.100	0.10	0.10	0
SI031	D_Y-122_a	0	0.02	0	0.022	0.02	0.02	0
SI040	D_9-15_a	0	0	0	0	0	<0.01	0
SI040	D_9-15_b	0	0	0	0	0	0.04	0
SI041	D_5688	0	0	0	0	0	<0.01	0
SI052	D_11E20	0	0	0	0	0	0.01	0
SI056	D_11E02a	0	0.06	0	0	0.06	0.06	0
SI056	D_11E02b	0	0.08	0	0	0.03	0.08	0
SI064	D_S-301_a	0	0.11	0	0.11	0.11	0.11	0
SI089	D_34_b	0	0.01	0	0.008	0.008	0.008	0
SI089	D_34_c	0	0.02	0	0.021	0.021	0.021	0
SI095	D_7-30_b	0		0	0	0	0.016	0
YU018	D_Y-122_a	0	0.02	0	0.022	0.022	0.022	0
YU023	D_Y-122_a	0	<0.01	0	0.003	0.003	0.003	0
YU023	D_Y-122_b	0	0.03	0	0.033	0.033	0.033	0
YU023	D_Y-122_c	0	0.00	0	0.040	0.040	0.040	0
YU023	D_Y-125_a	0	0.054	0	0	0.054	0.054	0

HRCA ID Number	Route ID	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
NV003	D_20-12-1a	0	0	0	0	0	0.011	0
NV003	D_20-12-1b	0	0	0	0	0	0.011	0
NV003	D_20-12_b	0	0	0	0	0	0.012	0
NV003	D_20-12_D	0	0	0	0	0	0.009	0
NV003	D_20-9_b	0	0	0	0	0	0.018	0
NV009	D_18-14_e	0	0	0	0	0	0.010	0
NV010	D_20-9_b	0	0	0	0	0	0.018	0
Subtotal for Routes to Dispersed Sites		**0**	**0.93**	**0**	**0.49**	**0.93**	**1.23**	**0**
Total All Routes		**281.7**	**13.3**	**0**	**6.2**	**14.8**	**11.0**	**7.6**

Changes to the NFTS-Reopened ML 1 Roads: The miles of reopened ML 1 roads are shown in Table 3.03-64 by HRCA ID Number and ML 1 Road Number for each of the alternatives. Alternative 5 would potentially adversely affect the greatest number of spotted owl HRCAs (19 of 181 or 10% of Tahoe NF HRCAs) from approximately 11 miles of reopened ML 1 roads where disturbance to foraging spotted owls has the potential to alter behavior, disrupt foraging, and potential affect reproductive success. Alternatives 6, 2, and 7 would also affect HRCAs used for foraging, from reopened ML 1 roads, but to a much lesser extent than Alternative 5. Alternative 6 would reopen about 1.5 miles of ML 1 roads within HRCAs, followed next by Alternative 2 and 7 with 1 mile and 0.1 mile of ML 1 roads reopened, respectively. Alternatives 1, 3, and 4 would not affect any spotted owl HRCAs used for foraging, since none of the ML 1 roads are proposed for reopening to motorized use under these alternatives.

Table 3.03-64. Miles of Reopened ML 1 Roads within HRCAs by HRCA ID Number and Road Number

HRCA ID Number	ML 1 Road Number	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
NV006	H20-2	0	0	0	0	1.2	0	0
NV006	H20-2-1	0	0	0	0	0.1	0	0
NV010	H20-8-5	0	0	0	0	0.4	0	0
NV015	YRS-B12	0	0.1	0	0	0.1	0.1	0
NV019	H20-16-2-7	0	0	0	0	0.2	0	0
NV024	YRS-B12	0	0.1		0.1	0.1	0.1	0.1
NV064	H20-2	0	0	0	0	0.9	0	0
NV064	H20-2-1	0	0	0	0	0.1	0	0
PC025	N44-22-8-1	0	0	0	0	<0.1	0	0
PC031	N33-8	0	0	0	0	0.3	0	0
PC031	N96-12c	0	0	0	0	0.4	0	0
PC091	H38	0	0	0	0	0.2	0	0
PC096	ARM-13	0	0	0	0	0	0.2	0
SI014	N35-10	0	0	0	0	0.6	0	0
SI014	N25-15-2	0	0	0	0	0.2	0	0
SI019	N25-18-1	0	0	0	0	0.5	0	0
SI019	N27-9	0	0	0	0	0.1	0	0

HRCA ID Number	ML 1 Road Number	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
SI020	N25-19-1	0	0	0	0	0.2	0	0
SI024	N25-2	0	0	0	0	0.1	0	0
SI024	N25-4-2	0	0	0	0	0.4	0	0
SI024	N25-4-2-2	0	0	0	0	<0.1	0	0
SI029	N39-5	0	0	0	0	0.4	0	0
SI029	N39-7	0	0	0	0	0.1	0	0
SI029	491-3_p	0	0	0	0	0.2	0.2	0
SI032	N27-3	0	0	0	0	0.5	0	0
SI032	N27-4	0	0	0	0	<0.1	0	0
SI032	N27-5	0	0	0	0	<0.1		0
SI033	N39-5	0	0	0	0	1.2		0
SI033	N39-5-1	0	0	0	0	0.2		0
SI033	N39-5-2	0	0	0	0	0.4		0
SI033	N39-5-4	0	0	0	0	0.2		0
SI033	N39-6	0	0	0	0	<0.1		0
SI033	N39-7	0	0	0	0	<0.1		0
SI033	491-3_p	0	0	0	0	0.2	0.2	0
SI064	H301-6	0	0	0	0	0.7		0
SI095	SV-005	0	0.6	0	0	0.6	0.6	0
	Total Miles	**0**	**0.8**	**0**	**0**	**10.9**	**1.5**	**0.1**

Cumulative Effects to Nesting Spotted Owl

Cumulative Effects Boundary (space and time)

The cumulative density of motorized routes increases within the larger cumulative effects analysis area that includes private lands within the Forest. The cumulative effects geographic boundary for the California spotted owls includes all spotted owl Protected Activity Centers and their associated Activity Centers (nest site or nest stand) within the boundary of the Tahoe NF. This is an appropriate scale for determining cumulative effects to spotted owls, since the Tahoe NF boundary is sufficiently large which includes 181 spotted owl territories and their home ranges across the Forest. In addition, the Tahoe NF boundary encompasses an array of spotted owl habitat conditions from low elevation to high elevation, including several vegetation types from westside mixed conifer, ponderosa pine, true fir, and eastside mixed conifer. The cumulative effects timeframe is the same as other species: 20 years out into the future and approximately 20 years or more into the past.

General Cumulative Effects of Past and Future Vegetation Management Projects and Wildfires

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on Forest Service system lands and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the California spotted owl within the cumulative effects boundary. In its Notice of Finding on a petition to list the

California spotted owl, the U.S. Fish and Wildlife Service indicated that loss of habitat to stand replacing wildfires and habitat modification for fuels reduction were the primary risk factors to California spotted owls occurring on NFS lands (USDI Fish and Wildlife Service 2006).

Between 1994 and 2008, wildfires resulted in burning 7,312 acres of spotted owl habitat (2,643 PAC acres; 4,669 HRCA acres outside PACs) affecting 24 spotted owl territories.

High and moderate severity burn areas generally resulted in a loss of habitat or a reduction in habitat quality. For example, within the 2001 Star Fire at least one spotted owl territory PAC was severely burned and the habitat was rendered unsuitable for nesting. Other spotted owl territories have experienced low severity burns and resulted in maintaining suitable nesting habitat conditions.

Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all have resulted in impacts to spotted owl habitats. Between 2001 and 2008, about 17,000 acres of forest vegetation and fuels thinning and mastication projects were completed, which were designed to reduce the risk of additional habitat loss to wildfires. These treatments generally do not result in habitat removal, but may result in habitat quality changes. Between 1960 and present, private land harvest within the boundaries of the Tahoe NF has resulted in over 87,000 acres of vegetation treatments including clearcuts, sanitation, shelterwood, and thinning. Much of the private land harvest has resulted in the loss or reduction in spotted owl habitat. These wildfires and vegetation treatment projects have resulted in a reduction in the amount and quality of spotted owl habitat on the Tahoe NF since 1960.

Thinning projects designed to reduce hazardous fuels will continue to be the primary activity affecting spotted owl habitat on the Tahoe (see Appendix H, Reasonably Foreseeable Projects and Cumulative Effects). Although these treatments may reduce habitat quality (i.e. nesting habitat reduced to foraging habitat), it expected that suitable habitat will be maintained, and it is anticipated that these treatments will reduce the amount spotted owl habitat potentially lost from future stand replacing wildfires (USDA Forest Service 2004). The California Department of Forestry and Fire Protection currently lists approximately 12,000 acres of private land within the Tahoe NF 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 in a suitable condition for spotted owls.

Assessing Cumulative Effects from Motorized Route Additions and Reopened ML 1 Roads

Cumulative effects to breeding spotted owls are assessed by determining the sum total miles of all motorized routes (existing, additions, and reopened) and non-motorized routes on the Tahoe NF including NFS lands and non-NFS lands (private) within spotted owl PACs and within 0.25 mile radius of spotted owl Activity Centers. For each alternative, cumulative effects are calculated by adding the total miles of proposed motorized route additions and reopened ML 1 roads (direct and indirect impacts) to the existing motorized routes (NFS lands and non-NFS lands) and non-motorized routes, then subtracting any routes that are either classified as “unauthorized routes” or “decommissioned.” Unauthorized motorized routes and decommissioned routes are subtracted from the total of all motorized routes because these routes would not receive motorized use, and therefore would not contribute to noise disturbance to breeding spotted owls. Although non-motorized routes are likely to have lesser impacts to spotted owls compared

to motorized routes, non-motorized routes are included in this analysis because non-motorized routes potentially may pose some level of disturbance to nesting owls depending on the level and duration of use during the breeding season.

Nest Site or Nest Stand (Within 0.25 mile Radius of Activity Centers)

When analyzing the cumulative route effects within the 0.25 mile radius circle of spotted owl activity centers (nest site or nest stand), it can be noted that a similar theme emerges as compared to the cumulative effects within spotted owl PACs. Alternative 1 has the most cumulative miles (124 miles) of motorized and non-motorized routes compared to the rest of the alternatives (range 83 to 86 miles) (Table 3.03-65). Of the action alternatives, Alternative 5 has the next highest cumulative route miles of 86 miles, where 0.2 miles are the result of motorized route additions and 2.5 miles are the result of reopened ML 1 roads. The remaining action alternatives each approximately have about 83 cumulative route miles within the 0.25 mile radius analysis circle. However, Alternatives 2, 6, and 7 would result in adding from 0.2 to 0.4 miles of motorized routes within the 0.25 mile radius circle. Alternatives 3 and 4 would not result in adding or reopening motorized routed, and therefore would have no effect on nesting spotted owls within 0.25 miles of the activity centers.

The potential for cumulative route effects to an owl nest site or nest grove site is very low for all the action alternatives; therefore, it can be concluded that implementing any of the action alternatives would have no or only minimal additional cumulative impact to nesting spotted owls across the Tahoe NF compared to Alternative 1. Alternative 1 clearly poses the greatest cumulative risk to nesting spotted owls by allowing continued cross country motorized travel, including motorized travel on approximately 41 miles of existing unauthorized motorized routes, followed by Alternative 5, which proposes to increase motorized route miles by about 3 miles within 0.25 miles of spotted owl activity centers, which may disturb, disrupt and cause nest failure.

All of the action alternatives would prohibit motorized cross country travel on 18,535 acres within a 0.25 mile radius of spotted owl activity centers (nest site or nest stand), where the potential for direct disturbance and habitat fragmentation within close proximity to nesting owls would be reduced.

Table 3.03-65. Cumulative Miles of Routes within a .25 Mile Radius Circle of Spotted Owl Activity Centers (Nest/Roost Sites)

Route Miles	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized Route additions (negative impact)[1]	41.1	0.2	0	0	0.2	0.4	0.2
Reopened ML 1 roads (negative impact)	0	0	0	0	2.5	0	0
Unauthorized routes where cross country travel would be prohibited (positive impact)	0	40.9	41.1	41.1	38.4	40.7	40.9
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	62.4	62.4	62.4	62.4	62.4	62.4	62.4
Existing routes on non-NFS lands (private) (negative impact)	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Existing non-motorized routes (negative impact)	8.3	8.3	8.3	8.3	8.3	8.3	8.3
Existing Closed routes (positive impact)	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Decommissioned routes (positive impact)	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Net Cumulative Effect[2]							
Miles of All Motorized Routes (overall negative impacts)[2]	124.3	83.4	83.2	83.2	85.9	83.6	83.4

[1] Alternative 1 includes existing unauthorized routes associated with the continuance of cross country travel.

[2] Net Cumulative Impact = Sum Total of Impacts both positive and negative

Cumulative Effects to Nesting Owls within Protected Activity Centers

When considering the cumulative effects of all motorized and non-motorized routes on both NFS lands and non-NFS lands, Alternative 1 has the greatest cumulative miles of routes (294 miles) within spotted owl PACs on the Tahoe NF, and therefore poses the greatest overall potential risk and cumulative impacts to breeding spotted owls on the Tahoe NF (Table 3.03-66) (Figure 3.03-4). Alternative 1 exceeds all the action alternatives in the number of cumulative route miles by approximately 80-100 miles. Given the magnitude of potential effects upon spotted owl nest sites and habitat, and considering the projections for future increases in recreation uses and OHV activity, Alternative 1 may, over time, contribute to cumulative effects upon spotted owl distribution and abundance, and ultimately may affect population numbers. Because Alternative 1 does not prohibit motorized cross country travel on 50,712 acres of spotted owl PACs, it is expected that cumulative effects to spotted owl PACs would increase due to unmanaged cross country travel in the future.

Alternative 5 would have the next highest cumulative impacts to breeding spotted owls, resulting in 214 miles within spotted owl PACs. Alternatives 2, 6, and 7 would have similar route miles and slightly fewer miles than Alternative 5. Alternatives 3 and 4 do not add to existing cumulative impacts, since no motorized routes within PACs are proposed to be added to the NFTS. All the action alternatives would benefit from the ban of motorized cross country travel on total of 52,790 acres within spotted owl PACs (2,078 existing prohibitions, 50,712 proposed prohibitions).

Table 3.03-66. Cumulative Miles of Motorized and Non-motorized Routes within Spotted Owl Protected Activity Centers

Cumulative Miles	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized Route Additions (negative impact)[1]	98.1	3.2	0	0	12.5	2.5	2.3
Reopened ML 1 Roads (negative impact)	0	0.9	0	0	6.1	1.3	0.9
Cross Country Travel Prohibition on Unauthorized routes (positive impact)	5.7	101.0	103.8	103.8	95.5	100.5	101.3
Cumulative effects of past, present, and proposed actions							
Existing Routes on NFS lands (negative)	161.4	161.4	161.4	161.4	161.4	161.4	161.4
Existing Routes on non NFS lands (private) (negative)	12.8	12.8	12.8	12.8	12.8	12.8	12.8
Non-motorized routes (negative)	21.2	21.2	21.2	21.2	21.2	21.2	21.2
Decommissioned Routes (positive)	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Net Cumulative Effect[2]							
Total Miles (overall cumulative effect)	**293.5**	**199.5**	**195.4**	**195.4**	**214.0**	**199.2**	**198.6**

[1]Alternative 1 includes existing unauthorized motorized routes associated with the continuance of cross country travel.

[2] Net Cumulative Impact = Sum Total of Impacts both positive and negative

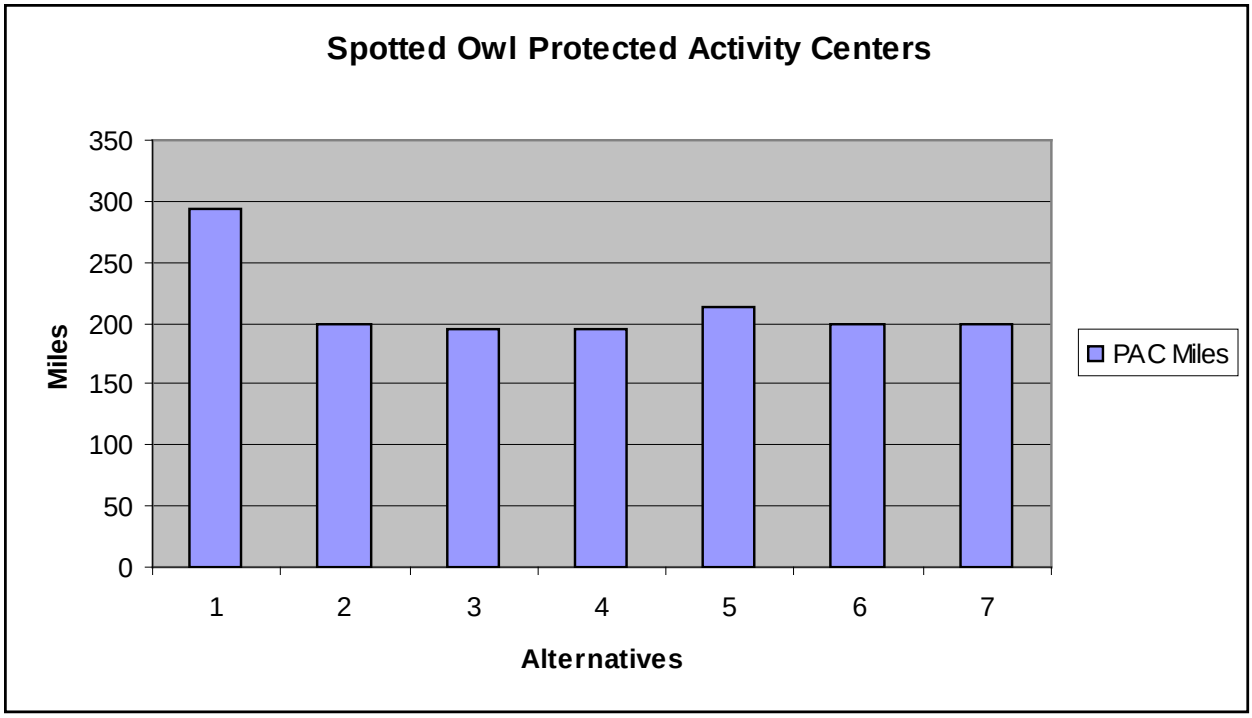

Figure 3.03-4. Cumulative Motorized Miles in Spotted Owl PACs

Cumulative Effects to Foraging Spotted Owls within Home Range Core Areas

Under Alternative 1, the cumulative effects of all motorized and non-motorized routes on both NFS lands and non-NFS lands, has the greatest cumulative miles of routes 761 miles) within spotted owl HRCAs on the Tahoe NF, and therefore poses the greatest overall potential risk and cumulative impacts to foraging

spotted owls on the Tahoe NF (Table 3.03-67) (Figure 3.03-5). Alternative 1 exceeds all the action alternatives in the number of cumulative route miles by approximately 256 to 282 miles. Given the large extent of potential adverse direct and indirect effects to spotted owls and their foraging habitat within HRCAs, and considering the estimates for future increases in recreation uses and OHV activity, Alternative 1 may, over time, contribute to cumulative adverse effects upon spotted owl distribution and abundance, and may ultimately result in downward population numbers. Because Alternative 1 does not prohibit motorized cross country travel on 98,806 acres within spotted owl HRCAs on the Tahoe NF, it is expected that adverse cumulative effects to spotted owl HRCAs would increase due to unmanaged cross country travel in the future, and may affect spotted owls ability to forage successfully and thrive.

Alternative 5 would have the next highest cumulative impacts from disturbance and habitat fragmentation to foraging spotted owls, resulting in 505 cumulative miles within spotted owl HRCAs. In descending order, Alternatives 2, 6, 7, 4, and 3 would result in slightly fewer cumulative miles within HRCAs than Alternative 5, ranging from 493 to 479 miles. All the action alternatives would substantially benefit from the ban of motorized cross country travel on total of 104,365 acres within spotted owl HRCAs (5,559 existing prohibitions, 98,806 proposed prohibitions).

Table 3.03-67. Cumulative Miles of Motorized and Non-motorized Routes within Spotted Owl Home Range Core Areas

Cumulative Miles	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized Route Additions (negative impact)[1]	281.7	13.3	0	6.2	14.8	11.0	7.6
Reopened ML 1 Roads (negative impact)	0	0.8	0	0	10.9	1.5	0.1
Cross Country Travel Prohibition on Unauthorized routes (positive impact)	0	267.6	281.7	275.5	256.0	269.2	274.0
Cumulative effects of past, present, and proposed actions							
Existing Routes on NFS lands (negative)	413.5	413.5	413.5	413.5	413.5	413.5	413.5
Existing Routes on non NFS lands (private) (negative)	18.1	18.1	18.1	18.1	18.1	18.1	18.1
Non-motorized routes (negative)	47.5	47.5	47.5	47.5	47.5	47.5	47.5
Decommissioned Routes and Closed ML 1 Roads (positive)	28.3	28.3	28.3	28.3	28.3	28.3	28.3
Net Cumulative Effect[2]							
Total Miles (overall cumulative effect)	**760.8**	**493.2**	**479.1**	**485.3**	**504.8**	**491.6**	**486.8**

[1]Alternative 1 includes existing unauthorized motorized routes associated with the continuance of cross country travel.

[2] Net Cumulative Impact = Sum Total of Impacts both positive and negative

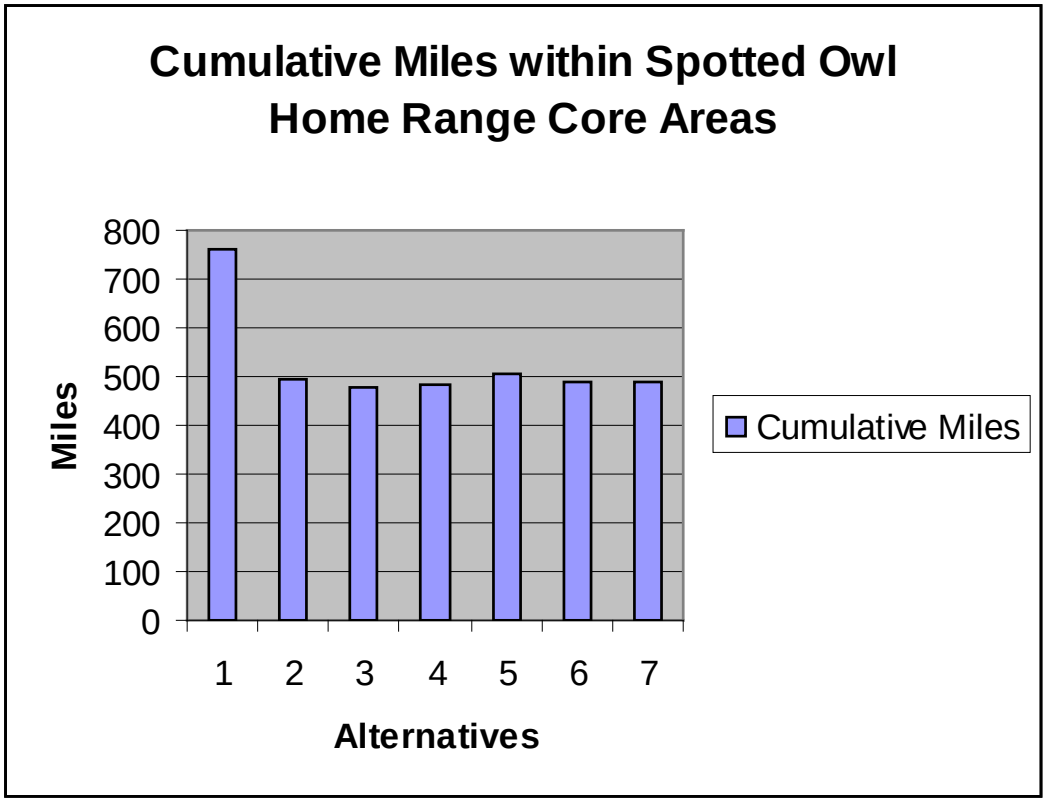

Figure 3.03-5. Cumulative Motorized Miles in Spotted Owl HRCAs

Summary of Cumulative Effects to Nesting and Foraging Spotted Owls from Disturbance at a Specific Site

An analysis of breeding spotted owls on the Tahoe NF at three scales (within 0.25 miles of activity centers, within PACs, and within HRCAs), indicates that cumulative effects are considerably greater in Alternative 1 (No Action) compared to all the other action alternatives. In addition, under Alternative 1, unmanaged cross country motorized travel would continue to occur, and could adversely affect the distribution and abundance of spotted owl populations on the Tahoe NF. Under all of the other alternatives, cross country motorized travel would be prohibited. All the action alternatives affect nesting and foraging spotted owls similarly, where cumulative effects at the forest-wide scale is minimal. When comparing only the action alternatives, Alternative 5 poses slightly greater cumulative effects from the proposed actions, followed by Alternatives 2, 4, 6, 7, 4, and 3 in descending order.

Site-specific cumulative impacts to spotted owls from the action alternatives could adversely affect the distribution and abundance of owls at a local level, particularly where motorized route density is already high, habitat fragmentation has occurred from past timber harvesting, and urban encroachment is a threat. Such is the case in the Burlington Ridge area. The Burlington Ridge area encompasses approximately 24,000 acres and provides habitat either wholly or partially for thirteen spotted owl territories. Spotted owls in this area are densely concentrated and have been subjected to increasing OHV

use in recent years. In addition, the area is in mixed private and federal ownership. Past timber harvest on both private and federal lands has significantly altered spotted owl habitat in the Burlington Ridge area. The Travel Management EIS would generally reduce the effects to spotted owls in the Burlington area by prohibiting cross country travel on approximately 33 to 45 existing unauthorized routes. Routes added to the NFTS under the alternatives include routes accessing dispersed sites to routes used for OHV use and routes for motorcycle use. One route of particular concern (YRS-B5 - Deer Creek Forebay trail) is approximately 4 miles in length and is located in an HRCA and is in an area densely concentrated by spotted owls. Habitat availability in the Burlington Ridge area is a limiting factor since several owl territories overlap. YRS-B5 proposed under Alternatives 4, 5, and 6 would add the most motorized miles potentially increasing noise related disturbance, and could cumulatively affect the long-term productivity and distribution of owls in the vicinity. In addition, the Burlington Area currently has high existing motorized route density, including both existing roads and motorized trails. Use of the Burlington Ridge area is popular with motorcycle users and the close proximity to the town of Nevada City poses a concern to spotted owls from human associated disturbance, since access is easy. Alternative 1 would be the worst case scenario where approximately 45 miles of motorized use would continue on existing unauthorized routes, which equates to approximately 1/3 more routes than the action alternatives. Due to the potential increasing use of the Burlington Ridge area, future cumulative effects under Alternative 1 could be significant.

Spotted Owl Habitat Fragmentation and Edge Effects

Indicators used to Measure Effects

Cross Country Travel: Motorized cross country travel is evaluated for the alternatives to determine the effects on spotted owl habitat fragmentation within PACs and HRCAs.

Zone of Influence within PACs and HRCAs: In addition to determining the habitat fragmentation within CWHR types 4M, 4D, 5M, 5D, and 6, described previously, zones of influence were determined within spotted owl PACs and HRCAs within 200 meters of motorized route additions and reopened ML 1 roads. Three ZOI were analyzed in the DEIS and are available in the project record. However, all effects identified in the 60 m and 100 m ZOI are also identified in the 200 m ZOI and therefore provide little additional information. Thus the analysis presented here is shortened to display only the 200 m ZOI.

Direct and Indirect Effects

Zone of Influence within PACs

Habitat fragmentation and edge effects were described for old forest coniferous associated species within old forest coniferous forest types (CWHR types 4M, 4D, 5M, 5D, and 6) and within Old Forest Emphasis Areas (OFEAs) under the section “Effects Common to All Old Forest Coniferous Associated Species.” Those analyses provided a forest-wide view of how the alternatives affect spotted owl habitat fragmentation within old forest coniferous habitats and OFEAs. This section provides a focused analysis of spotted owl habitat fragmentation and edge effects (including noise disturbance) from motorized routes at the site-specific PAC scale, where known spotted owl nest territories are located.

Spotted owl Protected Activity Centers (PACs) are delineated land allocations (SNFPA 2004), comprised of the best available spotted owl habitat, which are managed specifically for sustaining viable populations of spotted owls. For all spotted owl PACs on the Tahoe NF, the effects of the alternatives are analyzed for the amount of habitat fragmentation and edge effects occurring by considering the Zone of Influence within PACs within 200 meters of motorized additions and reopened ML 1 roads (Table 3.03-68). The 60 meters Zone of Influence represents habitat fragmentation to the spotted owl as it relates to habitat components, such as snag and down log removal along routes for public fuelwood and public safety hazards. Absolute noise disturbance thresholds for California spotted owls have not been established, but the best available science indicates that 100 meters and 200 meters may be important noise disturbance thresholds for spotted owls and other birds of prey (Delaney 1999, Delaney and Grubb 2001, Delaney and Grubb 2003).

Additions to the NFTS and Reopened ML 1 Roads: The Zone of Influence at 200 meters of motorized route additions and reopened ML 1 roads within PACs are shown in Table 3.03-64 for the alternatives. Alternative 1 would reduce habitat effectiveness for spotted owls considerably within 22% of PAC acres on the Tahoe NF. Alternatives 2, 5, 6, and 7 would reduce habitat effectiveness within PACs by 1% or less from motorized route additions. Alternatives 3 and 4 would not affect overall habitat effectiveness of spotted owl PACs since no motorized routes would be added to the NFTS within PACs.

The effect of reopening ML 1 roads is only proposed under Alternative 5 where an additional 1% of spotted owl PACs would be subject to motorized activities, potentially reducing habitat effectiveness for nesting owls. However, the amount of overall reduced habitat effectiveness resulting from reopened ML 1 roads across the Forest is likely to be benign at the Forest scale.

Table 3.03-68. Proportion of Spotted Owl PACs within 200 Meters of Motorized Route Additions and Reopened ML 1 Roads

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Percent of spotted owl PACs within ZOI of Route Additions	22%	1%	0%	0%	1%	1%	1%
Percent of spotted owl PACs within ZOI of Reopened ML 1 Roads	0%	0%	0%	0%	1%	0%	0%

*Alternative 1 includes existing unauthorized routes with the continuance of cross country travel.

Cumulative Effects to Habitat Fragmentation and Edge Effects within California Spotted Owl PACs

Zone of Influence at 200 meters

Cumulative effects of habitat fragmentation within California spotted owl PACs were assessed by determining the amount of spotted owl PACs that are influenced by all routes including both motorized and non-motorized routes on NFS lands and non-NFS lands. The Zone of Influence at 200 meters was used to determine potential habitat fragmentation from the influence of noise, edge effects, and habitat alteration associated with motorized and non-motorized routes.

Table 3.03-69 displays the cumulative effects of the proposed alternatives from all motorized and non-motorized routes on NFS and non-NFS lands. When comparing the cumulative effects of routes to

spotted owl PACs within a 200 meter Zone of Influence (by summing the direct and indirect effects of the alternatives and the cumulative effects of past, present, and future actions), Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 57%) and, therefore, poses the greatest risk to habitat connectivity and other negative cumulative impacts (including noise disturbance) associated with continued motorized cross country travel, including use of existing unauthorized routes within spotted owl PACs. In addition, Alternative 1 would contribute to route proliferation because unmanaged cross country motorized travel would continue into the future. Implementing Alternative 1 poses the greatest concern to habitat fragmentation to spotted owl habitat within PACs.

Alternative 5 has the second greatest contribution to overall cumulative impacts within PACs (cumulative impact score = 37%), due to the percentage of acres (2%) impacted by proposed additions and reopened ML 1 roads. Alternatives 3 and 4 do not add to existing cumulative effects, since no motorized routes within PACs would be added to the NFTS. Alternatives 2, and 6, affect 1% spotted owl habitat within 200 meters of PACs. In addition, cross country travel including use on existing unauthorized routes would be prohibited under all the action alternatives.

Table 3.03-69. Cumulative Effects - Proportion of Spotted Owl Protected Activity Centers within 200 meter Zone of Influence of All Routes

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized Route Additions (negative impact)[1]	22%	1%	0%	0%	1%	1%	1%
Reopened ML 1 Roads	0%	0%	0%	0%	1%	0%	0%
Unauthorized Routes Where Cross Country Travel would be Prohibited (postive impact)	0%	22%	23%	23%	21%	22%	23%
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	27%	27%	27%	27%	27%	27%	27%
Existing routes on non-NFS lands (private) (negative impact)	5%	5%	5%	5%	5%	5%	5%
Existing non-motorized routes (negative impact)[2]	3%	3%	3%	3%	3%	3%	3%
Decommissioned or Existing Closed routes (positive impact)	2%	2%	2%	2%	2%	2%	2%
Total Cumulative Effects							
Overall Cumulative Effects (total of all impacts, both positive and negative)	**57%**	**36%**	**35%**	**35%**	**37%**	**36%**	**36%**

[1] Alternative 1 includes existing unauthorized routes associated with the continuance of cross country travel.

[2] Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60 meters

Direct and Indirect Effects to Fragmentation and Edge Effects within Home Range Core Areas (HRCAs)

Cross Country Travel: Alternative 1 poses the greatest risk to spotted owls within spotted owl Home Range Core Areas (HRCAs), where cross country motorized travel would continue and proliferate on 98,806 acres. The action alternatives would benefit spotted owls from reduced habitat fragmentation and disturbance from the ban of cross country travel on 98,806 acres.

Additions to the NFTS and Reopened ML 1 Roads (Zone of Influence): To evaluate habitat fragmentation, noise disturbance, and edge effects on spotted foraging habitat within HRCAs, the Zone of Influence of motorized route additions and reopened ML 1 roads within spotted owl HRCAs was determined for each alternative within 200 meters (Table 3.03-70).

Alternative 1 reduces habitat effectiveness for spotted owls considerably where the percentage of HRCAs on the Tahoe NF affected is 22% influenced by existing unauthorized routes.

All the action alternatives would enhance habitat effectiveness within HRCAs by prohibiting cross country travel on the majority of existing unauthorized routes. When comparing all the action alternatives, Alternative 5 would contribute to about a 2% reduction in habitat effectiveness within HRCAs from route additions and reopened ML 1 roads combined. Alternatives 2 and 6 reduce habitat effectiveness within HRCAs by 1% from motorized route additions, but would not affect HRCAs from reopening ML 1 roads. Alternatives 4 and 7 only add about 0.5% direct and indirect effects to HRCAs, and would not pose concern to foraging owls at the Forest-wide scale. Alternative 3 would not affect overall habitat effectiveness within spotted owl HRCAs at a 200 meter Zone of Influence. Except for Alternative 3, the remaining action alternatives would only contribute to a very small amount of reduced habitat fragmentation at the Forest-wide scale. However, when specific HRCAs are considered, it becomes apparent that individual spotted owl territories would result in habitat fragmentation from adding routes and reopening ML 1 roads within HRCAs, as shown in Tables 3.03-63 and 64. For example, the HRCA for spotted owl territory NV017 would be affected by 6 different route additions totaling between 0.5 and 1.7 miles. Additions of motorized routes within spotted owl territories, such as NV017 and NV024 in the Burlington Ridge area would result in direct and indirect impacts to spotted owls foraging in the area through increased noise and disturbance, and long-term habitat fragmentation.

Table 3.03-70. Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within 200 Meters influenced by Motorized Route Additions and Reopened ML 1 Roads

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Percent of HRCAs within Zone of Influence of Motorized Route Additions	22%	1.2%	0	0.5%	1.3%	1.2%	0.5%
Percent of HRCAs within Zone of Influence of Reopened ML 1 Roads	0%	0%	0%	0%	1%	0%	0%

Alternative 1 includes existing unauthorized routes associated with the continuance of cross country travel.

Cumulative Effects to HRCAs

Cross Country Travel: Alternative 1 would significantly add to adverse cumulative effects within spotted owl HRCAs, and would potentially disturb nesting and foraging spotted owls and fragment suitable spotted owl habitat since on cross country would continue on 98,806 HRCA acres because unmanaged cross country motorized travel would continue and proliferate into the future. Alternative 1 would limit cross country travel on 5,559 acres that are currently closed to motorized use under the existing LMP standards and guidelines. Whereas all the action alternatives would benefit spotted owls

within HRCAs by prohibiting cross country travel on an additional 98,806 acres, which would greatly reduce habitat fragmentation and disturbance from motorized use.

Additions to the NFTS and Reopened ML 1 Roads (Zone of Influence): The cumulative effects to spotted owl HRCAs within a 200-meter Zone of Influence are compared for the proposed alternatives (Table 3.03-71). As previously discussed, the cumulative effects analysis presented here only provides a relative comparison of cumulative effects to spotted owl foraging habitat from motorized and non-motorized routes.

When comparing the cumulative effects of routes to HRCAs within a 200 meter Zone of Influence (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions), Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 58%) and, therefore, poses the greatest risk to habitat connectivity and other negative cumulative impacts (including noise disturbance) associated with routes within spotted owl HRCAs. Overall cumulative effects of the action alternatives are similar (cumulative impact scores range from 36% to 38%). With the exception of Alternative 3, the action alternatives all slightly add to cumulative impacts, where 1-2% of HRCA acres would be influenced by the addition of motorized routes to the NFTS and reopened ML 1 roads (Alt 5 only). Although the action alternatives would only result in adding a small percentage of cumulative impacts to Tahoe NF HRCAs from motorized route additions or reopened ML 1 roads, individual owl territories could receive adverse cumulative impacts, particularly in areas such as Burlington Ridge on the Yuba River Ranger District where cumulative effects to spotted owls are already high from motorized activities associated with the Burlington Ridge trail system, existing motorized routes, and past vegetation management.

Alternative 3 would not add to cumulative effects, since no motorized routes would be added to the NFTS nor would ML 1 roads would be reopened. Finally, all cross country travel would be prohibited on 98,806 HRCA acres, including the use on existing unauthorized motorized routes that affect approximately 11% of HRCAs within Alternatives 2, 3, 4, 5, 6, and 7.

Table 3.03-71. Cumulative Effects - Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within a 200-meter Zone of Influence

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Proposed motorized route additions to NFTS (negative impact)[1]	22%	1.2%	0	0.5%	1.3%	1.2%	0.5%
Reopened ML 1 Roads	0%	0%	0%	0%	1%	0%	0%
Cross country travel prohibited on existing unauthorized routes (positive impact)	0%	21%	22%	21%	20%	21%	21%

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	27%	27%	27%	27%	27%	27%	27%
Existing routes on non-NFS lands (private) (negative impact)	5%	5%	5%	5%	5%	5%	5%
Existing non-motorized routes (negative impact)[1]	4%	4%	4%	4%	4%	4%	4%
Decommissioned routes and Closed ML 1 roads (positive impact)	3%	3%	3%	3%	3%	3%	3%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**58%**	**37%**	**36%**	**37%**	**38%**	**37%**	**37%**

[1] Motorized route Additions - Alternative 1 includes existing unauthorized routes associated with the continuance of cross country travel.

[2] Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60 meters

Cumulative Effects Summary of Habitat Fragmentation and Edge Effects within Spotted Owl HRCAs

The proportion of spotted owl Home Range Core Areas (HRCAs) within a 200-meter Zone of Influence of all motorized and non-motorized within NFS and non-NFS were determined in order to assess the cumulative effects from the proposed alternatives. Alternative 1 poses the greatest cumulative effects within spotted owl HRCAs that would be used for foraging spotted owls from route associated factors including noise, edge effects, and habitat fragmentation. Alternative 1 affects approximately 22% of spotted owl HRCAs within a 200-meter Zone of Influence, respectively. In the future, motorized route proliferation would continue at an unknown rate because unmanaged cross country travel would continue.

Sensitive Species Determinations

The Tahoe NF Biological Evaluation for Birds, Mammals, Amphibians, Reptiles, Fish, and Invertebrates is incorporated by reference in the Project Record. Based on the spotted owl analysis of effects, the Biological Evaluation for the Tahoe NF Travel Management EIS made a determination that implementation of all the actions alternatives may affect spotted owls, but are not likely to lead to a trend toward listing or a loss in population viability.

Although, some habitat fragmentation and edge effects would occur from the action alternatives, none of the action alternatives would likely cause enough fragmentation to be a concern to spotted owl population viability on the Tahoe NF when considering the combined effects of the alternatives and the additional activities occurring within the cumulative effects analysis area. Based on this information and the findings from U.S. Fish and Wildlife Service, the alternatives as proposed are not expected to result in a loss of viability or lead to a trend toward Federal listing for the California spotted. The alternatives would not likely affect Forest-wide spotted owl population trends. In addition, recent studies between off highway vehicles and spotted owls indicate that disturbance associated with off-highway vehicle do not affect reproductive success. However, the uncertainty of long term effects to spotted owls from increasing disturbance from motorized vehicle use poses an unknown risk. Under Alternative 1, cross country travel would continue on 50,712 PAC acres and 98,806 HRCA acres, which could cause long-term chronic

effects to spotted owl from factors associated with motorized routes. In addition, uncontrolled motorized route proliferation over time may contribute to downward spotted owl population trends on the Tahoe NF.

MIS Summary

The California spotted owl was selected as an MIS for late-seral closed canopy coniferous forest (5M, 5D, 6M, 6D within ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. The Sierra Nevada Forests Bioregional MIS Report and the Tahoe NF Motorized Travel Management MIS Project-level Report are incorporated by reference.

Based on the MIS analysis conducted, Alternative 1 directly, indirectly, and cumulatively affects the greatest amount of late-seral closed canopy coniferous forest with a 200-meter Zone of Influence of existing unauthorized routes, which would continue without prohibiting cross country travel. Alternative 1 reduces habitat effectiveness by 8% (13,435 acres out of 167,938 Tahoe NF habitat acres), with the potential to disturb, cause avoidance, and abandonment of California spotted owl, American marten, and northern flying squirrel. Considering the checkerboard pattern of land ownership within the Tahoe NF boundary, Alternative 1 could cause a downward trend in habitat effectiveness for these species. In addition, the cross country travel would continue and proliferate on 119,091 acres of late-seral closed canopy coniferous forest habitat.

Alternatives 2, 4, 5, and 6 would affect 1,679 acres of late-seral closed canopy coniferous forest habitat or 1% of Tahoe NF habitat within a 200-meter Zone of Influence of proposed motorized route additions. Alternatives 3 and 7 do not affect late-seral closed canopy coniferous forest habitat within a 200-meter Zone of Influence of proposed motorized route additions to the NFTS. The Tahoe NF Motorized Travel Management Project action alternatives would not result in a direct or indirect change in the amount of late-seral closed canopy coniferous forest habitat affected by motorized routes for all the alternatives. Therefore, habitat effectiveness for these species would be maintained at current levels.

For all the alternatives, the change in the class of vehicles would not directly, indirectly, or cumulatively affect late-seral closed canopy coniferous forest habitats or their habitat effectiveness. Wet weather seasonal restrictions on all native surfaced roads and motorized trails under Alternatives 4, 5, and 6 would not likely affect late-seral closed canopy coniferous forest habitat effectiveness for the California spotted owl, American marten, and the northern flying squirrel, but slight localized reduced disturbance, avoidance, and abandonment may result. Finally, the prohibition of motorized cross country travel on 119,091 acres of late-seral habitats would benefit these species over time, thereby preventing the continued cumulative increase in motorized route proliferation in the future.

Summary of Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the California spotted owl; hence, the late-seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data. This information

is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 994,000 acres of late-seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on NFS lands in the Sierra Nevada. The trend is slightly increasing (from 7% to 9% within the last decade on NFS lands).

Population Status and Trend California spotted owl has been monitored in California and throughout the Sierra Nevada through general surveys, monitoring of nests and territorial birds, and demography studies (Verner et al. 1992; USDA Forest Service 2001, 2004, 2006; USFWS 2006; Sierra Nevada Research Center 2007). Current data at the range wide, California, and Sierra Nevada scales indicate that, although there may be localized declines in population trend [e.g., localized decreases in "lambda" (estimated annual rate of population change)], the distribution of California spotted owl populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trends for the species. Based on the small proportion of late-seral closed canopy coniferous forest habitat that is directly, indirectly and cumulatively affected (0% to 1.4% of Sierra Nevada habitat) by the alternatives, the Tahoe NF Motorized Travel Management Project would not alter existing trend in the habitat, nor would it lead to a change is the distribution of California spotted owl across the Sierra Nevada bioregion.

Summary of Direct and Indirect, Impacts to Spotted Owls

Table 3.03-72 summarizes the alternatives for the direct and indirect effects to California spotted owl from cross country travel, motorized route additions to the NFTS, establishment of "Open Areas," changes to the NFTS (wet weather restrictions, changes in class of vehicles and reopened ML 1 roads), and Amendments to the Forest Plan.

Table 3.03-73. California Spotted Owl - Summary of Direct and Indirect Effects (PACs, HRCAs, and 0.25 mile radius of Activity Centers)

		Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Trend of Effect		Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Habitat Acres Where Cross Country Travel Prohibited	**¼ mile of Nests site/stand**	0	18,535	18,535	18,535	18,535	18,535	18,535
	PACs	0	50,712	50,712	50,712	50,712	50,712	50,712
	HRCAs	0	98,806	98,806	98,806	98,806	98,806	98,806
Motorized Route Additions								
Trend of Effect		**Negatively affects the greatest proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs**	4th most negative impacts to a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs	No Effect	6th most negative impacts to a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs	2nd most negative impacts to a small proportion of spotted owl habitat within PACs and HRCAs. Sligh	3nd most negative impacts to a very small proportion of spotted owl habitat within PACs and HRCAs. At nest stand scale, has slightly greater impacts than Alts 5 and 6.	5th most negative impacts to a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs
Nests site/stand (within ¼ mile of Activity Center)	**Miles**	41.1	0.2	0	0	0.2	0.4	0.2
PACS	**ZOI**	22%	0.6%	0%	0%	0.7%	0.7%	0.3%
	Miles	98.1	1.8	0	0	2.2	2.0	1.6
HRCAs	**ZOI**	22%	1.2%	0	0.5%	1.3%	1.2%	0.5%
	Miles	281.7	13.3	0	6.2	14.8	11.0	7.6
Establishment of "Open Areas"		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect

				Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Changes to NFTS	**Wet Weather Restrictions**			No Effect	No Effect	No Effect	Beneficial from reduced disturbance	Beneficial from reduced disturbance	Beneficial from reduced disturbance	No Effect
	Change in Class of Vehicles			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Reopened ML 1 Roads	**Trend of Effect**		No Effect	Negative, shares 3rd most impacts with Alt 7	No Effect	Negative, shares 3nd most impacts with Alt 7.	**Negative, most impactive alternative**	Negative, 2nd most impacts	Negative, shares 3nd most impacts with Al t 2.
		¼ mi. of nests site	**Miles**	0	0	0	0	2.5	0	0
		PACs	**ZOI**	0%	<1%	0%	0%	1%	<1%	<1%
			Miles	0	0.9	0	0	6.1	1.3	0.9
		HRCAs	**ZOI**	0%	<1%	0%	<1%	1.5%	0%	0%
			Miles		0.8	0	0.1	10.9	0	0
Overall Effects of Proposed Alternatives				Negative effects primarily due to un-managed cross country travel where most threatens of disturbance and habitat fragmentation.	Benefits PACs, within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited; although minor negative impacts from route additions and reopened ML 1 roads; overall Reduces disturbance and habitat fragmentation.	Benefits PACs, within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited; although minor negative impacts from route additions and reopened ML 1 roads; overall reduces disturbance and habitat fragmentation..	Benefits PACs, within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited; although minor negative impacts from route additions and reopened ML 1 roads; overall Reduces disturbance and habitat fragmentation.	Benefits PACs, within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited; although minor negative impacts from route additions and reopened ML 1 roads; overall Reduces disturbance and habitat fragmentation.	Benefits PACs, within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited; although minor negative impacts from route additions and reopened ML 1 roads; overall Reduces disturbance and habitat fragmentation.

[1]Alternative 1 includes existing unauthorized routes that would continue with cross country travel, while all the action alternatives include proposed route additions.

[2]Zone of Influence is 200 meters of motorized route additions and reopened ML 1 roads

Compliance with the Forest Plan and Other Direction

The Tahoe NF LRMP, as amended by the SNFPA ROD (2004) provided management standards and guidelines for the California spotted owl as follows:

> *Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites (Management Standard & Guideline 82).*

Alternatives under the Tahoe NF Travel Motorized Management Project were evaluated for their potential to disturb California spotted owl nest sites at two scales—(1) within spotted owl Protected Activity Centers (PACs) and (2) within a 0.25 mile radius of known nest sites or activity centers. Analysis of the alternatives indicates Alternative 1 disturbs nest sites the most from allowing cross country travel to continue on 50,712 PAC acres, affecting 22% of PAC acres within a 200-meter Zone of Influence of existing unauthorized routes. Compared to Alternative 1, the action alternatives all reduce overall effects to spotted owl PACs by prohibiting cross country travel, including 22% of PAC acres within a 200-meter Zone of Influence of existing unauthorized routes. Analysis of the alternatives within 0.25 mile of activity centers (i.e. nest sites) indicates a similar pattern as found for spotted owl PACs.

Northern Goshawk: Affected Environment

The northern goshawk is designated as a Forest Service Sensitive Species in Region 5. There are currently 285,695 acres of suitable goshawk habitat on NFS lands within the Tahoe NF as defined by CWHR types 4 M, 4D, 5M, 5D, and 6. Northern goshawk territories are managed on the Tahoe National Forest as Protected Activity Centers (PACs) as prescribed by the Sierra Nevada Forest Plan Amendment (2004). To date, the Tahoe National Forest has 97 known northern goshawk PACs.

Collection, habitat loss or fragmentation, disturbance at a specific site, and edge effects were described by Gaines et al. (2003) as being road and trail-associated factors that potentially affect the northern goshawk.

Collection: The Sierra Nevada Forest Plan Amendment (USDA Forest Service 2001) cited that northern goshawk were harassed and shot in areas where human recreation was concentrated. Additionally, the Forest Service identified illegal harvest may pose a risk to local populations in certain areas. Both illegal and legal harvest has the potential to affect local individual territories that receive repeated visits and harvesting. No specific incidence of illegal goshawk harvest is known from the Tahoe NF area, though local falconers have knowledge of specific goshawk territories on the Forest which are likely getting repeated visitation and harvesting.

Disturbance at a Specific Site: Human disturbance has the potential to cause goshawk to abandon nesting during the nesting and post fledging period (February 15 through September 15). Goshawk initiate breeding when the ground is still covered in snow. Sometimes nests are constructed along roads and trails. Additionally, roads and trails provide flight access for goshawk. When the snow melts, these sites can potentially be areas of conflict as these roads and trails are used by people. Joslin and Youmans (1999) recommend maintaining low road densities to minimize disturbance to goshawk. Grubb et al.

(1998) reported that vehicle traffic from roads did not elicit any discernable behavioral response from goshawk at distances exceeding 400 meters (0.25 miles) from nests.

Habitat Loss and Fragmentation and Edge Effects: a network of roads and motorized trails can fragment goshawk habitat by reducing canopy closure (Beier and Drennan 1997, Daw and DeStefano 2001) and by reducing forest interior patch size. However, how habitat fragmentation from roads and trails affects goshawk habitat suitability is not well understood. Generally, wider roads that receive higher volumes of traffic result in greater habitat fragmentation. Native surfaced roads and trails probably do not pose as much a risk to habitat fragmentation compared to smooth surfaced roads. For obvious reasons, state and federal highways create the greatest habitat fragmentation due to the width of the road and associated edge effects.

Northern Goshawk: Environmental Consequences

Indicators used to Measure Effects

Disturbance to Nesting Northern Goshawk

The direct and indirect effects to nesting northern goshawk may be measured by the amount of disturbance that may be generated from noise or other motorized trail and road associated factors by the following indicators:

Cross Country Travel: The acres of cross country travel within northern goshawk Protected Activity Centers (PACs) and within 0.25 mile radius of goshawk nest sites or nest stands are determined for each of the alternatives.

Additions to the NFTS and Changes to the NFTS--Reopened ML 1 Roads: Motorized route additions to the NFTS and Changes to the NFTS from Reopened ML 1 Roads are analyzed to determine how they would impact northern goshawk "disturbance to a specific site. Disturbance to goshawk PACs and nest sites is analyzed for the alternatives at two scales-- within 0.25 miles of spotted owl Activity Centers (nest sites or nest groves), within PACs.

- **Nest or Nest Stand (Within a 0.25 miles radius of spotted owl Activity Centers)**: Activity Centers are known nest sites or suspected nest stands. Nest abandonment and failure can result from excessive noise disturbance that may be associated with use of motorized routes. The miles of proposed motorized route additions and the miles of reopened ML 1 roads within a 0.25 mile radius of goshawk Activity Centers are compared by each of the alternatives to display the potential impact to goshawk nesting sites from noise disturbance and other factors associated with motorized use.
- **Protected Activity Centers (PACs)**: Goshawk PACs are delineated surrounding all known and newly discovered nesting territories on NFS lands on the Tahoe NF . PACs are designated to include the latest documented nest site and location of alternate nests (SNFPA 2004). PACs encompass the best available 200 acres of forested habitat which include (1) 2 or more canopy layers, (2) trees in the dominant and co-dominant crown classes averaging 24 inches diameter at breast height or greater; (3) in westside conifer and eastside mixed conifer forest types, stands

have at least 70 percent tree canopy cover; and (4) in eastside pine forest types, stands have at least 60 percent tree canopy cover.

- The miles of proposed additions to the NFTS and the miles of reopened ML 1 roads within goshawk PACs are compared to determine how the various alternatives have the potential impact nesting goshawk from noise disturbance and other factors associated with motorized use.

Northern Goshawk: Direct and Indirect Effects

Disturbance to Nesting Northern Goshawk

Cross Country Travel

Nest Site or Nest Stand (Within 0.25 Mile of Goshawk Activity Centers)

Alternative 1 would significantly add to adverse cumulative effects within goshawk PACs and to nest sites/groves, and would potentially disturb nesting goshawk habitat since on cross country would continue on 10,384 goshawk PAC acres because unmanaged cross country motorized travel would continue and proliferate into the future. Nesting goshawk would benefit from implementation of the action alternatives by prohibiting cross country travel on at least 10,384 PAC acres, which would greatly reduce habitat fragmentation and disturbance to nesting goshawk from motorized use.

Protected Activity Centers

Alternative 1 would significantly add to adverse cumulative effects within goshawk PACs and to nest sites/groves, and would potentially disturb nesting goshawk habitat since on cross country would continue on 20,036 goshawk PAC acres because unmanaged cross country motorized travel would continue and proliferate into the future. Alternative 1 would limit cross country travel on only 644 acres that are currently closed to motorized use under the existing LMP standards and guidelines. Whereas all the action alternatives would benefit goshawk within goshawk PACs by prohibiting cross country travel on an additional 20,036 acres, which would greatly reduce habitat fragmentation and disturbance to nesting goshawk from motorized use.

Additions to the NFTS and Reopened ML 1 Roads

Nest Site or Nest Stand (Within 0.25 Mile of Goshawk Activity Centers)

Table 3.03-74 displays the potential effects of the proposed motorized additions and reopened ML 1 roads on nesting goshawk within a 0.25 mile radius circle of goshawk Activity Centers (nest site or nest stand). Alternative 1 would pose the greatest risk from noise disturbance to nesting goshawk by allowing continued cross country motorized travel, including motorized use on nearly 25 miles of existing unauthorized routes within 0.25 miles of goshawk activity centers. Alternative 1 would not propose to reopen any ML 1 roads, and therefore no effects to nesting goshawk would occur.

All the action alternatives would reduce the amount of disturbance to nesting goshawk by at least 24 miles from the either the addition of motorized routes and reopened ML 1 roads. The action alternatives affect from 0 to 0.3 miles of motorized route additions (Alternative 3 adds none, Alternatives 5 and 6 add 0.3 miles). Reopened ML 1 roads would only affect nesting goshawk under alternatives 2, 4, 5, and 6,

where less than 0.1 to 0.8 miles would be added. Of these alternatives Alternative 5 would reopen the most miles (0.8 miles) and Alternative 4 would reopen the least miles (less than 0.1).

Table 3.03-74. Miles of Proposed Motorized Route Additions and Reopened ML 1 Roads within 0.25 Mile Radius Circle of Northern Goshawk Activity Center (Nest Site or Nest Stand)

Miles	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Route additions to the NFTS	24.8	0.2	0	<0.1	0.3	0.3	0.2
Reopened ML 1 Roads	0	0.4	0	0	0.4	0.8	0
Total	**24.8**	**0.6**	**0**	**<0.1**	**0.7**	**1.1**	**0.2**

*Alternative 1 includes existing unauthorized routes associated with cross country travel, whereas all the action alternatives include route additions or reopened ML 1 roads.

Protected Activity Centers

The miles of proposed motorized routes to be added to the NFTS are compared to determine how the various alternatives have the potential to impact breeding Northern goshawks from noise disturbance and other factors associated with motorized use.

Table 3.03-75 displays the miles of motorized route additions to the NFTS within goshawk PACs by route identification number, and miles of route additions for the alternatives. It also displays the number and percentage of PACs affected by proposed motorized route additions to the NFTS for each alternative. There are a total of 97 goshawk PACs designated on the Tahoe NF.

Alternative 1 contributes significantly to direct and indirect effects to breeding goshawk, where cross country motorized travel would continue, including motorized use of over 42 miles of existing motorized unauthorized routes, where 68% of goshawk PACs (66 PACs) on the Tahoe NF would be subjected to disturbance from continued cross country travel.

All the action alternatives would reduce the miles of motorized routes within goshawk PACs by at least 40 miles compared to Alternative 1. Alternatives 2, 5, 6, and 7 would add approximately 1 motorized route mile affecting between 2 and 5 goshawk PACs, ranging from less than 0.01 mile to about ½ mile in length. Alternatives 3 and 4 do not propose any motorized routes to be added to the NFTS within goshawk PACs, and therefore, would not cause direct or indirect effects to nesting goshawk.

Five goshawk PACs (Frazier Creek, Lacy Creek, Wornmill, and Castle Valley) are intersected by proposed route additions which are short spurs which provide access to dispersed recreation sites. The amount of disturbance resulting from routes accessing dispersed recreation sites depends on the type and amount of dispersed recreation that occurs in association with these routes. The following summary briefly describes how each goshawk PAC is affected by motorized route additions for Alternatives 2, 5, 6, and 7.

Frazier Creek PAC (R05F17D54T07): The Frazier Creek PAC would be affected by the addition of short route (.01 mi) to access a dispersed recreation site under Alternative 6.

Omega PAC (R05F17D55T18): The Omega PAC would be affected by the addition of route H29-11 totaling 0.1 mile under Alternative 5.

Lacy Creek PAC (R05F17D56T08): The Lacy Creek PAC would be affected by the addition of a route to access a dispersed recreation site under Alternative 6.

Wornmill PAC (R05F17D57T11): The Wornmill PAC would be affected by the addition of route TKN-J9 (0.3 mi) under alternatives 2, 5, 6, and 7. In addition, 2-3 routes accessing dispersed recreation sites are proposed under Alternatives 2, 5, and 6. Alternative 6 would result in 1 additional route to a dispersed site compared to Alternatives 2 and 5. However, Alternative 5 also proposes to add a very short segment (N270-8-5) totaling less than 0.01 mile. In sum, the differences between alternatives 2, 5, and 6 would be very little, if any at all. Of the four alternatives affecting the Wornmill PAC, Alternative 7 would result in the least disturbance to nesting goshawk for the Wornmill PAC, since no routes accessing dispersed recreation sites are proposed under this alternative.

Castle Valley PAC (R05F17D57T15): The Castle Valley PAC would be affected by the addition of TKN-J5 under alternatives 2, 5, 6, and 7. TKN-J5 totals about 0.5 miles and is coincidental with the southern boundary of the Castle Valley PAC. Based on the vicinity of TKN-J5, it is likely that this route would have lesser disturbance impacts to nesting goshawk than if the route were to dissect the PAC area. Alternative 6 also proposes to add 5 short routes totaling less than 0.1 mile that come off of TJN-J5. These dispersed recreation assess routes could result in increased disturbance to nesting goshawk within the Castle Valley PAC.

Table 3.03-75. Northern Goshawk PACs - Miles of Motorized Route Additions by PAC ID and Route ID

Goshawk PAC ID	Territory Name	Route ID	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Numerous PACs	Numerous	Unauthorized routes	42.3	0	0	0	0	0	0
R05F17D54T07	Frazier Creek	D_44_c (route to dispersed site)	0	0	0	0	0	0.01	0
R05F17D55T18	Omega	H29-11	0	0	0	0	0.1	0	0
R05F17D56T08	Lacy Creek	D_86-40-30 (route to dispersed site)	0	0	0	0	0	0.02	0
R05F17D57T11	Wornmill	D_72 (route to dispersed site)	0	0	0	0	0	0.04	0
R05F17D57T11	Wornmill	D_72_a & b (routes to dispersed site)	0	0.04	0	0	0.04	0.04	0
R05F17D57T11	Wornmill	N270-8-5	0	0	0	0	<0.01	0	0
R05F17D57T11	**Wornmill**	**TKN-J9**	0	**0.30**	0	0	**0.30**	**0.30**	**0.30**
R05F17D57T15	**Castle Valley**	**TKN-J5**	0	**0.52**	0	0	**0.52**	**0.52**	**0.52**
R05F17D57T15	Castle Valley	D_TKN-J5_a, b, c, d, e (routes to dispersed site)	0	0	0	0	0	0.05	0
Number PACs Intersected			**66**	**2**	**0**	**0**	**5**	**5**	**2**
Percentage PACs Affected (TNF PACs = 97)			**68%**	**2%**	**0%**	**0**	**5%**	**5%**	**2%**
		Total Miles	**42.3**	**0.9**	**0.0**	**0.0**	**0.9**	**1.0**	**0.8**

* Motorized Route Additions - Alternative 1 includes existing unauthorized routes associated with continued cross country travel

Reopened ML 1 Roads

Table 3.03-76 displays how the alternatives are affected by reopened ML 1 roads. Only alternatives 2, 5, and 6 propose to reopen ML 1 roads, potentially affecting 1 to 2 goshawk PACs. The remaining alternatives do not propose to reopen ML 1 roads, and therefore would not affect any goshawk PAC. Alternative 6 would affect two goshawk PACs (Tad Pole PAC and Perazzo Meadow PAC) for a total of about 0.7 miles where nesting goshawk could be disturbed from motorized activities associated with reopened ML 1 roads (ARM-3 and SV-005). Following Alternative 6, Alternative 5 would reopen a total of 0.4 miles of ML 1 roads potentially where nesting goshawk could be disturbed from motorized use within the Perazzo Meadow PAC and the Robinson Flat PAC. Of the three alternatives potentially affecting PACs from reopened ML 1 roads, Alternative 2 would affect the least, where only the Perazzo Meadow PAC would be affected by reopening 0.3 miles of ML 1 road.

Table 3.03-76. Miles of Reopened ML 1 Roads by Northern Goshawk PAC and Route ID

Goshawk PAC ID	Territory Name	Route ID	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
R05F17D54T14	Tad Pole	ARM-13	0	0	0	0	0	0.35	0
R05F17D54T15	Robinson Flat	H88-44	0	0	0	0	0.10	0	0
R05F17D56T04	Perazzo Meadow	SV-005	0	0.31	0	0	0.31	0.31	0
Number PACs Intersected			**0**	**1**	**0**	**0**	**2**	**2**	**0**
Percentage PACs Affected (TNF PACs = 97)			**0**	**1%**	**0%**	**0%**	**2%**	**2%**	**0%**
		Total Miles	**0**	**0.31**	**0**	**0**	**0.41**	**0.66**	**0**

Effects to Individual Northern Goshawk PACs from Route Additions and Reopened ML 1 Roads. The routes proposed to be added to the NFTS and the reopened ML 1 roads (converted from closed to open) contribute a certain amount of disturbance to the activity center on which each PAC is based. Disturbance could result in flushing from nests, roosts, or perches, in alarm responses, and in increased stress hormone levels in individual goshawks. In the absence of further research, it is assumed that motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting goshawk. Based on that assumption, approximately 1-2% of activity centers would receive some disturbance from routes added to the NFTS and/or routes that would be reopened. Without further research, this analysis assumes that effects within 60 meters (approximately 60 meters) of an activity center will result in negative effects to reproduction over the short term. Therefore, if all the routes proposed to be added to the NFTS or proposed to be reopened are further than 400 meters from the activity center on which a given PAC is based, it is assumed that the routes under this alternative in that PAC would contribute a low level of disturbance to the goshawks at that activity center. If any of the routes proposed to be added or reopened are between 60 and 400 meters from the activity center on which the PAC is based, it is generally assumed that the routes in that PAC would contribute a moderate level of disturbance to the owls at that activity center. Within certain PACs meeting that criterion, the contribution to disturbance was rated as low for the reasons given below. If any of the routes proposed to be added or

reopened are within 60 meters of the activity center, it is assumed that the routes under this alternative in that PAC would contribute a high level of disturbance to the owls at that activity center.

For each of the proposed route additions and reopened ML 1 roads, the relative "LEVEL OF CONTRIBUTION TO DISTURBANCE" to each PACs "activity center" and supporting rationale is shown in Table 3.03-77.

Table 3.03-77 Level of Contribution to Disturbance to Northern Goshawk by Specific PAC for Route Additions and Reopened ML 1 Roads

PAC Number	Territory Name	Route ID	Route Addition	Reopened ML 1 Rd	Length (miles)	Alternatives	Level of Contribution to Disturbance	Rationale
D54T07	Frazier Creek	D_44_c	X		0.01	Alt 6	Low to none	Proposed route is short spur <.01 mi, off of existing system route, located >400 meters from nest site. Route located at very extreme northwest boundary of PAC, should not add to disturbance.
D54T14	Tad Pole	ARM-13		X	0.35	Alt 6	Low	Proposed route is 0.3 mi (>400 meters) from known nest site.
D54T15	Robinson Flat	H88-44		X	0.10	Alt 5	Low	Proposed route is 0.4 mi (>400 meters) from known nest site, route is near northern edge of PAC.
D55T18	Omega	H29-11	X		0.1	Alt 5	Moderate	Short route segment within PAC located 0.05 mi (>60 meters, <400 meters) from known nest site.
D56T04	Perazzo	SV-005		X	0.6	Alts 2, 5, 6	Moderate	Reopened route located 0.05 mi (>60 meters and <400 meters) from most recent known nest site.
D56T08	Lacy Creek	D_86-40-30	X		0.02	Alt 6	Low	Short route segment comes off of existing system road, route located at 400 meters (0.25 mi) from known nest site.
D57T11	Wornmill	D_72	X		0.04	Alt 6	Low	Short route comes off of existing system road, route located 0.7 mi (>400 meters) from nest site.
D57T11	Wornmill	D_72_a & b	X		0.04	Alt 6	Low	Two short routes at eastern edge of boundary come off of existing system road, routes located 0.9 mi (>400 meters) from known nest site.
D57T11	Wornmill	N270-8-5	X		<0.01	Alt 5	Low	Very short route comes off of existing system road, located 0.3 mi (> 400 meters) from known nest site.
D57T11	Wornmill	TKN-J9	X		0.30	Alts 2, 5, 6, 7	Moderate	Proposed route is along existing powerline, located within 0.15 mi (< 400 meters) of 1 of 3 alternate nest sites.
D57T15	Castle Valley	TKN-J5	X		0.52	Alts 2, 5, 6, 7	Low	Proposed route borders southern edge of PAC, route located 0.3 mi (>400 meters) from known nest site.
D57T15	Castle Valley	D_TKN-J5_a, b, c, d, e	X		0.05	Alt 6	Low	Short route segments comes off of proposed route TKN-J5 and located >400 meters from known nest site.

Summary of Individual PAC Analysis

Table 3.03-78 summarizes the potential risk of increased disturbance to goshawk activity centers within PACs out of a total of 97 goshawk PACs, as a result of motorized route additions and reopened ML 1 roads. Alternatives 3 and 4 would not increase disturbance to goshawk within any PAC, since no routes or reopening of ML 1 road would be proposed. Overall, Alternative 6 would result in the greatest number of goshawk PACs (9 of 97 PACs or 9%) could be affected either by a low or moderate risk of increased disturbance from activities associated with motorized route additions or reopened roads through temporary displacement, nest failure, or territory abandonment. Alternatives 7, 2, 5, and 6 would potentially increase disturbance to goshawk activity centers within PACs, in increasing order, ranging from 2% to 9%. None of the alternatives would add routes or reopen ML 1 roads that would result in a "high" risk of increased disturbance where a route would be added or reopened ML 1 road would occur within 60 meters (200 feet) of a spotted owl activity center. The remaining action alternatives would result in either a low or moderate risk of increased disturbance from the addition of routes or reopening ML 1 roads. Alternative 5 would result in the most number of PACs (3 of 97 or 3%) potentially affected by a moderate level of increased disturbance, followed by Alternatives 2 and 6 (2 of 97 PACs or <2%, and Alternative 7 would result in the least amount of moderately increased disturbance to PACs (1of 97 PACs or 1%). Alternative 6 would result in the greatest number of PACs with a low risk of increased disturbance (7 of 97 PACs or 75), followed by alternatives 5, 2, and 7 in decreasing order (Table 3.03-78).

Table 3.03-78. Northern goshawk: summary of risk of increased disturbance to Activity Centers within PACs

		Alt 1		Alt 2		Alt 3, 4		Alt 5		Alt 6		Alt 7	
Risk of increased disturbance effects	**Rationale**	**# PACs**	**% PACs**	**# PACs**	**% PACs**	**# PACs**	**% PACs**	**# PACs**	**% PACs**	**# PACs**	**% PACs**	**# PACs**	**% PACs**
HIGH	Route added or reopened ML 1 road within 60 meters (200 feet) of activity center	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
MODERATE	Routes added or reopened ML 1 roads occurring less than 400 meters (1/4 mi) and more than 200 feet from activity center, and no intervening topography	0	0%	2	2%	0	0%	3	3%	2	2%	1	1%
LOW	All routes added or reopened ML 1 roads greater than 400 meters from activity center.	0	0%	2	2%	0	0	3	3%	7	7%	1	1%
HIGH	PACs where cross country travel continued	96	99%	0	0	0	0	0	0	0	0	0	0
DECREASE	PACs where cross country travel prohibited, including on unauthorized routes	0	0%	96	99%	96	99%	96	99%	96	99%	96	99%
Total PACs in which routes are added and/or being converted from closed ML 1 roads to open		**0**	**0%**	**4**	**4%**	**0**	**0%**	**6**	**6%**	**9**	**9%**	**2**	**2%**
Total PACs where cross country travel continued, including on unauthorized routes		**96**	**99%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**	**0**	**0%**
Total PACs where cross country travel would be prohibited, including on unauthorized routes		**0**	**0%**	**96**	**99%**	**96**	**99%**	**96**	**99%**	**96**	**99%**	**96**	**99%**

Summary of Direct and Indirect Impacts to Northern Goshawk

When considering all the direct and indirect impacts to the northern goshawk within PACs and within 0.25 miles of activity centers (nest sites/nest stands), Table 3.03-79 summarizes the overall net effect to the northern goshawk from the proposed actions from cross country travel, motorized route additions to the NFTS, establishment of "Open Areas," changes to the NFTS (change of season of use, change in class of vehicles, reopened ML 1 roads), and amendments to Forest Plan.

Table 3.03-79. Northern Goshawk - Summary of Overall Net Direct and Indirect Effects

			Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel									
Trend of Effect			Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Cross Country Travel Prohibited	**0.25 mile radius of Activity Center**		0	10,384 acres	10,384 acres	10,384 acres	10,384 acres	10,384 acres	10,384 acres
	PACs		0	20,036 acres	20,036 acres	20,036 acres	20,036 acres	20,036 acres	20,036 acres
Motorized Route Additions									
Trend of Effect			Negative, most impactive alternative	Slight Negative, - shares 3rd most impacts with Alt 7	No Effect	No Effect	Slight negative, shares 2nd most impacts with Alt 6.	Slight Negative, - shares 2nd most impacts with Alt 5.	Slight Negative, - shares 3rd most impacts with Alt 2.
Within 0.25 mile radius of Activity Center (Miles)			24.8	0.2	0	0	0.3	0.3	0.2
PACs (Miles)			42.3	0.9	0	0	1.0	1.0	0.8
Percentage of PACs Affected			68%	2%	0%	0%	7%	6%	2%
Establishment of "Open Areas"			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Changes to NFTS	**Wet Weather Restrictions**		No Effect	No Effect	No Effect	Beneficial from reduced disturbance	Beneficial from reduced disturbance	Beneficial from reduced disturbance	No Effect
	Change in Class of Vehicles		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Reopened ML 1 Roads in PACs	**Trend of effect**	No Effect	3rd most impactive alternative	No Effect	No Effect	2nd most impactive alternative	Most impactive alternative	No Effect
		Miles	0	0.3	0	0	0.4	0.7	0
		% PACs Affected	0	1%	0%	0%	2%	2%	0
Amendments to Forest Plan			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Most impactive alternative. Increases disturbance and habitat fragmentation primarily from continued cross country travel within 20,036 PAC acres on **42 miles of unauthorized routes.**	4th most impactive alternative from the addition of routes and reopened ML 1 roads totalling **1.2 miles in PACs** Benefits goshawk from the prohibition of cross country travel, and reduces disturbance and habitat fragmentation within 20,036 PAC acres..	Shares least impacts with Alternative 4 (**no routes added or reopened**). Benefits goshawk from the prohibition of cross country travel, and reduces disturbance and habitat fragmentation within 20,036 PAC acres.	Shares least impacts with Alternative 3. (**no routes added or reopened**). Benefits goshawk from the prohibition of cross country travel, and reduces disturbance and habitat fragmentation within 20,036 PAC acres..	3rd most impactive alternative from the addition of routes and reopened ML 1 roads totalling **1.4 miles in PACs.** Benefits goshawk from the prohibition of cross country travel, and reduces disturbance and habitat fragmentation within 20,036 PAC acres.	2nd most impactive alternative from the addition of motrized routes and ML 1 roads, totalling **1.7 miles in PACs.** Benefits goshawk from the prohibition of cross country travel, and reduces disturbance and habitat fragmentation within 20,036 PAC acres..	5th most impactive alternative from the addition of routes totalling **0.8 miles** in PACs. Benefits goshawk from the prohibition of cross country travel, and reduces disturbance and habitat fragmentation within 20,036 PAC acres.

* Alternative 1 includes existing unauthorized routes that would continue with cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects to Nesting Goshawk

Cumulative Effects Boundary (space and time)

The cumulative effects geographic boundary for nesting goshawks includes all goshawk Protected Activity Centers and their associated Activity Centers (nest site or nest stand) within the boundary of the Tahoe NF. This is an appropriate scale for determining cumulative effects to the goshawk, since the Tahoe NF boundary is sufficiently large which includes 97 goshawk territories and their home range. In addition, the Tahoe NF boundary encompasses an array of goshawk habitat conditions from low elevation to high elevation, including several vegetation types including westside mixed conifer, ponderosa pine, true fir (red fir and white fir), eastside mixed conifer, pure eastside pine, lodgepole pine, and subalpine conifer. The cumulative effects timeframe is the same as other species - 20 years out into the future and approximately 20 years or more into the past. In addition, cumulative effects of all past actions are incorporated into the existing condition (see discussion of cumulative effects).

Assessing Cumulative Effects

Cumulative effects to nesting goshawk are assessed by determining the sum total miles of all motorized routes (proposed and existing) and non-motorized routes on the Tahoe NF including NFS lands and non-NFS lands (private) within goshawk PACs and within 0.25 mile radius of goshawk Activity Centers. For each alternative, cumulative effects are calculated by adding the total miles of proposed motorized routes (direct and indirect impacts) with existing motorized routes (NFS lands and non-NFS lands) and non-motorized routes. Although non-motorized routes may have lesser impacts to goshawk compared to motorized routes, non-motorized routes are included in this analysis because human disturbance potentially may pose some level of disturbance to nesting goshawk depending on the level and duration of use during the breeding season. Non-motorized routes associated with high use non-motorized trails, such as the Pacific Crest Trail, may have considerable impacts to goshawk if nest sites are located nearby. Goshawks are known to exhibit territorial behavior, and have been known to dive bomb hikers during critical breeding periods.

Cross Country Travel

Existing motor vehicle cross country travel is currently banned on 644 goshawk PAC acres for all the alternatives. If Alternative 1 were implemented, cross country travel would only be prohibited on these 644 acres. For all the action alternatives, the prohibition of cross country travel would benefit goshawk on an additional 20,036 PAC acres, where disturbance, avoidance, and abandonment would be reduced. Whereas, Alternative 1 would continue cross country travel within 20,036 PAC acres, including on existing unauthorized routes. The ban of cross country travel on unauthorized routes would benefit goshawk because motorized use would no longer occur on these routes, since disturbance associated with these routes would be eliminated.

Disturbance to Nesting Northern Goshawk

Protected Activity Centers

Considering the cumulative effects of all motorized and non-motorized routes on both NFS lands and non-NFS lands, indicates Alternative 1 would result in the most cumulative miles of routes (120 miles) within goshawk PACs on the Tahoe NF, and therefore poses the greatest overall potential risk and cumulative impacts to nesting goshawk on the Tahoe NF (Table 3.03-80) (Figure 3.03-6), where disturbance to nesting goshawk could result nesting failure and abandonment. All the action alternatives have similar cumulative route miles within PACs ranging from about 78 miles (Alternatives 3 and 4) to about 79 miles (remaining alternatives). Therefore, all the action alternatives would cumulatively benefit northern goshawk nesting where noise and other disturbance associated with motorized and non-motorized use would be reduced by at least 40 miles. Individual goshawk PACs would receive cumulative adverse effects of noise and disturbance from the direct and indirect impacts of motorized route additions to the NFTS and reopened ML 1 roads, however, overall cumulative effects to goshawk Forest-wide would be significantly beneficial.

Table 3.03-80. Cumulative Miles of All Routes within Tahoe NF Goshawk PACs

Miles	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized route additions to NFTS* (negative impact)	42.3	0.9	0	0	1.0	1.0	0.8
Reopened ML 1 Roads	0	0.3	0	0	0.4	0.7	0
Unauthorized routes, where cross country travel would be prohibited (positive impact)	0	41.2	42.3	42.3	41.0	40.7	41.5
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	69.6	69.6	69.6	69.6	69.6	69.6	69.6
Existing motorized routes on private land - non-NFS lands (negative impact)	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Existing non-motorized routes (negative impact)	7.7	7.7	7.7	7.7	7.7	7.7	7.7
Decommissioned routes (positive impact)	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Closed Roads (ML1 roads, closed by previous NEPA, but not implemented) (positive)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Total Cumulative Effects							
Total Cumulative Impact = Sum Total of Negative Impacts both positive and negative	**120.0**	**78.9**	**77.7**	**77.7**	**79.1**	**79.4**	**78.5**

*Motorized route additions - Alternative 1 includes existing unauthorized motorized routes associated with continued cross country travel.

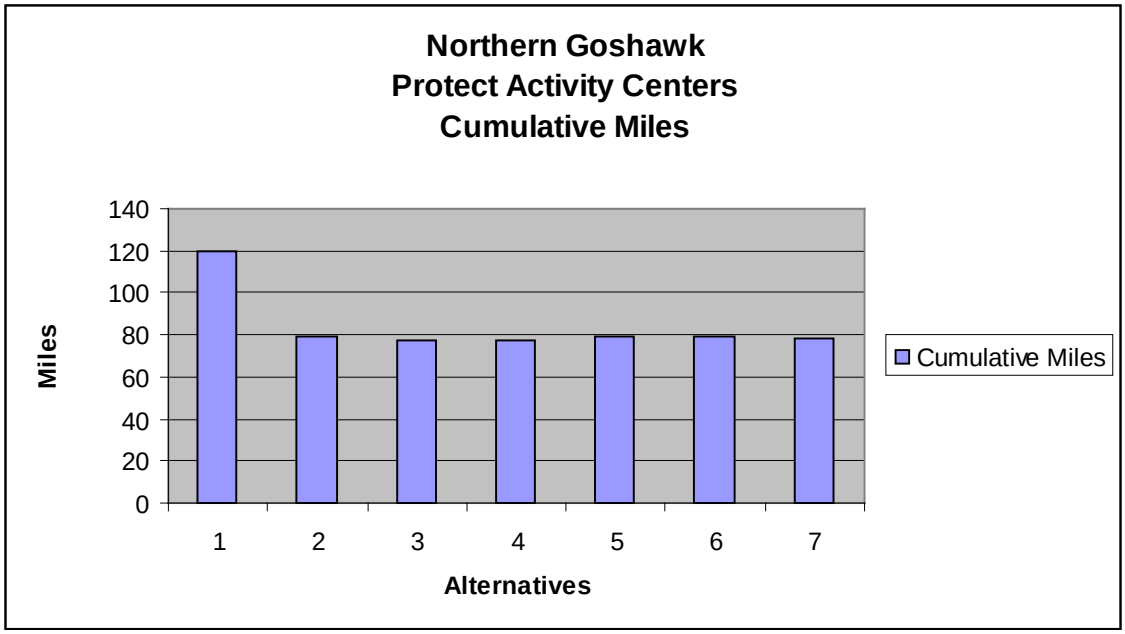

Figure 3.03-6. Cumulative Route Miles in Goshawk PACs

0.25 mile Radius Circle of Activity Centers (Nest Site or Nest Stand)

When analyzing the cumulative effects within the 0.25 mile radius circle of goshawk activity centers (nest site or nest stand), a similar theme emerges as compared to the cumulative effects of the proposed alternatives within PACs. Alternative 1 has the most cumulative route miles (74 miles) (Table 3.03-81) (Figure 3.03-7). The remaining action alternatives would reduce the cumulative miles to around 50 miles compared to Alternative 1. The actual miles of motorized routes additions that would potentially affect goshawk nest sites or nest groves, are very low (approximately range 0 to ~1 mile) across all goshawk territories on the Tahoe NF. Therefore, it can be concluded that implementing the alternatives would have very little additional cumulative impact to nesting goshawks on the Tahoe compared to Alternative 1. Alternative 1 clearly poses the greatest cumulative risk to nesting goshawk, with continued cross country motorized travel on 10,384 acres, including continued use on approximately 25 miles of existing unauthorized routes within 0.25 mile of goshawk activity centers. Of the action alternatives, Alternative 6 has the greatest cumulative motorized and non-motorized route miles (50.4 mi) and alternatives 3 and 4 would share the least cumulative motorized and non-motorized route miles (49.3 mi).

Table 3.03-81. Miles of All Routes within 0.25 mile of Tahoe NF Goshawk Activity Centers (nest site or nest stand)

Miles	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized route additions to NFTS (negative impact)*	24.8	0.24	0	0.01	0.33	0.26	0.23
Reopened ML 1 roads (negative impact)	0	0.4	0	0	0.4	0.8	0
Unauthorized motorized routes prohibited to cross country travel (positive impact)	0	24.0	24.7	24.7	24.0	23.7	24.5
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	41.1	41.1	41.1	41.1	41.1	41.1	41.1
Existing motorized routes on private land - non-NFS lands (negative impact)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Existing non-motorized routes (negative impact)	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Decommissioned routes (positive impact)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Roads Closed with previous NEPA decision, pending implementation (positive impact)	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Total Cumulative Effects							
Net Cumulative Impact = Sum Total of Negative Impacts minus positive impacts							
Miles of routes	**74.1**	**49.8**	**49.3**	**49.3**	**50.0**	**50.4**	**49.5**

*Motorized route additions - Alternative 1 includes existing unauthorized motorized routes associated with continued cross country travel.

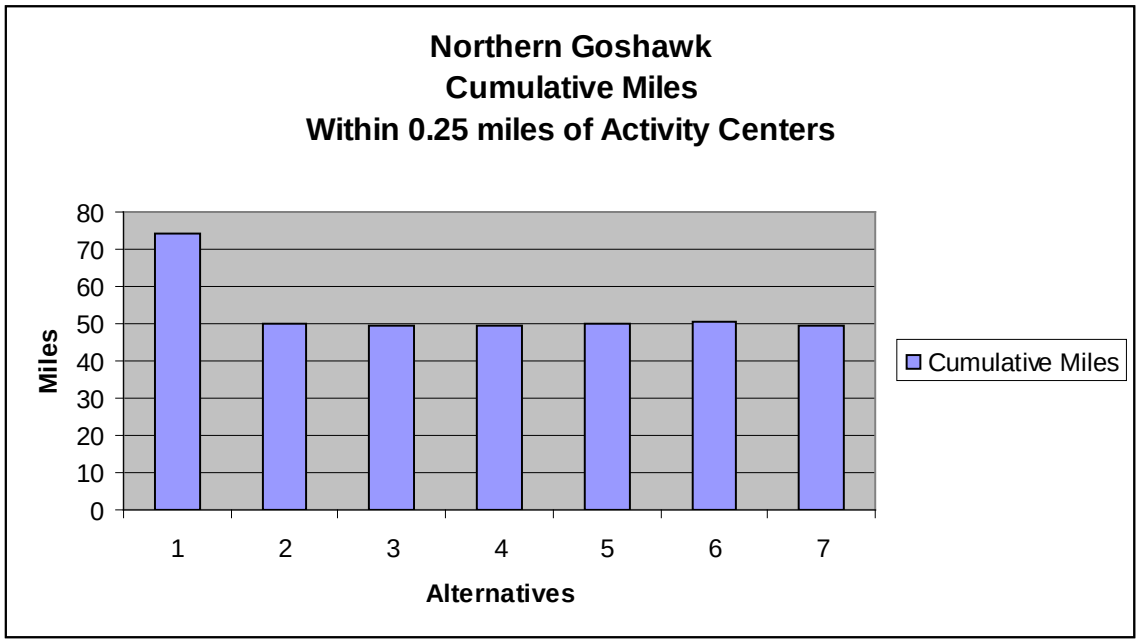

Figure 3.03-7. Cumulative Miles within 0.25 miles of Goshawk Activity Centers (Nest Site/Nest Stand)

Effects to Fragmentation and Edge Effects within Northern Goshawk Protected Activity Centers

Habitat fragmentation and edge effects were described for old forest coniferous associated species within old forest CWHR conifer types (4M, 4D, 5M, 5D, and 6) and within Old Forest Emphasis Areas (OFEAs)

under the section "Effects Common to All Late-seral Coniferous Associated Species." Those analyses provided a forest-wide view of how the alternatives affect spotted owl habitat fragmentation within late-seral coniferous forest habitats and OFEAs. This section provides a focused analysis of goshawk habitat fragmentation and edge effects (including noise disturbance) from motorized routes at the site-specific goshawk PAC scale, where known goshawk nest territories are located.

Indicators used to Measure Effects

Zone of Influence within PACs to assess potential habitat fragmentation and edge effects: In addition to determining the habitat fragmentation potential from zones of influence within suitable goshawk habitat within CWHR types 4M, 4D, 5M, 5D, and 6 (See effects to late-seral coniferous forest habitats in effects common to all late-seral coniferous forest associated species), zones of influence were determined within goshawk PACs at 400 meters (0.25 mile) of proposed motorized routes added to the NFTS and reopened ML 1 roads.

Direct and Indirect Effects of Additions to the NFTS and Reopened ML 1 Roads

400-meter Zone of Influence

Goshawk Protected Activity Centers are delineated land allocations (SNFPA 2004), comprised of the best available goshawk habitat, which are managed specifically for sustaining viable populations of goshawks. For all goshawk PACs on the Tahoe NF, the effects of the alternatives are analyzed for the amount of habitat fragmentation and edge effects are occurring by considering the Zone of Influence within goshawk PACs within 400 meters (0.25 miles) of motorized routes added to the NFTS (Table 3.03-82). Although absolute disturbance thresholds for goshawk are not readily available in the literature, Grubb et al. (1998) reported that goshawk were found to react negatively (flush) when noise associated with logging trucks occurred less than 400 meters (0.25 miles) from nests. Determining the proportion of a goshawk PAC that is influenced by motorized routes within 400- meters (0.25 mile) gives a relative index of habitat fragmentation or habitat effectiveness at the site specific goshawk territory scale.

Comparing the direct and indirect effects to goshawk PACs within a 400-meter Zone of Influence of proposed motorized routes indicates Alternative 1 reduces habitat effectiveness and associated habitat fragmentation (including noise disturbance) within PACs by 34%.

All the action alternatives would enhance overall habitat effectiveness compared to Alternative 1. When comparing the action alternatives, Alternative 5 reduces habitat effectiveness of goshawk PACs by 6%. Alternatives 2 and 6 each reduce habitat effectiveness within goshawk PACs by 2%. Alternative 4 and 7 each reduce habitat effectiveness of goshawk PACs by 1%. Habitat effectiveness within goshawk PACs would be enhanced by implementing Alternative 3 since no additions to the NFTS are proposed and existing unauthorized routes would be prohibited to cross country travel.

Cumulative Effects of Additions to the NFTS and Reopened ML 1 Roads

400-meter Zone of Influence

Table 3.03-82 and Figure 3.03-8 display the cumulative effects of the proposed alternatives in combination with motorized and non-motorized routes on NFS and non-NFS lands. When comparing the cumulative effects of routes within a 400-meter Zone of Influence of goshawk PACs (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions), Alternative 1 poses the greatest risk to goshawk PACs, where 83% of PAC acres are cumulatively affected within a 400 meter Zone of Influence of all routes both motorized and non-motorized, and, therefore, adversely impacts habitat connectivity and would result in increased noise disturbance associated with routes within goshawk PACs. In addition, Alternative 1 would contribute to continued route proliferation on 20,036 PAC acres because unmanaged cross country motorized travel would continue into the future.

All the action alternatives would result in beneficial and reduced cumulative impacts compared to Alternative 1, where approximately 51% to 53% of PACs would be cumulatively affected from all routes within the 400-meter Zone of Influence. Of the action alternatives, Alternatives 6 has the greatest cumulative impacts within goshawk PACs, but only slightly more than the remaining action alternatives All action alternatives would result in adding 0-2% increased cumulative impacts from the addition of motorized routes and reopened ML 1 roads, combined. Alternative 3 does not directly or indirectly affect habitat within the 400-meter Zone of Influence within goshawk PACs, and therefore no cumulative impacts would be added to the existing situation. In addition, under the prohibition of cross country travel (including the use on existing unauthorized motorized routes) all action alternatives would benefit from reduced motorized disturbance on 30 to 35% of goshawk PAC acres compared to the No Action Alternative. Over time, existing unauthorized routes would eventually become revegetated and recover. The rate of recovery would depend on the site specific vegetation and soil conditions.

Table 3.03-82. Cumulative Effects - Proportion of Goshawk Protected Activity Centers within a 400-meter (0.25 mile) Zone of Influence of All Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized route additions to NFTS (negative impact)[1]	32%	1%	0%	0.3%	1.3%	2.3%	0.7%
Reopened ML 1 Roads	0%	0.2%	0%	0.1%	0.9%	0.5%	0.0%
Motorized routes prohibited to cross country travel (positive impact)	0	31%	35.4%	35.1%	30.4%	30.2%	31.3%
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	36%	36%	36%	36%	36%	36%	36%
Existing motorized routes on private land - non-NFS lands (negative impact)	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%	9.6%
Existing non-motorized routes (negative impact)	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Decommissioned routes (positive impact)	4%	4%	4%	4%	4%	4%	4%
NFTS roads closed with NEPA, pending implementation	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**82.6%**	**51.8%**	**50.6%**	**51.0%**	**52.8%**	**53.4%**	**51.3%**

[1] Alternative 1 includes the existing unauthorized routes, while all action alternatives include motorized route additions to the NFTS .

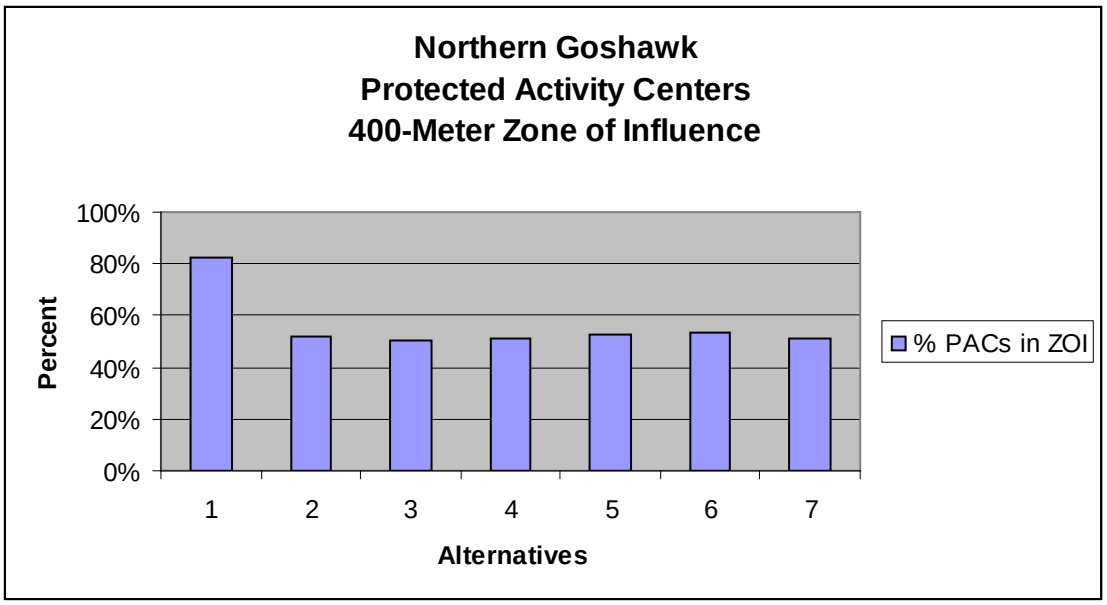

Figure 3.03-8. Cumulative Effects of All Routes within a 400-meter Zone of Influence within Tahoe NF Northern Goshawk PACs

Cumulative Effects from Past, Present and Future Vegetation/Fuels Management Projects and Past Wildfires

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on NFS lands and private lands within the Tahoe NF

boundary. Some, but not all, of these activities would contribute to impacts to the Northern goshawk within the cumulative effects boundary.

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. The following information summarizes recent past cumulative impacts from wildfires and fuels/vegetation projects that have impacted goshawk habitats.

Between 1994 and 2008, several wildfires resulted in burning approximately 11,000 acres of suitable goshawk acres burned affecting 14 goshawk PACs affecting approximately 1,400 acres within goshawk PACs. In some cases, goshawk PACs were rendered unsuitable for nesting, and in other cases low or moderate severity fires retained habitat conditions suitable for nesting. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all have resulted in impacts to goshawk habitats. Between 2001 and 2008, approximately 17,000 acres of forest vegetation and fuels thinning and mastication projects were completed, which were designed to reduce the risk of additional habitat loss to wildfires. These treatments generally do not result in habitat removal, but may result in habitat quality changes.

Although the timeframe for assessing cumulative effects is 20 years in the past, it is important to describe past cumulative effects that are still affecting goshawk habitat on the landscape at present from past activities that occurred prior to 20 years ago. Between 1960 and present, private land harvest within the boundaries of the Tahoe NF has resulted in approximately 95,000 acres of vegetation treatments including clearcuts, sanitation, shelterwood, and thinning. Much of the private land harvest has resulted in the loss or reduction in goshawk habitat. These wildfires and vegetation treatment projects have resulted in a reduction in the amount and quality of goshawk habitat on the Tahoe NF since 1960.

Thinning projects designed to reduce hazardous fuels would continue to be the primary activity affecting goshawk habitat on the Tahoe (see Appendix H, Reasonably Foreseeable Projects and Cumulative Effects). Although these treatments may reduce habitat quality (i.e. nesting habitat reduced to foraging habitat), it is expected that suitable habitat would be maintained, and it is anticipated that these treatments would reduce the amount goshawk habitat potentially lost from future stand replacing wildfires (USDA Forest Service 2004). The California Department of Forestry and Fire Protection currently lists approximately 12,000 acres of private land within the Tahoe NF 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 in a suitable condition for goshawk.

Sensitive Species Determinations

The Tahoe NF Biological Evaluation for Birds, Mammals, Amphibians, Reptiles, Fish, and Invertebrates is incorporated by reference in the Project Record. Based on the northern goshawk analysis of effects, the Biological Evaluation for the Tahoe NF Travel Management EIS made a determination that

implementation of all the actions alternatives may affect northern goshawks, but are not likely to lead to a trend toward listing or a loss in population viability.

Although some habitat fragmentation and edge effects would occur from the action alternatives, none of the action alternatives would likely cause enough fragmentation to be a concern to goshawk population viability on the Tahoe NF when considering the combined effects of the alternatives and the additional activities occurring within the cumulative effects analysis area. Based on this information, the alternatives as proposed are not expected to result in a loss of viability or lead to a trend toward Federal listing for the northern goshawk. The alternatives would not likely affect Forest-wide northern goshawk population trends. However, the uncertainty of long term effects to goshawk from future increases in motorized vehicle use on NFS lands poses an unknown risk. It is expected that recreation and motorized use on NFS lands will increase. Alternative 1 could cause long-term chronic effects to northern goshawk from increased motorized route proliferation over time, and therefore may contribute to downward population trends on the Tahoe NF.

When considering the direct, indirect, and cumulative impacts to goshawk, Alternative 1 poses a considerable risk to nesting goshawk on the Tahoe NF where 32% of the PAC acres within a 400-meter Zone of Influence would be impacted by continued cross country travel, including use on existing unauthorized routes. In addition, continued use on existing unauthorized routes under Alternative 1 would result in directly and indirectly affecting 68% (66 out of 97) total PACs on the Tahoe NF. Cross country travel would continue to increase and proliferate. Goshawk are extremely sensitive to human disturbance during the breeding season where continued motorized route proliferation could impact the productivity of nesting goshawk which could cause chronic impacts which may ultimately affect the abundance and distribution of goshawk on the Tahoe NF.

All the remaining action alternatives would considerably reduce the impacts associated with motorized use of existing unauthorized routes through the prohibition of cross country travel. Alternatives 5 and 6 are similar in their impacts to the goshawk. Under Alternative 6, a total of 1.6 miles of route additions and reopened ML 1 roads would impact 6 goshawk PACs, and Alternative 5 would result in impacts to 7 PACs totaling 1.4 miles of route additions and reopened ML 1 roads. Alternatives 2 and 7 follow with decreasing route miles added to the NFTS, affecting 2-3 PACs totaling approximately 1 mile. Alternatives 3 and 4 do not propose any route additions or reopening ML 1 roads, and therefore would not affect nesting goshawk.

All the action alternatives would influence between 0-3% of PAC acres within a 400-meter Zone of Influence of motorized route additions and reopened ML 1 roads, and therefore would not affect the distribution and abundance of goshawk on the Tahoe NF. Therefore, the action alternatives do not affect habitat or population trends on the Tahoe NF.

Compliance with the Forest Plan and Other Direction

The Tahoe NF LRMP, as amended by the SNFPA ROD (2004) provided management standards and guidelines for the Northern goshawk as follows:

Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites (Management Standard & Guideline 82).

Alternatives under the Tahoe NF Travel Motorized Management Project were evaluated for their potential to disturb Northern goshawk nest sites at two scales - (1) within goshawk Protected Activity Centers (PACs) and (2) within a 0.25 mile radius of known nest sites or activity centers. Analysis of the alternatives indicates Alternative 1 disturbs nest sites the most from allowing cross country travel to continue on 20,036 PAC acres, affecting 68% of PACs from 42 miles of existing unauthorized routes. Compared to Alternative 1, the action alternatives all reduce overall effects to goshawk PACs by prohibiting cross country travel on 20,036 PAC acres, where disturbance to approximately 30% of PAC acres within a 400-meter Zone of Influence would be substantially reduced, and thereby benefiting nesting goshawk on the Tahoe NF. The analysis of the alternatives within 0.25 mile of activity centers (i.e. nest sites) indicates a similar pattern as found for goshawk PACs. Under the action alternatives, at least 95% of existing unauthorized routes would be prohibited to cross country travel within 0.25 miles of nest sites or nest stands.

Forest Carnivores: American Marten, Pacific Fisher, Sierra Nevada Red Fox and Wolverine

Forest Carnivores include the American marten, Pacific fisher, the Sierra Nevada red fox, and Wolverine. The Sierra Nevada red fox and the wolverine are addressed under the Wide-ranging Carnivore Group. This section will focus on the marten and fisher. Impacts to the marten and fisher will be considered together, since effects to these species are similar. More detailed information for these species can be found in the Biological Evaluation and Management Indicator Species reports, which are hereby incorporated by reference. Limited research or information on road and trail impacts to Forest Carnivores is available in the literature, but some information is available as described below for species considered here.

The Tahoe NF developed a Forest Carnivore Network in 1998 by modeling suitable marten and fisher habitat using a focal mean analysis based on the home ranges of marten and fisher. The purpose of the Forest Carnivore Network is to provide a framework for managing and maintaining linkages and connectivity for Forest Carnivore species including the marten, fisher, Sierra Nevada red fox, and the wolverine. Forest Carnivores are considered to be interior Forest Species where habitat fragmentation is a concern.

American Marten and Pacific Fisher: Affected Environment

Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersion of riparian areas and meadows. Important habitat attributes are: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1987).

At a landscape scale, patches of preferred habitat and the distribution of openings with respect to habitat patches may be critical to the distribution and abundance of martens (USDA 1994). As landscapes become fragmented, the combination of increasing isolation and decreasing patch size of suitable habitat compounds the results of simple habitat loss (Andren 1994). For species like marten, this is likely to result in a decrease of greater magnitude than can be explained solely by the loss of suitable habitat. Marten may be a species that demonstrate exponential population declines at relatively low levels of fragmentation (Bissonette et al. 1997, *in* USDA Forest Service 2004).

The Tahoe NF falls within an area considered to be a distribution gap within the range of the fisher (Zielinski et al. 2005). However, roads can impact fisher in ways similar to the marten through direct mortality and habitat fragmentation. Suitable habitat for the fisher occurs primarily on the west side of the Tahoe NF.

Summary of road and trail associated factors to marten and fisher:

- Mortality or injury resulting from a motorized vehicle running over or colliding with an animal
- Loss and resulting fragmentation of habitat due to the establishment of roads or trails and associated human activities
- Changes to habitat microclimate associated with the edge induced by roads or trails
- Reduction in density of snags and down logs due to their removal near roads as facilitated by road access
- Collection of live animals for use as pets as facilitated by the physical characteristics of roads or trails or by road or trail access
- A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young
- Increase in heart rate or stress hormones when near a road or trail

Based upon a review of the literature, fisher and marten were found likely to be affected by the same road and motorized trail-associated factors: trapping, poaching, collisions, displacement or avoidance, habitat loss or fragmentation, snag reduction, down log reduction, edge effects, movement barrier or filter, and route for competitors (Gaines et al. 2003, Buskirk and Ruggierro In USDA 1994). These factors are discussed below.

Human-caused mortality: Marten are known for their vulnerability to trapping in many parts of their range. In California, however, body-gripping traps have been banned since 1998 and, as a result, the likelihood of incidental capture of marten by legal fur trapping has been dramatically reduced. Illegal harvest threats remain and could increase in relation to greater accessibility. At present, illegal trapping or shooting of marten is not known to be a substantial source of mortality (USDA Forest Service 2001). The increased opportunity for poaching provided by increased public access may represent a substantial risk for fisher, based upon findings in the southern Sierra Nevada. Of nine recently documented fisher

mortalities, two were suspected of being the result of poaching (Truex et al 1998 In USDI Fish and Wildlife Service 2004).

Collision: Highways and roads can result in the direct and indirect mortality of martens and fisher. Road collisions with vehicles have been identified as a source of marten mortality (Buskirk and Ruggerio 1994), including in the Sierra Nevada (Spencer 1981, Martin 1987), and fisher mortality (Heinemeyer 1993 In USDA 2001). Marten and fisher road mortality from highway collisions on the Tahoe NF may be of concern since Interstate-80, and State Highways 89, 49, and 20 bisect their habitat. Approximately 3.4 percent of 147 radio-collared fishers studied in Massachusetts (York 1996) and Maine (Krohn et al. In USDA 1994) were killed by vehicles. The risk of collision mortality increases with road density, but possibly increases with the density of highways and freeways where vehicle speeds are highest. Collisions are much less likely to occur along the slower-speed native surface roads and trails that are being evaluated in this project.

Habitat Loss and Fragmentation, Edge Effects, Movement Barriers, Displacement or Avoidance: Roads and trails can fragment habitat, thus affecting the ability of marten and fisher to use otherwise suitable habitat on either side of the route. Martens are known to be sensitive to changes in overhead cover, such as can result from roads or trails (Hargis and McCullough 1984, USDA 1994). Roads can contribute to habitat fragmentation for fisher as well because fishers generally avoid entering "Open Areas" that have no overstory or shrub cover; roads, and the associated presence of vehicles and humans can cause animals to modify their behavior near roads (USDA Forest Service 2001). Previous studies have reported a negative correlation between detections of fisher and roads (Dark 1997, Golightly et al. 2006). Road construction associated with timber harvest activities could directly and indirectly affect fishers. If fishers avoid areas in proximity of roads, then these areas constitute habitat loss.

The loss and fragmentation of suitable habitat by roads and development is thought to have played a significant role in both the loss of fisher from the central Sierra Nevada and its failure to re-colonize this area (USFWS 2004). Campbell (2004, *in* USFWS 2004) found that sample units within the central and southern Sierra Nevada region occupied by fishers were negatively associated with road density. This relationship was significant at multiple spatial scales (from 494 to 7,413 acres). The USFWS (2004) concluded that, "vehicle traffic during the breeding season in suitable habitat may impact foraging and breeding activity" and that "hiking, biking, off-road vehicle and snowmobile trails, may adversely affect fishers." Dark (1997) found that fishers in the Shasta-Trinity National Forest used landscapes with more contiguous, unfragmented forests and less human activity. These indirect effects on fisher habitat could negatively affect the ability for fishers to be successfully reintroduced to the Tahoe NF.

Robitaille and Aubrey (2000), studied marten in an area of low road density and traffic (primarily logging roads), and found that marten use of habitat within 300 and 400 meters of roads was significantly less than habitat use at 700 or 800 meters distance. Although marten are detected in close proximity to roads, it appears that significantly less marten activity occurs within these zones.

If highways, with their high traffic speeds, jersey barriers, and often steep side-slopes, limit the success and frequency of marten crossings, then effects on marten dispersal may be of concern. Interstate I-80 and State highways 89, 49, and 20 bisect marten habitat. If marten avoid these highways, then marten

populations could become fragmented into small isolated populations. In their assessment of connectivity in the California landscape, Penrod et al. (2001) identified Interstate-80 in particular as a threat to wildlife movement, and roads and highways in general as the most common barriers to movement.

Roads may decrease prey and food availability for marten and fisher (Allen 1987) due to prey population reductions from road kills and/or behavioral avoidance of roads. Occasional one and two lane forest roads with moderate levels of traffic should not limit marten movements.

In a study conducted on the Lake Tahoe Basin Management Unit and Sierra National Forest, however, 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.

Standards and guidelines in the Sierra Nevada Forest Plan Amendment ROD (2004), provides management direction for habitat connectivity for old forest associated species to “minimize old forest habitat fragmentation” and “assess the potential impacts of projects on the connectivity of habitat for old forest associated species,” particularly marten and fisher.

Snag and Down Log Reduction: High levels of coarse woody debris (snags, downed logs, root masses, large branches) are an essential component of marten habitat, especially during the winter months when marten require subnivian structures for cover and hunting opportunities. In addition, large logs with cavities provide rest and den sites for marten and fisher. Activities that remove large logs are therefore likely to degrade marten and fisher habitat (USDA 1994). Hazard tree removal along roads will reduce numbers of snags (future down logs) within a distance of about 60 meters alongside roads. In addition, motorized routes provide access for fuelwood collection, which would also contribute to decreased levels of snag and down wood within roadside corridors. However, snag removal within 60 meters of roads may be incidental compared to the displacement and avoidance factors that seem to influence marten habitat use adjacent to motorized routes.

Disturbance at Meadows (Marten only): Various studies in the Sierra Nevada indicate marten have a strong preference for meadows and forest-meadow edges for foraging (USDA Forest Service 2001). While marten use small openings, and particularly meadows for foraging, these openings must occupy 25 percent or less of the landscape (Hargis and Bissonette 1999; Potvin et al. 2000). Microtine rodents (meadow voles) are important for the marten diet, and therefore, the quality of meadow habitat (especially meadows surrounded by mature lodgepole and red fir forests) influences the quality of marten habitat (Spencer et al. 1983). Routes that are adjacent to and intersect meadows can alter meadow hydrology and vegetation which may have a negative effect on prey abundance. The combination of route use and increased human activity, as well as the potential impacts of routes upon meadow vegetation, may result in loss of these more easily exploitable “prey patches.”

American Marten and Pacific Fisher: Environmental Consequences

Based upon a review of the literature, fisher were found likely to be affected by the same road and motorized trail-associated factors as marten: trapping, poaching, collisions, displacement or avoidance, habitat loss or fragmentation, snag reduction, down log reduction, edge effects, movement barrier or filter, and route for competitors (Gaines et al. 2003, Buskirk and Ruggierro In USDA 1994). The current absence of fisher on the Tahoe NF renders temporal risk factors moot, but this analysis will be conducted to analyze impacts of the alternatives to fisher if populations were to be re-established on the Tahoe NF.

Environmental consequences for marten and fisher are analyzed at three different scales - within old forest coniferous habitat (defined as CWHR types 4M, 4D, 5M, 5D and 6), Old Forest Emphasis Areas (OFEAs), and Tahoe NF Forest Carnivore Network. Old forest coniferous habitat is considered to be suitable for marten (USDA 2004). The OFEAs, as previously described, are land allocations designated to manage for old forest dependent species, including marten. Although no management direction is specifically designated within the Tahoe NF Forest Carnivore Network, the network provides a broad framework for considering habitat connectivity issues for Forest Carnivores, including the marten. These three scales are used for comparison, since habitat connectivity within these habitats are important considerations for marten populations. Although all 3 scales have considerable overlap because older forest types are included in all of them, there are slight differences between them because they were derived in different manners. The old forest coniferous habitat types are comprised of individual patches of habitat types that may not necessarily be connected, whereas both the OFEAs and the Carnivore Network incorporates larger blocks of older forest types.

Indicators used to Measure Effects

Cross Country Travel and Establishment of "Open Areas": Cross country travel and establishment of "Open Areas" are evaluated for the alternatives to determine the impacts to fisher and marten habitats within old forest coniferous CWHR habitat, Old Forest Emphasis Areas (OFEAs), and Tahoe NF Forest Carnivore Network.

Additions to the NFTS and Reopened ML 1 Roads: Motorized route additions to the NFTS and reopened ML 1 roads are evaluated for their potential to directly and indirectly affect marten and fisher habitats by assessing the Zone of Influence within 300 meters and meadow habitats as described below.

Zone of Influence: Studies indicate marten habitat use declines within a distance within exceeding 300 meters from roads. For this analysis, the proportion of marten habitat occurring within a Zone of Influence of 300 meters from motorized routes was determined. Within this zone, some factors would be expected to influence a smaller area (probably about 60 meters) adjacent to motorized routes; thus a second Zone of Influence of 60 meters was analyzed for the DEIS and is available in the Project Record. These factors include changes to habitat such as fragmentation, edge effects, and the reduction of snags and down wood. Thresholds associated with these measures have not been established, but relative changes in habitat effectiveness for marten and fisher can be evaluated and compared.

Meadows Affected by Motorized Routes (Marten only): In the Sierra Nevada, marten are known to have a strong preference for meadows and forest-meadow edges for foraging (USDA Forest Service

2001). The number of meadows that are intersected by miles of motorized route additions and reopened ML 1 roads is used to measure the effects on wet meadow habitat important for the marten.

Changes to the NFTS (Change in Class of Vehicles and Wet Weather Seasonal Restrictions): The effects of Change in class of vehicles and wet weather seasonal restrictions are discussed previously under the section "Effects Common to All Old Forest Conifer Associated Species."

Direct and Indirect Effects: American Marten and Pacific Fisher

Cross Country Travel

Motorized cross country travel is not prohibited under Alternative 1, where habitat for American marten and Pacific fisher habitat would be at risk of habitat fragmentation, disturbance, avoidance, and abandonment from motorized use within 394,847 OFEA acres, 267,952 late-seral habitat (CWHR 4M, 4D, 5M, 5D, and 6) acres, and 396,602 Carnivore Network acres (acres may overlap). All the action alternatives prohibit cross country travel on over 250,000 acres of marten and fisher habitat, where habitat fragmentation, disturbance, avoidance, and abandonment would be reduced.

Establishment of "Open Areas"

Alternative 2 establishes motorized "Open Areas" at Greenhorn (60 acres), and Reservoir Areas at Stampede, Boca, and Prosser Reservoirs (2,589 acres). Alternative 6 establishes 244 acres of "Open Areas" at the reservoirs. In general, suitable habitat for marten and fisher is not available in these areas, and therefore motorized use of these areas would not alter habitat for these species. The Greenhorn area is below the elevation range for the marten. The reservoirs' "Open Areas" are also devoid of vegetation and occur within eastside pine and sagebrush/bitterbrush habitats that are generally not important for these species. If animals are traveling through in the vicinity of these "Open Areas," some direct disturbance could occur, although this is expected to be low.

Zone of Influence

Additions to the NFTS (300-meter Zone of Influence): The proportion of Carnivore Network, OFEAs, and Old Forest CWHR types within a 300-meter Zone of Influence of motorized route additions is displayed in Table 3.03-83.

Within a 300-meter Zone of Influence, Alternative 1 would result in the greatest amount of habitat fragmentation and reduced habitat connectivity within the Carnivore Network, late-seral coniferous forest habitat, and within OFEAs, where marten and fisher habitat suitability may be reduced. Alternative 1 results in contributing to 27% reduction in habitat connectivity within the Carnivore Network, a 22% reduction in habitat connectivity in Old Forest Emphasis Areas, and a 22% reduction in habitat connectivity in Old Forest habitat types

Within a 300-meter Zone of Influence, all the action alternatives would increase habitat connectivity within the Carnivore Network OFEAs, and old forest CWHR habitats compared to Alternative 1. Alternative 3 would improve habitat connectivity the greatest, and Alternatives 5 and 6 would reduce

habitat connectivity the least. The differences between the action alternatives would result in affecting from 0 to 2% within a 300 meter Zone of Influence of motorized route additions.

Table 3.03-83. Percent of Carnivore Network, OFEAs, and Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6) within a 300-meter "Zone of Influence" of motorized route additions to the NFTS

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Carnivore Network	27%	2%	0%	1%	2%	2%	1%
Old Forest Emphasis Areas (SNFPA)	22%	1%	0%	<1%	2%	2%	<1%
Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6)	22%	1%	0%	1%	2%	2%	1%

* Alternative 1 includes the existing unauthorized routes, while all action alternatives include proposed motorized route additions to the NFTS.

Reopened ML 1 Roads (300-meter Zone of Influence): Alternatives 1 and 3 do not propose to reopen any ML 1 roads within the Carnivore Network, OFEAs, and old forest CWHR habitats, and would not affect habitat effectiveness. Alternative 5 proposes to open the most ML 1 roads where approximately 2% of the Carnivore Network, OFEAs, and old forest CWHR habitats would be directly and indirectly affected. The remaining action alternatives would affect up to 0.2% of the Carnivore Network, OFEAs and old forest CWHR habitat from reopening ML 1 roads as shown in Table 3.03-84. This represents a small influence from reopened ML 1 roads within the Carnivore Network, OFEAs, and old forest CWHR habitat, which would not increase habitat fragmentation and would therefore maintain habitat connectivity for marten and fisher across the Tahoe NF.

Table 3.03-84. Percent of Carnivore Network, OFEAs, and Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6) within a 300-meter "Zone of Influence" of reopened ML 1 roads

Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Carnivore Network	0%	0.1%	0%	0.2%	2.2%	0.3%	0.1%
Old Forest Emphasis Areas (SNFPA)	0%	0.1%	0%	0.1%	1.7%	0.2%	0%
Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6)	0%	0.1%	0%	0.1%	1.8%	0.2%	0%

Wet Meadows (Marten only)

Cross Country Travel: Motorized cross country travel would continue under Alternative 1, no action, where wet meadows providing foraging habitat for marten could receive damage from motorized vehicle use. However, under current policy, it is illegal to cause resource damage in wet meadows. Under all the action alternatives motorized cross country travel would be prohibited on 9,167 acres of wet meadow across the Forest, where marten prey habitat would benefit.

Additions to the NFTS: The number of wet meadows that are intersected by proposed motorized route additions for the alternatives is shown in Table 3.03-85. Out of 518 wet meadows on the Tahoe NF, Alternative 1 would result in 87 meadow sites (17%) intersected by 16 miles of existing unauthorized routes. Motorized use on these existing unauthorized routes could directly disturb marten while foraging within and adjacent to these 87 meadow sites. These 16 miles of routes intersecting marten meadow

habitat could continue to receive cross country travel with the potential to indirectly affect the distribution and abundance of marten and its prey species. Routes through meadows can result in changes in meadow condition, particularly from meadow drying, loss of meadow vegetation, and through soil compaction and/or erosion. Loss of meadow vegetation and drying of meadows can affect the abundance and distribution of prey species available to marten, particularly meadow voles.

All the action alternatives would greatly reduce the impacts to wet meadows compared to Alternative 1. Amongst the action alternatives, Alternative 6 intersects the greatest number of meadows (25) for over 1 mile of motorized route additions. The majority of these additions are routes which access dispersed sites (33 out of 39 routes). The majority of the dispersed routes are short spur routes that total less than 0.10 miles in length. Alternatives 2 and 5 would each result in 9 wet meadows (2%) that are intersected by motorized route additions to the NFTS. Alternatives 4 and 7 result in approximately less than 1% wet meadows intersected by motorized route additions. Alternative 3 does not propose any motorized route additions, and therefore would not affect marten prey species within wet meadows.

Table 3.03-85. Meadows Intersected by Motorized Route Additions to the NFTS

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Wet Meadows Intersected by motorized route additions (518 total)	87	9	0	3	9	25	2
Percent Wet Meadows Affected	17%	2%	0%	<1%	2%	5%	<1%
Miles of Route Additions Intersecting Wet Meadows	16.2	0.5	0	0.04	0.5	1.35	0.31

*Alternative 1 includes unauthorized routes associated with continued cross country travel while all the action alternatives include motorized route additions.

Reopened ML 1 Roads: Only Alternative 5 would reopen ML 1 roads with the potential to adversely affect 2 meadows totaling 0.3 miles, which could affect the distribution and abundance of marten and its prey. Although this only represents less than 1% of all wet meadows on the Tahoe NF, there could be site specific impacts where meadow degradation may occur from use on these roads. Refer to Table 3.03-86.

Table 3.03-86. Meadows Intersected by Reopened ML 1 Roads

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number Wet Meadows Intersected by motorized route additions (518 total)	0	0	0	0	2	0	0
Percent Wet Meadows Affected	0%	0%	0%	0%	<1%	0%	0%
Miles of Reopened ML 1 Roads Intersecting Wet Meadows	0	0	0	0	0.3	0	0

Summary of Direct and Indirect, Impacts to American Marten and Pacific Fisher

When considering all the direct, indirect, and cumulative impact to the American marten and the Pacific fisher within American marten and Pacific fisher habitat, Table 3.03-87 summarizes the overall net effect to the American marten and Pacific fisher from the proposed actions from motorized route additions to the NFTS, prohibition of cross country travel, and change in seasonal of use.

Table 3.03-87. American marten and Pacific fisher - Summary of Overall Net Direct and Indirect Effects

				Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel										
Trend of Effect				Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Cross Country Travel Prohibited	**Carnivore Network**			0	401,428	401,428	401,428	401,428	401,428	401,428
	OFEAs			0	398,060	398,060	398,060	398,060	398,060	398,060
	Old Forest CWHR Types			0	268,895	268,895	268,895	268,895	268,895	268,895
Motorized Route Additions to the NFTS										
Trend of Effect				Negative	Minimal Negative Effects	No Effect	Minimal Negative Effects	Minimal Negative Effects	Minimal Negative Effects	Minimal Negative Effects
ZOI	**Carnivore Network**			27%	2%	0%	1%	2%	2%	1%
	OFEAs			22%	1%	0%	<1%	2%	2%	<1%
	Old Forest CWHR types			22%	1%	0%	1%	2%	2%	1%
Routes In Wet Meadows (miles)				16.2	0.5	0	0.04	0.5	1.35	0.31
Establishment of "Open Areas"				No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Changes to the NFTS	**Change in Season of Use**			No Effect	No Effect	No Effect	Beneficial from reduced disturbance	Beneficial from reduced disturbance	Beneficial from reduced disturbance	No Effect
	Change in Class of Vehicles			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Reopened ML 1 Roads	**Trend of Effect**		No Effect	No Effect	No Effect	Negative	Negative	No Effect	No Effect
		ZOI	**Carnivore Network**	0%	0.1%	0%	0.2%	2.2%	0.3%	0.1%
			OFEAs	0%	0.1%	0%	0.1%	1.7%	0.2%	0%
			Old Forest CWHR	0%	0.1%	0%	0.1%	1.8%	0.2%	0%
		In Wet Meadows (miles)		0	0	0	0	0.3	0	0
Amendments to the Forest Plan				No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects 22-27% habitat in ZOI, and where motorized cross country travel continued on unauthorized routes affecting between 268,895 and 401,428 acres.	3rd most beneficial alternative, route additions affects between 1-2% habitat in ZOI. Benefits from cross country travel prohibited on 268,895 and 401,428 acres.	Most beneficial alternative from since no routes added or reopened. Benefits from cross country travel prohibited on 268,895 and 401,428 acres.	2nd most beneficial alternative shared with Alt 7; about 1% habitat affected in ZOI of route additions. Benefits from motorized cross country travel prohibited on 268,895 and 401,428 habitat acres.	5th most beneficial alternative, approx. 4% habitat affected from ZOI of route additions and reopened ML 1 roads. Benefits from motorized cross country travel prohibited on 268,895 and 401,428 habitat acres.	4th most beneficial alternative; approx. 2% habitat affected in ZOI of route additions. Benefits from motorized cross country travel prohibited on 268,895 and 401,428 habitat acres.	2nd most beneficial altenative shared with Alt 4; about 1% habiat affected in ZOI of route additions. Benefits from motorized cross country travel prohibited on 268,895 and 401,428 habitat acres.

*Alternative 1 includes existing unauthorized routes that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects

Indicators to Measure Cumulative Effects

Motorized Route Density: The magnitude of effects caused by habitat loss and fragmentation, displacement or avoidance, routes for competitors will correspond, to some degree, with the density of motorized routes and the associated extent of public access and use. Marten have been found to be less active near motorized routes, and higher densities of motorized routes are therefore likely to result in less marten activity or occurrence in an area. In general, several studies indicate that factors associated with higher route densities are negatively correlated with numbers of marten and fisher. Habitat fragmentation effects also increase in relation to increased route densities. Forest Plan standards and guidelines direct that projects "minimize old forest habitat fragmentation" and emphasize old forest habitat connectivity. Since the "Old Forest Emphasis Area" land allocation and the Tahoe Forest Carnivore Network are intended to provide for structurally complex forests and connectivity of old forest habitat, route densities within this land allocation are evaluated.

Cross Country Travel: Cumulative effects of Motorized cross country travel are compared for the alternatives within Carnivore Network, OFEAs, and Old Forest CWHR habitats.

300 meter Zone of Influence: The cumulative effects within a 300-meter Zone of Influence of motorized and non-motorized routes are evaluated at three scales-- Carnivore Network, OFEAs, and old forest CWHR habitat types. The three scales are similar in attributes and overlap in some locations, but vary slightly in terms of patch size, distribution, and condition across the Tahoe NF landscape. Each of the scales was developed with different criteria. Analyzing the Zone of Influence within the three scales provide a relative comparison of how different types of "old forest" designations may be affected by motorized and non-motorized activities resulting in changes to habitat connectivity for marten and fisher at a large landscape scale.

Cumulative Effects of Motorized Route Density

The proportion of area with moderate to high motorized route densities (greater than 2 miles per square mile) are shown in Table 3.03-88 within old forest CWHR habitat types (4M, 4D, 5M, 5D and 6), Old Forest Emphasis Areas, and the Tahoe Forest Carnivore Network for each of the alternatives. Habitat connectivity for marten within these areas is an important consideration, since higher route densities may affect marten population densities. Alternative 1 would result in 86% to 89% of areas managed for marten (OFEAs-89%, Carnivore Network-87%, and old forest coniferous habitat - 86%) with motorized route densities that are greater than 2 miles per square mile. Since marten may demonstrate population declines at relatively low levels of fragmentation (USDA Forest Service 2001), Alternative 1 could result in population declines, especially since cross country motorized travel would continue and motorized route proliferation would be expected to increase over time.

The action alternatives result in about 10% less of the landscape with moderate to high motorized route densities when compared to Alternative 1. These alternatives result 74-80% of areas managed for marten (OFEAs, Forest Carnivore Network, and late-seral coniferous forest forests) with route densities

exceeding 2 miles per square mile, which is still relatively high. The majority of the areas with higher route densities are comprised of the existing road system. Also, the majority of marten and fisher habitats have route densities of 2-4 mi/mi^2.

As motorized route densities are reduced, habitat connectivity for marten and fisher are likely to be improved (Robitaille and Aubry 2000). The connectivity of higher elevation habitats that are not as affected by motorized routes is improved substantially in the action alternatives as compared to the Alternative 1. On the Tahoe NF, there are 11 Inventoried Roadless Areas (IRAs). These areas include Westside mixed conifer, red fir and lodgepole pine types that are preferred habitat for marten in the Sierra Nevada (USDA Forest Service 2001) and increase the size and connectivity of undisturbed habitat that occurs in the wilderness areas. Since Alternative 3 does not add any motorized routes to the NFTS in IRAs, it provides greater connectivity of marten and fisher habitat as compared to the other alternatives which propose some motorized route additions to the NFTS within these areas.

Table 3.03-88. Proportion of Tahoe NF Lands with Motorized Route Densities greater than 2 miles/square mile within Old Forest CWHR type, Old Forest Emphasis Areas, and Tahoe Carnivore Network

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Old forest CWHR types (4M, 4D, 5M, 5D, & 6)	86%	75%	75%	75%	78%	75%	75%
Old Forest Emphasis Areas	89%	76%	76%	76%	81%	78%	76%
Carnivore Network	87%	74%	74%	74%	78%	75%	74%

*For Alternative 1, route density within mature and old forest coniferous habitat (CWHR 4M, 4D, 5M, 5D & 6), Old Forest Emphasis Areas (OFEAs), and Carnivore Network includes existing motorized unauthorized routes, as well as existing NFTS routes and non-NFTS routes.

Cross Country Travel

Table 3.03-89 shows the acres of cross country travel prohibited to motor vehicle use for the alternatives, including proposed cross country prohibitions and current prohibitions designated under the Tahoe Land Management Plan (LRMP). Cross country travel would continue under Alternative 1on between 268,895 and 401,428 acres where marten and fisher habitat would result in significant habitat fragmentation and disturbance from motorized cross country travel within the Tahoe NF Carnivore Network, OFEAs, and old forest CWHR types, all of which are important landscapes to maintain habitat connectivity and integrity. Under Alternative 1, only existing LRMP motorized cross country prohibitions on 17,892 and 39,428 acres would occur.

All the action alternatives would cumulatively benefit marten and fisher habitat at all three landscape scales where cross country travel would be prohibited, ranging from a total of 286,787 acres to 437,488 acres, including LRMP areas currently prohibited to motor vehicles. Under the action alternatives reduced disturbance and habitat fragmentation would be significantly beneficial to marten and fisher and their habitat where habitat connectivity would be enhanced and maintained

Table 3.03-89. Cross Country Travel Cumulative Effects in Carnivore Network, OFEAs, and Old Forest CWHR habitat

Carnivore Network							
Existing LMP cross country travel prohibition (acres)	34,303	34,303	34,303	34,303	34,303	34,303	34,303
Proposed cross country travel prohibition (acres)	0	401,428	401,428	401,428	401,428	401,428	401,428
Cumulative Total	**34,303**	**435,731**	**435,731**	**435,731**	**435,731**	**435,731**	**435,731**
OFEAs							
Existing LMP cross country travel prohibition (acres)	39,428	39,428	39,428	39,428	39,428	39,428	39,428
Proposed cross country travel prohibition (acres)	0	398,060	398,060	398,060	398,060	398,060	398,060
Cumulative Total	**39,428**	**437,488**	**437,488**	**437,488**	**437,488**	**437,488**	**437,488**
Old Forest CWHR types (4M, 4D, 5M, 5D, & 6)							
Existing LMP cross country travel prohibition (acres)	17,892	17,892	17,892	17,892	17,892	17,892	17,892
Proposed cross country travel prohibition (acres)	0	268,895	268,895	268,895	268,895	268,895	268,895
Cumulative Total	**17,892**	**286,787**	**286,787**	**286,787**	**286,787**	**286,787**	**286,787**

300-meter Zone of Influence

The cumulative proportion of Carnivore Network, OFEAs, and Old Forest CWHR occurring within a 300-meter Zone of Influence of motorized route additions to the NFTS, existing motorized routes on NFS and non-NFS lands, and non-motorized routes for all the alternatives is shown in Tables 3.03-90, -91, and -92. In addition, the zones of influence where positive cumulative impacts are realized where motorized routes are decommissioned or cross country travel is prohibited, including use on unauthorized motorized routes, is also displayed for each of the alternatives.

Within the Carnivore Network, OFEAs and Old Forest habitat types, Alternative 1 would pose the greatest risk to habitat fragmentation where considerable cumulative impacts would be added to existing cumulative effects to marten and fisher. Existing motorized routes in the NFTS influence between 30 and 32% of marten and fisher habitat within the Carnivore Network, OFEAs, and Old Forest CWHR types. Under Alternative 1, continued motorized cross country travel, with continued use on existing unauthorized routes, would influence an additional 22 to 27% (cumulative impact score) of the Carnivore Network, OFEAs, and Old Forest habitat types, further reducing habitat connectivity, where cumulative impacts to marten and fisher habitat would be significant. Future route proliferation due to unmanaged cross country travel would further increase habitat fragmentation which could seriously limit the distribution of marten and the future reestablishment potential of the fisher on the Tahoe NF.

Compared to Alternative 1, all the action alternatives would benefit fisher and marten habitats by reducing habitat fragmentation by at least 20%. In general, Alternative 5 would increase habitat connectivity the least and Alternative 3 would increase habitat connectivity the most at all three landscape scales.

The cumulative impact added to existing conditions for all the action alternatives from motorized route additions and reopened ML 1 roads would not affect the overall distribution and abundance of marten on the Tahoe NF, and would not affect the future reintroduction of fisher on the Tahoe NF. Therefore, population viability for the marten would not be affected by any of the action alternatives.

Under these alternatives cross country motorized travel would be prohibited and future route proliferation should be minimized.

Table 3.03-90. Cumulative Percent of Carnivore Network within a 300-meter Zone of Influence of Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of Proposed Alternatives							
Motorized route additions to the NFTS (negative impact)[1]	27%	2%	0%	1%	2%	2%	1%
Reopened ML 1 roads	0%	0%	0%	0%	2%	0%	0%
Existing Unauthorized routes where cross country travel is prohibited (positive impact)	0%	25%	26%	26%	24%	25%	26%
Cumulative Effects of Past and Present							
Existing motorized routes - NFS lands (negative impact)	31%	31%	31%	31%	31%	31%	31%
Existing motorized routes on private land - non-NFS lands (negative impact)	5%	5%	5%	5%	5%	5%	5%
Existing non-motorized routes (negative impact)[2]	6%	6%	6%	6%	6%	6%	6%
Decommissioned routes (positive impact)	2%	2%	2%	2%	2%	2%	2%
Roads closed by previous NEPA decisions, pending implementation (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Cumulative Impact Score = Sum Total of All Routes (Note: Some overlap may occur where route categories intersect)	**69%**	**44%**	**42%**	**43%**	**46%**	**44%**	**43%**

[1]Motorized Additions - Alternative 1 includes use on existing unauthorized routes associated with continued cross country travel

[2]Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60

Table 3.03-91. Cumulative Percent of Old Forest Emphasis Areas within a 300-meter Zone of Influence

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of Proposed Alternatives							
Motorized route additions to the NFTS (negative impact)[1]	22%	1%	0%	<1%	2%	2%	<1%
Reopened ML 1 roads (negative)	0%	0%	0%	0%	2%	0%	0%
Existing unauthorized routes where cross country travel prohibited (positive impact)	0%	21%	22%	21%	20%	21%	21%
Cumulative Effects of Past and Present							
Existing motorized routes - NFS lands (negative impact)	32%	32%	32%	32%	32%	32%	32%
Existing motorized routes on private land - non-NFS lands (negative impact)	12%	12%	12%	12%	12%	12%	12%
Existing non-motorized routes (negative impact)[2]	5%	5%	5%	5%	5%	5%	5%
Decommissioned routes (positive impact)	2%	2%	2%	2%	2%	2%	2%
Roads closed by previous NEPA decisions, pending implementation (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Relative Cumulative Impact Score (Percent of Tahoe NF OFEA) = Sum Total of all routes both positive and negative (Note: Some overlap may occur where route categories intersect)	**71%**	**50%**	**49%**	**49%**	**53%**	**51%**	**49%**

[1]Motorized Additions - Alternative 1 includes use on existing unauthorized routes associated with continued cross country travel

[2]Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60

Table 3.03-92. Cumulative Percent of Forest-wide Late-seral Forest (CWHR 4, 5, 6) within 300-meter "Zone of Influence" of Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and indirect effects of Proposed Alternatives							
Motorized route additions to the NFTS[1] (negative impact)	22%	1%	0%	1%	2%	2%	1%
Reopened ML 1 roads (negative)	0%	0%	0%	0%	1%	0%	0%
Unauthorized routes where cross country travel is prohibited (positive impact)	0%	22%	22%	22%	21%	21%	22%
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	30%	30%	30%	30%	30%	30%	30%
Existing motorized routes - non-NFS lands (private) (negative impact)	15%	15%	15%	15%	15%	15%	15%
Existing non-motorized routes (negative impact)[2]	5%	5%	5%	5%	5%	5%	5%
Decommissioned routes (positive impact)	2%	2%	2%	2%	2%	2%	2%
Roads closed by previous NEPA decisions, pending implementation (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Relative Cumulative Impact Score = Sum Total of All Routes (negative impacts) (Note: Overlap occurs where route categories intersect, therefore percentages are only relative to each other and not actual amounts)	**72%**	**51%**	**50%**	**51%**	**53%**	**52%**	**51%**

[1]Motorized Additions - Alternative 1 includes use on existing unauthorized routes associated with continued cross country travel

[2]Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60

Cumulative Effects to Meadows from Past, Present and Reasonably Foreseeable Actions

The cumulative effects geographic boundary for marten prey habitat includes 518 wet meadows occurring within the boundary of the Tahoe NF including NFS and non-NFS lands. This scale is sufficiently large to evaluate effects to microtine rodents that are important prey species for the marten. The cumulative effects timeframe is the same as stated for other species.

In some meadows, livestock grazing has reduced the suitability of meadow vegetation for microtine rodents and other marten prey (USDA Forest Service 2001). Livestock grazing occurs on 31 active grazing allotments on the Tahoe NF, totaling 538,431 acres of NFS and private lands. On the Tahoe NF, the impact 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 alternatives upon meadow habitat and condition.

Cumulative Effects to Meadows

Cumulative effects are evaluated by assessing the number of wet meadows that are intersected by motorized route additions to the NFTS, motorized routes on existing NFS lands and non-NFS lands (private). In

addition, non-motorized routes are also evaluated. Finally, the prohibition of cross country travel, including on existing unauthorized routes or decommissioned routes are also evaluated for their beneficial cumulative impacts where the adverse impacts of motorized routes would be removed are considered.

Direct and indirect effects of adding motorized routes to the NFTS would add to existing cumulative effects to wet meadows which provide habitat for foraging marten and microtine rodents which are preferred marten prey species (Alternative 1 to the greatest extent, followed by Alternatives 5, 2, 3, 6, 4, and 7, in decreasing order). Alternative 1 directly and indirectly affects 81 of 518 meadows (16% of all meadows) that would be impacted by continued cross country motorized use, including use of existing unauthorized routes. Considering existing cumulative effects from existing motorized routes on both public and private lands and non-motorized routes, this additional 16% of meadow impacts is substantial. In addition, since Alternative 1 does not prohibit public motor vehicle cross country travel on 9,167 acres of wet meadow habitat, which would continue and proliferate, and would result in cumulative impacts upon marten.

The remaining action alternatives would result in progressively fewer meadows being cumulatively impacted, with Alternative 5 contributing the most, to Alternative 3, which would not contribute to additional cumulative adverse impacts since no motorized routes are proposed. All the action alternatives benefit from the prohibition of cross country travel on 9,167 acres of wet meadow habitat, including on existing unauthorized routes, affecting between 78 and 81 meadows (15 to 16% of all meadows) where motorized vehicle use would be prohibited, as shown in Table 3.03-93. The overall cumulative effect as a result of cross country prohibitions, motorized route additions, and reopening ML 1 roads ranges from 275 to 370 meadows intersected by routes (Alt 3 - the least, Alt 1 - the most).

Table 3.03-93. Cumulative Number of Wet Meadows Intersected by Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Wet Meadows Intersected by motorized route additions to the NFTS (negative impact)[1]	81	7	0	1	9	5	3
Wet Meadows Intersected by reopened ML 1 roads (negative impact)	0	0	0	0	2	0	0
Wet Meadows Intersected by existing unauthorized routes due to the prohibition of cross country travel (positive impact)	1	78	82	81	76	78	80
Cumulative effects of past, present, and proposed actions							
Wet Meadows Intersected by existing motorized routes - NFS lands (negative impact)	150	150	150	150	150	150	150
Wet Meadows Intersected by existing motorized routes on non-NFS lands (private) (negative impact)	96	96	96	96	96	96	96
Wet Meadows Intersected by existing non-motorized routes (negative impact)[2]	39	39	39	39	39	39	39
Wet Meadows Intersected by decommissioned routes (positive impact)	11	11	11	11	11	11	11
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**370**	**296**	**275**	**289**	**300**	**296**	**288**

[1]Motorized Additions - Alternative 1 includes use on existing unauthorized routes associated with continued cross country travel

[2]Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60

Overall Cumulative Effects Summary

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable vegetation and fuels management projects on NFS lands and private lands within the Tahoe NF 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. In 2001 and 2004, the Forest Service amended Sierra Nevada Forest Plans to better address the needs of old forest-associated species (USDA Forest Service 2001 and 2004). In this assessment, the following key risk factors were identified for marten in the Sierra Nevada: (1) habitat alternation, 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.

On the Tahoe NF, several activities have influenced these risk factors for marten. Wildfires occurring between 1990 and 2008 burned over 11,000 acres of suitable marten and fisher habitat (CWHR 4M, 4D, 5M, 5D and 6), some of which was rendered unsuitable, and other areas maintained key habitat components. Past timber harvest and more recent fuels reduction treatments have reduced important habitat components in marten habitats. Between 2001 and 2008, fuels treatments on NFS lands have occurred on approximately 17,000 acres. These vegetation treatments have reduced habitat quality for marten and 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. Over 30,000 acres of fuels and vegetation treatments are planned to occur over the next few years based upon the projects listed in Appendix H. Some, but not all of them would affect marten and 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 would be reduced in response to these treatments (USDA Forest Service 2004).

The California Department of Forestry and Fire Protection currently lists approximately 12,000 acres of private land within the Tahoe NF 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 provide suitable habitat for marten and fisher.

Alternative 1 has the greatest likelihood of contributing to substantial adverse cumulative effects upon marten populations and may affect the ability to reestablish fisher over time. Alternatives 2, 4, 5, 6, and 7, would result cumulative effects to a lesser extent than Alternative 1. Alternative 3 results in the least cumulative effects because no motorized routes are proposed for addition to the NFTS; therefore, motorized route densities in marten habitat remain lowest, and motorized routes would not be added to the NFTS in habitats of particular importance to marten (meadows). The combined effects of the alternatives and other factors affecting marten and fisher habitats do not indicate that the magnitude of these combined effects would result in a loss of viability or lead to a trend toward Federal listing for the American marten under any alternative (see project Biological Evaluation).

These alternatives do not result in a loss of habitat (no route construction), but may add to existing cumulative effects through reduced habitat effectiveness from the sum total of route additions, reopened

ML1 road, and cross country travel prohibitions, where an additional 20 to 25% of marten habitat may be influenced by continued cross country travel, including continued use of existing unauthorized routes under Alternative 1; about 5% under Alternative 5; and from 0 to 2% under the remaining action alternatives. The cumulative effects under Alternative 1, including fuels treatment and livestock grazing effects upon marten habitat, could be considerable. Inventoried Roadless Areas (IRAs) and adjacent wilderness areas may become increasingly important as the cumulative effect of fuels treatment activities expand within other portions of marten and fisher habitat.

Existing unauthorized routes, may receive non-motorized use (hiking, mountain bicycling, equestrian). It is generally considered that non-motorized use would be less impactive to fisher and marten due to reduced noise and other factors. The extent and magnitude of non-motorized use is unknown. However, it is expected that over time, these routes would eventually become revegetated and recover either through active or passive restoration means.

Sensitive Species Determination – American Marten

The Biological Evaluation for the Tahoe NF Motorized Travel Management Project, which is incorporated by reference, made a determination that all the action alternatives may affect individual American martens, but are not likely to result in a loss of viability or lead to a trend toward federal listing. Motorized routes through wet meadows are not proposed to be added to the NFTS in Alternative 6, the Preferred Alternative. Motorized routes within riparian conservation areas, including meadows would be significantly reduced compared to Alternative 1, no action. Habitat fragmentation from motorized routes would be considerably reduced. Future route proliferation would be minimized due to prohibition of unmanaged cross country motorized travel. In addition, wet weather restrictions on native surfaced routes would reduce potential erosion and sedimentation within meadow habitat, important to marten prey species.

MIS Summary – American Marten

The American marten was selected as an MIS for late-seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures above 40% within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersion of riparian areas and meadows. Important habitat attributes are: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1987). Key components for westside and eastside marten habitat can be found in the Sierra Nevada Forest Plan Amendment FEIS (USDA Forest Service 2001), Volume 3, Chapter 3, part 4.4, pages 20-21.

Based on the analysis conducted, Alternative 1 directly, indirectly, and cumulatively affects the greatest amount of late-seral closed canopy coniferous forest with a 200-meter Zone of Influence of existing motorized unauthorized routes, which would continue under continued cross country travel.

Alternative 1 reduces habitat effectiveness by 8% (13,435 acres out of 167,938 Tahoe NF habitat acres), with the potential to disturb, cause avoidance, and abandonment of California spotted owl, American marten, and northern flying squirrel. Considering the checkerboard pattern of land ownership within the Tahoe NF boundary, Alternative 1 could cause a downward trend in habitat effectiveness for these species. In addition, the cross country travel would continue and proliferate on 119,091 acres of late-seral closed canopy coniferous forest habitat.

Alternatives 2, 4, 5, and 6 would affect 1,679 acres of late-seral closed canopy coniferous forest habitat or 0.2% of Tahoe NF habitat within a 200-meter Zone of Influence of motorized route additions to the NFTS. Alternatives 3 and 7 do not affect late-seral closed canopy coniferous forest habitat within a 200-meter Zone of Influence of motorized route additions. The Tahoe NF Motorized Travel Management Project action alternatives would not result in a direct or indirect change in the amount of late-seral closed canopy coniferous forest habitat affected by motorized routes for all the alternatives. Therefore, habitat effectiveness for these species would be maintained at current levels.

For all the alternatives, the change in the class of vehicles would not directly, indirectly, or cumulatively affect late-seral closed canopy coniferous forest habitats or their habitat effectiveness. Wet weather seasonal restrictions on all native surfaced roads and motorized trails under Alternatives 4, 5, and 6 would enhance late-seral closed canopy coniferous forest habitat effectiveness for the California spotted owl, American marten, and the northern flying squirrel through the reduced disturbance, avoidance, and abandonment. Finally, the prohibition of motorized cross country travel on 119,091 acres of late-seral habitats, would benefit these species over time, thereby preventing the continued cumulative increase in motorized route proliferation in the future.

Summary of Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the American marten; hence, the late-seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008) and the Tahoe NF Motorized Travel Management Project-level MIS Report, which are hereby incorporated by reference.

Habitat Status and Trend. There are currently 994,000 acres of late-seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on NFS lands in the Sierra Nevada. The trend is slightly increasing (from 7% to 9% within the last decade on NFS lands).

Population Status and Trend. American marten has been monitored throughout the Sierra Nevada as part of general surveys and studies from 1996-2002 (Zielinski et al. 2005). Since 2002, the American marten has been monitored on the Sierra Nevada forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA Forest Service 2005, 2006, 2007b). Current data at the range-wide, California, and Sierra Nevada scales indicate that, although marten appear to be distributed throughout their historic range, their distribution has become fragmented in the southern Cascades and

northern Sierra Nevada, particularly in Plumas County. The distribution appears to be continuous across high-elevation forests from Placer County south through the southern end of the Sierra Nevada.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trends. Based on the small proportion of late-seral closed canopy coniferous forest habitat that is directly, indirectly and cumulatively affected (0% to 1.4% of Sierra Nevada habitat) by the alternatives within a 200-meter Zone of Influence of motorized route additions to the NFTS, the Tahoe NF Motorized Travel Management Project would not alter existing trend in the habitat, nor would it lead to a change in the distribution of American marten across the Sierra Nevada bioregion.

Pacific Fisher Sensitive Species Determination

Due to the absence of the Pacific fisher on the Tahoe NF, implementing the Tahoe NF Travel Management Project EIS would not affect the Pacific fisher (The Tahoe NF Biological Evaluation is incorporated by reference). Furthermore, this project as proposed would not likely affect any future reintroduction efforts and the ability for the fisher to become reestablished on the Tahoe NF since habitat fragmentation by the addition of motorized routes is minimized. Cross country motorized use would be prohibited, including use on existing unauthorized routes within suitable fisher habitat.

Compliance with Forest Plan and Other Direction

The Tahoe LRMP, as amended by the 2004 SNFPA ROD, provide the following management direction for meadow and wetland habitat:

- *Locate roads away from meadow edges where alternative routes are available (Tahoe LRMP) (Management Standard and Guideline).*
- *Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.*
- *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 (RCO#2, Management Standard & Guideline 100).*
- *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) 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 (Management Standard & Guideline 92).*

Marten foraging habitat within wet meadow were analyzed for the alternatives. Based on the analysis of the alternatives, Alternative 1 least complies with this direction. Alternative 1 negatively affects 81 of 518 meadows (16%) from cross country travel on 14 miles of existing unauthorized routes. The action alternatives all meet the Forest Plan Standards and Guidelines by reducing motorized impacts to meadows by prohibiting cross country travel, including on 13 to 14 miles of existing unauthorized routes. Of the

action alternatives, Alternative 5 reduces the impacts on meadows the least and Alternative 3 reduces the impacts on meadows the most.

The Tahoe LRMP, as amended by the 2004 SNFPA ROD provides management direction for the fisher and marten as follows:

> *Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites (Management Standard & Guidelines 87 and 89).*

Fisher have not been verified to occur on the Tahoe NF, and therefore this standard and guideline does not apply for fisher. However, marten does occur on the Tahoe NF, although known den sites have not been identified. The sections above thoroughly analyzes the alternatives for the potential to disturb suitable fisher and marten denning habitat (as defined by CWHR 4M, 4D, 5M, 5D, and 6 habitat types). The analysis of alternatives also analyzed the potential to disturb marten and fisher habitat within Old Forest Emphasis Areas and the Tahoe NF Carnivore Network, both of which provide important habitat attributes for these species.

Snags in Green Forest Ecosystem Component Associated Species: Affected Environment

Many wildlife species depend on snags or dead trees for nesting, roosting, denning, foraging, resting, or shelter. Snag associated species included in this group include both primary and secondary excavators. The hairy woodpecker is the species chosen to represent this group, although many other species are snag dependent species including other woodpecker species, pallid bat, and small songbirds such as nuthatches and chickadees. In addition, the hairy woodpecker was selected as the MIS on the Tahoe NF, as amended by the Sierra Nevada Forest Bioregion EIS, for the ecosystem component of snags in green forests. Medium to large (diameter breast height between 15 to 30 inches and greater than 30 inches) snags are most important. The hairy woodpecker uses stands of large, mature trees and snags of sparse to intermediate density; cover is also provided by tree cavities (CDFG 2005). Mature timber and dead snags or trees of moderate to large size are apparently more important than tree species (Siegel and DeSante 1999).

Snags are the result of tree mortality that can result from insect outbreaks, diseases, fire, drought, and flooding. Such events maintain the snag resource through time, though snag numbers may fluctuate as forests undergo cycles of drought accompanied by higher tree mortality, followed by lower tree mortality after stands have thinned (Bull et al. 1997).

Habitat for snag associated species (cavity nesting birds and bats) is considered to be forested vegetation types with snags larger than 15 inches diameter. Table 3.03-3 lists the types of road and motorized trail-associated factors likely to affect Tahoe NF terrestrial species; one of these factors is the category listed as edge effects and the reduction of snags and down logs. Snag and log reduction occurs as result of managing roads or trails for public use. Trees posing a potential safety hazard (“hazard trees”) are removed along roads open for public use, as well as along roads receiving concentrated use during

implementation of a specific project. Hazard trees are typically dead or dying trees that occur within a tree-height distance from the road. This safety policy results in a reduction in snags within a zone of about 60 meters from a road's edge. This, in turn, reduces habitat quality and availability for snag associated species (i.e. cavity nesting birds and tree nesting bat species) within these roadside corridors. Studies have shown cavity-nesting birds to decline 53 to 77 percent after snag removal (Scott and Oldemeyer 1983, Raphael and White 1984, Hejl 1997).

The amount of down wood is also influenced within this zone, both by the removal of hazard trees that would become future down wood, and by the access provided for woodcutters. Down wood is important as a foraging substrate, providing insects required by species like the pileated woodpecker.

Nests of cavity nesting birds are typically more secure from nest predation than other forest birds, and recreational disturbance is not known to be a limiting factor as it is for some other forest bird species (Gaines et al. 2003). Roads and trails have the potential to adversely affect bats by facilitating access to bat habitats which may directly or indirectly affect bats.

Snags in Green Forest Ecosystem Component Associated Species: Environmental Consequences

Indicators used to Measure Effects

Zone of Influence within 60 Meters: For the proposed alternatives, the habitat factor used in this analysis to assess effects to medium (15-30 inches dbh) and large (greater than 30 inches dbh) snags within green forest, was the amount of green forest that fell within a 60-meter Zone of Influence of motorized routes added to the NFTS. A 60-meter Zone of Influence represents the proportion of snag habitat along motorized routes that may be affected by fuelwood or hazard tree removal, resulting in a reduction of snag habitat for the hairy woodpecker. This distance represents the maximum height of a snag that could be removed along proposed routes.

The No Action Alternative (Alternative 1) was analyzed by determining the amount of green forest habitat that fell within a 60-meter Zone of Influence of existing unauthorized routes that could be affected by fuelwood.

Current Condition of the Habitat Factor(s) in the Project Area: On the Tahoe NF, snags in green forest ecosystem component vary in density, size, decay class, and distribution, depending upon the forest type, presence of decay factors (insects and diseases), and the amount of management activities that have taken place. Annual precipitation also affects the amount of snags present within green forests. Snag densities are generally higher in mixed conifer forests and true fir forests. Pure eastside pine forests generally have lower snag densities compared to forest types that have higher concentrations of true fir species (red fir and white fir). Snag densities on the Tahoe NF vary from 0 snags per acre to well over 6 snags per acre.

Direct and Indirect Effects to Habitat

Cross Country Travel. Under Alternative 1, cross country travel would not be prohibited, potentially affecting 637,148 acres of green forest habitat, potentially causing reduced habitat effectiveness through

disturbance, avoidance, and abandonment by the hairy woodpecker. For all action alternatives, cross country travel would be prohibited on these acres thus reducing or eliminating disturbance, avoidance, abandonment.

Additions to the NFTS and Reopened ML 1 Roads: Table 3.03-94 displays the alternatives affect hairy woodpecker habitat within a 60-meter Zone of Influence of motorized route additions to the NFTS and reopened ML 1 roads, where snags could be removed for hazard tree removal or public fuelwood gathering. The Tahoe NF Motorized Travel Management Project could potentially directly or indirectly affect 1.5% (64,315 acres out of 4,381,000 Sierra Nevada habitat acres) of hairy woodpecker habitat under Alternative 1, where incidental snags could be lost through public fuelwood removal, though it is not expected that this activity to be significant.

All the action alternatives would reduce affects to hairy woodpecker habitat by banning cross country travel, including on existing unauthorized routes. Alternative 5 would affect 0.2% (7,076 acres of 4,381,000 Sierra Nevada habitat acres) of hairy woodpecker habitat from both motorized route additions and reopened ML 1 roads, where each contributes about equal portion of the impacts.

Alternatives 2, 4, and 7, similarly would affect 0.1% hairy woodpecker habitat (2,637 out of 4,381,000 Sierra Nevada habitat acres), while Alternative 3 does not directly or indirectly affect hairy woodpecker habitat. It is not expected that all snags along motorized routes would be removed, but incidental removal of hazard trees for public safety and access to fuelwood gathering could result in the loss of incidental snags along proposed motorized route additions. The relatively small amount of habitat within a 60-meter Zone of Influence is not likely to result in a measurable change in the snag habitat component at the scale of the Sierra Nevada Bioregion.

Changes to NFTS (Wet Weather Seasonal Restrictions). Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where hairy woodpecker habitat effectiveness (snags within green forests) would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced routes are restricted during the wet weather season. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, the hairy woodpecker habitat effectiveness would not be enhanced when native surfaced motorized routes are under wet weather seasonal restrictions. Under Alternative 1, continued cross country travel, including on existing unauthorized routes would result in the greatest amount of disturbance (reduced habitat effectiveness) to hairy woodpecker habitat within snags within green forests.

Table 3.03-94. Cross Country Travel and Proportion of Snags in Green Forest Hairy Woodpecker habitat within a 60-meter "Zone of Influence" of Motorized Route Additions and Reopened ML 1 Roads to the NFTS

Hairy Woodpecker (Snags in Green Forest Habitat Ecosystem component)		**Alt 1**[1]	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Cross Country Travel within Tahoe NF project area								
Acres of Hairy Woodpecker habitat where cross country travel is prohibited		0	637,148	637,148	637,148	637,148	637,148	637,148
Proportion of Snag Ecosystem Component in Green Forest Habitat (Hairy Woodpecker MIS Habitat) within 60-meter "Zone of Influence"								
Acres – Hairy Woodpecker Green Forest Habitat[2]	**Motorized route additions**	64,315	2,512	0	1,214	3,347	2,950	1,335
	Reopened ML Roads	0	0	0	0	3,729	0	0
	Total	**64,315**	**2,512**	**0**	**1,214**	**7,076**	**2,950**	**1,335**
Proportion of Sierra Nevada Habitat (Based on total acres early, mid, late-open canopy, and late-closed canopy coniferous forests in SN bioregion)	4,381,000	1.5%	0.06%	0%	0.03%	0.16%	0.07%	0.03%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat	990,707	6.5%	0.3%	0%	0.1%	0.7%	0.3%	0.1%
Habitat Security Risk in Tahoe NF		Low	Low	Low	Low	Low	Low	Low

[1] Alternative 1 includes existing unauthorized routes that would continue with the continuance of cross country travel.

[2] The Zone of Influence within 60 meters of motorized routes include both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard ownership pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Summary of Direct and Indirect Effects

Table 3.03-95 summarizes the overall net direct and indirect effect of the alternatives from motorized route additions, prohibition of cross country travel, wet weather restrictions, and changes in class of vehicles to the hairy woodpecker.

Table 3.03-95. Hairy Woodpecker - Summary of Overall Net Direct and Indirect Effects

			Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel									
Trend of Effect			Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Cross Country Travel Prohibited			0	637,148	637,148	637,148	637,148	637,148	637,148
Motorized Route Additions*									
Trend of Effect			Negative	Negative	No Effect	Negative	Negative	Negative	Negative
Percent Habitat Affected within ZOI*			6.5%	0.3%	0%	0.1%	0.3%	0.3%	0.1%
Establishment of "Open Areas"			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Changes to NFTS	**Change in Season of use**		No Effect	No Effect	No Effect	Habitat effectiveness enhanced during seasonal restrictions	Habitat effectiveness enhanced during seasonal restrictions	Habitat effectiveness enhanced during seasonal restrictions	No Effect
	Change in Class of Vehicles		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Reopened ML 1 Roads	**Trend of Effect**	No Effect	No Effect	No Effect	No Effect	Negative	No Effect	No Effect
		Percent Habitat Affected within ZOI	**0%**	0%	0%	0%	0.4%	0%	0%
Amendments to Forest Plan			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Cross Country Travel Prohibited	0	637,148	637,148	637,148	637,148	637,148	637,148
Motorized Route Additions*							
Overall Net Effect of Proposed Actions	Most impactive alternative from continued use on existing unauthorized routes (**6.5% habitat affected in ZOI**) Cross country travel continued on 637,148 acres.	3rd most beneficial alternative, shared with Alt 6 (**0.3% habitat affected in ZOI**). Cross country travel prohibited on 637,148 acres; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.	Benefits the most—**does not add routes or reopen ML 1 roads.** Cross country travel prohibited on 637,148 habitat acres; reduces disturbance and habitat fragmentation.	2nd most beneficial alternative, shared with Alt 7 (**0.1% habitat affected within ZOI**) Cross country travel prohibited on 637,148 habitat acres; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.	Benefits the least (**0.7% habitat affected in ZOI**). Cross country travel prohibited on 637,148 habitat acres; although minor negative impacts from route additions and reopened ML 1 roads; overall reduces disturbance and habitat fragmentation.	3rd most beneficial alternative, shared with Alt 2 (**0.3% habitat affected in ZOI**). Cross country travel prohibited on 637,148 habitat acres. although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.	2nd most beneficial alternative, shared with Alt 4 **(0.1% habitat affected within ZOI**). cross country travel prohibited on 637,148 habitat acres; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.

*Alternative 1 includes existing unauthorized routes that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to the hairy woodpecker includes all medium (15 to 30 inch dbh) and large snags (greater than 30 inch dbh) within green forests within the boundary of the Tahoe NF. Past and current cumulative effects to the medium and large snag ecosystem component include loss of snags through catastrophic wildfires; timber and fuels management; urban development and expansion within a highly checkerboard land ownership pattern; and public fuelwood removal. In addition, hazard tree removal along NFTS roads and recreational facilities has had an impact on the snag resource. Snag recruitment and creation from natural levels and unnaturally high levels of tree mortality has also been a factor in the condition of snags on the Tahoe NF.

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on NFS and private lands within the Tahoe NF boundary. Some, but not all, of these activities would contribute to impacts to the late-seral closed canopy coniferous forests within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to snags in green forest habitats. Between 2001 and 2008, approximately 17,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally do not result in a reduction of snags in green forest habitat because they generally retain snags throughout the project areas as required by LRMP standards and guidelines. Between 1994 and 2008, approximately 95,000 acres burned on the Tahoe NF, some of which have resulted in the loss of hairy woodpecker habitat. Facilities maintenance through hazard tree removal along roads and near recreational facilities has resulted in a limited loss of snags.

Table 3.03-96 lists reasonably foreseeable future actions, including fuels, vegetation, recreation, non-motorized trail development, and special use permit re-issuances.

Table 3.03-96. Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	~30	Loss of incidental snags for public safety and harvest operations.	Incidental loss of snags. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Salvage harvest of burned forests	2	Short-term disturbance from harvest activities. Loss of nesting and foraging habitat (snags), particularly in low to moderate burn areas.	Short term cumulative impact in localized areas, but overall snag retention requirements should offset any losses in habitat at the landscape scale..
Hazard tree removal	4	Potential loss of snags through hazard tree removal. Short-term disturbance during harvest.	None to minimal cumulative impact
Special Use permit renewal	4	N/A administrative action	None

Cumulative Effects Conclusion

The Tahoe NF Motorized Travel Management Project could potentially add to existing cumulative effects by directly or indirectly affecting approximately 6% (64,315 acres out of 990,707 Tahoe NF acres) of hairy woodpecker habitat, under Alternative 1, where snags could be removed for public safety along existing unauthorized routes. Alternative 5 affects approximately 1% (7,076 acres of 990,707 Tahoe NF acres) of hairy woodpecker habitat from motorized route additions and reopened ML 1 roads, each contributing about 50% of the impacts. Alternatives 2, 4, and 7, similarly affects 0.3% hairy woodpecker habitat, while Alternative 3 does not directly or indirectly affect hairy woodpecker habitat. Based on the small proportion of hairy woodpecker habitat potentially affected by the addition of motorized routes and reopened ML 1 roads, the Tahoe NF Motorized Travel Management Project would not alter the existing trend in the snags in green forest ecosystem component.

The change is the class of vehicles would not affect or alter the condition of snags in green forest ecosystem component for the hairy woodpecker, but may result in higher snag densities along routes that receive different maintenance.

Hairy woodpecker habitat effectiveness may be enhanced under Alternatives 4, 5, and 6 where wet weather seasonal restrictions on all native surfaced roads and motorized trails would be implemented. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, the hairy woodpecker habitat effectiveness would not be enhanced when native surfaced motorized routes are under wet weather seasonal restrictions.

Under Alternative 1, cross country travel would continue, potentially affecting 637,148 acres of snags within green forest habitat, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment by the hairy woodpecker. For the action alternatives, cross country travel would be prohibited on 637,148 acres, where disturbance, avoidance, abandonment would be reduced or eliminated.

Summary of Hairy Woodpecker Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the hairy woodpecker; hence, the snag effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the hairy woodpecker. This information is drawn from the detailed information on habitat and distribution population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Ecosystem Component Status and Trend. The current (based on 2001-2004 inventory sources) average number of medium-sized and large-sized snags ($\geq$ 15” dbh, all decay classes) per acre across major coniferous and hardwood forest types (westside mixed conifer, ponderosa pine, white fir, productive hardwoods, red fir, eastside pine) in the Sierra Nevada ranges from 1.4 per acre in eastside pine to 8.3 per acre in white fir. Detailed information by forest type, snag size, and snag decay class can be found in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Data from the mid-to-late 1990s were compared with the current data to calculate the trend in total snags per acre by Regional forest type for the 10 Sierra Nevada national forests and indicate that, during this period, snags per acre increased within westside mixed conifer (+0.80), white fir (+1.98), and red fir (+0.68) and decreased within ponderosa pine (-0.17), productive hardwoods (-0.17), and eastside pine (-0.16).

Population Status and Trend. The hairy woodpecker has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including 1997 to present – Lassen National Forest (Burnett and Humple 2003, Burnett et al. 2005); 2002 to present - Plumas and Lassen National Forests (Sierra Nevada Research Center 2007); 1992 to 2005 – Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that the hairy woodpecker continues to be present at these sample sites, and current data at the range wide, California, and Sierra Nevada scales indicate that the distribution of hairy woodpecker populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Hairy Woodpecker Trend. Based on the small proportion of the snag ecosystem component in green forest that is directly, indirectly and cumulatively affected (0 to 1% of Sierra Nevada habitat) by the alternatives, the Tahoe NF Motorized Travel Management Project would not alter existing trend in the habitat, nor would it lead to a change is the distribution of hairy woodpecker across the Sierra Nevada bioregion.

Aquatic and Riparian Associated Species

Introduction: The Aquatic-Riparian group includes either terrestrial and aquatic species that spend a part or their entire life cycle within or adjacent to riparian and/or aquatic habitats. These include a large number of special status species on the Tahoe NF (Tables 3.03-1 and 3.03-2). This section will provide general information on road and trail-associated impacts to bald eagles, willow flycatchers, great gray owls, greater sandhill crane, frogs, fish, aquatic invertebrates, and general aquatic/riparian habitats that may be associated with this group. Species not included in detail here will be addressed in the Biological Evaluation and Management Indicator Species reports, which are hereby incorporated by reference.

The effects of roads and motorized trails on aquatic habitat are considered to be wide-ranging and potentially serious at local levels. The Tahoe NF utilized the Ecosystem Management Decision Support (EMDS) system which utilizes knowledge-based decision support for determining relative risk of motorized travel routes to aquatic species and habitats. EMDS integrated geographic information system (GIS) data with knowledge-based reasoning and decision modeling technologies. Aquatic habitats include Riparian Conservation Areas associated with streams, ponds, lakes, meadows, and other riparian habitat. The analysis consisted of GIS and EMDS modeling outputs which included data on road density, proximity to streams, erosion hazard ratings, and stream crossings at multiple watershed scales (5th field, 6th field, and 7th field). A detailed summary of the aquatic habitat modeling can be found in Chapter 3.02 (Watershed Resources: Geology, Soil, and Hydrology).

The indicators used to measure effects for aquatic and riparian species responds to the desired conditions and the management standards and guidelines for wetland, meadow, and aquatic systems as directed in the Tahoe LRMP, as amended by the SNFPA ROD (2004). See *Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction* at the beginning of this Terrestrial and Aquatic Species section.

Riparian Associated Bird Species

Introduction

Under Executive Order 13186, migratory bird species are identified as a priority for planning efforts and for evaluating environmental effects of projects. In the Sierra Nevada bioregion, 53 species of birds depend critically on or substantially utilize riparian or meadow habitats (Siegel and DeSante 1999). Focal species associated with riparian habitats include the black-headed grosbeak, song sparrow, warbling vireo, Swainson's thrush, tree swallow, Wilson's warbler, and yellow warbler (RHJV 2004). These species are strongly associated with a range of riparian habitats on the Tahoe NF, from lower elevation streamside zones to higher elevation meadows.

Meadows provide some of the most important habitat for neotropical migrants and resident landbirds in the Sierra Nevada, providing important stopover habitat for many species (Siegel and DeSante 1999). Thirty-seven species critically depend on, or are strongly associated with Sierra montane meadows. Of these species, six are stable, 14 are decreasing, and four are increasing (13 are inadequately sampled by the BBS to allow the calculation of a population trend, but among these 13 are two California endangered species (willow flycatcher and great gray owl) and a California Bird Species of Special Concern (Vaux's swift)). The preponderance of decreasing species is statistically significant. Riparian focal species that use meadow habitats include the song sparrow, yellow warbler, and Wilson's warbler (RHJV 2004). Meadows also provide important habitat for the red-breasted sapsucker which is identified as a "Watch List" species in the Partners in Flight North American Landbird Conservation Plan.

Effects Common to All Riparian Bird Species

Changes in Class of Vehicles: Although responses to motorized vehicle use varies by species and depends upon the type of vehicle, in addition to the intensity, timing, speeds, and amount motorized vehicle use, specific species responses are not well understood. For this analysis, it is assumed that all vehicle types result in the same disturbance to riparian associated bird species. Therefore, changes in the class of vehicles would not vary in their direct effects to riparian associated bird species for all of the proposed alternatives. Indirect effects to riparian habitats are discussed under each species, as appropriate.

Wet weather seasonal restrictions: Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails where riparian species would benefit from reduced noise disturbance when wet weather restrictions would be implemented.

Bald Eagle: Affected Environment

On July 9, 2007, USDI Fish and Wildlife Service in a Final Rule announced that the bald eagle would be removed (delisted) from the Federal List of Endangered and Threatened Wildlife in the lower 48 states. Official delisting of the bald eagle occurred 30 days from the date the Final Rule. The bald eagle will continue to be protected by the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. Upon delisting, the bald eagle was placed on the Regional Forester's list of Sensitive Species.

Bald eagles nest near or adjacent to large bodies of water. Within the Tahoe National Forest, twelve bald eagle breeding territories have been identified within the Tahoe NF boundary including NFS lands and private lands in recent years. Eight bald eagle territories with recent nesting activity are located on NFS lands. Four territories occur on private land at Donner Lake, Fordyce Lake, Spaulding Reservoir, and Milton Reservoir.

The road and motorized 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). 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 1987, Buehler et al. 1991, Grubb and King 1991, Grubb et al. 1992, Chandler et al. 1995, Grubb 1995, Mathisen 1968).

The response of bald eagles to human activities is variable. Individual bald eagles show different thresholds of tolerance for disturbance. The distance at which a disturbance causes bald eagles to modify their behavior also is affected by the sight distance of the motorized use. For example, forested habitat can reduce the noise generated by motorized activity. In addition, if the noise-generating activity is hidden from the nest site, disturbance thresholds may be reduced. Some studies report that bald eagles seem to be more sensitive to humans afoot than to vehicular traffic (Grubb and King 1991, Hamann 1999). Anthony et al. (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. However, in 2005 a bald eagle nest was discovered near a well-used County Road on the Tahoe NF to access a popular reservoir used for recreational activities including fishing and boating. Furthermore, other studies indicate bald eagles can tolerate a certain amount of human disturbance (Harmata and Oakleaf 1992 *IN* Gaines et al. 2003). Disturbance is most critical during: nest building, courtship, egg laying and incubation (Dietrich 1990). In general, recommended buffer distances to reduce potential disturbance to bald eagles during the breeding season have ranged from 300 to 800 meters (Anthony and Isaacs 1989, Fraser et al. 1985, McGarigal 1988, Stalmaster 1987 In Joslin and Youmans 1999, Mathisen 1968). Grubb et al. (1992) found that eagles are disturbed by most activities that occur within 1500 feet (460 m); and they take flight when activities occur within 600 feet (180 m). Grubb and King (1991) assessed pedestrian traffic and vehicle traffic on bald eagle nesting activities and recommended buffers of 550 meters for

pedestrians and 450 meters for vehicles. The USDA Forest Service routinely institutes a Limited Operating Period for ground disturbing projects within 0.25 mile (400 meters) of bald eagle nest sites.

Nest site protection through area closures is one of the primary ways that the Forest Service has implemented measures to prevent the potential for bald eagle nest failure and/or abandonment due to human disturbances (USFWS 1986). There are currently two seasonal area closures for bald eagle nest site protection - one at Boca Reservoir and one at New Bullards Bar Reservoir.

In addition, roads and motorized trails have the potential to indirectly affect bald eagles by degrading water quality which may impact the distribution and abundance of fisheries upon which bald eagles prey.

Bald Eagle: Environmental Consequences

Indicators used to Measure Effects

Cross Country Travel: The proliferation of routes associated with cross country travel can have an adverse impact to nesting bald eagles, and is analyzed for the alternatives at two scales within 400 meters (0.25 mi) and 800 meters (0.5 mi) of known nest sites.

Establishment of "Open Areas": Motorized access across dry soils to shoreline of Boca, Stampede, and Prosser Reservoirs during low water is assessed to determine their impact to nesting bald eagles.

Disturbance at a Specific Site (Additions to the NFTS): Motorized route additions to the NFTS within ¼ mile and ½ mile of known bald eagle nest sites were determined to assess direct, indirect and cumulative effects.

Changes to the NFTS (Reopened ML 1 Roads and Wet Weather Seasonal Restrictions): Changes to the system within ¼ mile and ½ mile of known bald eagle nest sites were determined to assess direct, indirect and cumulative effects.

Direct and Indirect Effects to Nesting Bald Eagles

Cross Country Travel. Cross country travel would be prohibited on 814 acres within 400 meters and on 3,299 acres within 800 meters of bald eagle nest sites, for all the action alternatives. The prohibition of cross country travel would prevent the proliferation of new unauthorized routes and would reduce disturbance associated with motorized use on these routes within foraging and nesting habitat for bald eagles. The prohibition of cross country travel also results in a reduction of the total amount of roads and trails available for motorized use by preventing cross country motorized use, including use of the existing unauthorized routes in all the action alternatives. The prohibition of cross country travel would reduce the potential for disturbance to nesting bald eagles that may be vulnerable to activities associated with motorized cross country travel. Alternative 1 does not prohibit cross country motorized use, and may result in increased disturbance to nesting bald eagles on between 814 acres and 3,299 acres.

Establishment of "Open Areas": Motorized access to Boca, Stampede, and Prosser reservoirs would potentially affect three bald eagle nest territories under Alternatives 2 and 6, where motorized access to the shoreline below the high water mark is allowed when soils are dry. Bald eagle territories potentially affected by motorized access are located at Stampede Reservoir #2 (Sagehen Arm) and Prosser Reservoir. Although motorized access to the shoreline at Boca Reservoir is also proposed, there is currently a

seasonal closure to protect bald eagles during the nesting season at this location. A second territory near Stampede Dam would not be affected by motorized access at Stampede Reservoir, since the nest site is located outside of the area where motorized access to the shoreline would be permitted.

Generally, low water conditions at these reservoirs occur during the latter part of the summer. However, the timing and duration of low water conditions occurring at Stampede Reservoir nest #2 and Prosser Reservoir will vary depending upon the yearly precipitation condition and upon the level of water drawn down. Reservoir water levels are regulated by the Bureau of Reclamation. Considerable water draw down levels can result during very dry years. Depending upon the timing and the actual water levels, overlap between the bald eagle nesting period (January through August) and motorized access may occur at Prosser and Stampede reservoirs. In general, overlap between motorized access and bald eagle nesting would likely occur toward the latter part of the bald eagle nesting season which could potentially cause nest disturbance and/or failure depending upon the timing when the activities overlap. However, the bald eagle nest territory at Prosser Reservoir was recently discovered and is located at the end of a well-used County Road. For Alternative 2, it is uncertain how providing motorized access to the shoreline during low water would impact nesting bald eagles at Stampede Reservoir nest #2 and Prosser Reservoir in the future because the nesting eagles may either become habituated to the motorized or may be subject to nest disturbance from increased use over time. Current levels of motorized use seem to be compatible with bald eagles nesting at Prosser Reservoir. However, if motorized and dispersed use increases in the future, this could potentially cause disturbance and ultimately loss in reproductive productivity for bald eagles at this site.

Table 3.03-97 displays how the alternatives would affect nesting bald eagles. Alternative 2 would result in establishing the most acres of “Open Areas” where disturbance to bald eagle could occur, especially on 12.8 acres within 0-400 meters of the Prosser Reservoir bald eagle nest site. Alternative 6 proposes 5.4 acres of “Open Areas” within 0-400 meters, and therefore would have slightly less area where disturbance to bald eagles nesting at Prosser Reservoir would be likely to occur. Although, “Open Areas” are designated in the outer 400-800 meters from nest sites, the likelihood of motorized use in these “Open Areas” would not likely result in disturbance to eagles at this distance.

Alternatives 1, 3, 4, 5, and 7 would not propose “Open Areas” to access reservoirs, and therefore would have no effect to nesting eagles at Boca, Prosser, or Stampede reservoirs.

Table 3.03-97. Establishment of “Open Areas” to Access Reservoirs

Proposed “Open Areas” to Access Reservoirs		**Alt 1, 3, 4, 5, 7** (acres)	**Alt 2** (acres)	**Alt 6** (acres)
Boca Reservoir Territory				
Boca Reservoir. #7 (East Shore Boca)	0-400 meters	0	0	0
	400-800 meters	0	4.8	4.8
Prosser Reservoir Territory				
Prosser Reservoir	0-400 meters	0	7.4	0
	400-800 meters	0	17.9	0

Proposed "Open Areas" to Access Reservoirs		**Alt 1, 3, 4, 5, 7** (acres)	**Alt 2** (acres)	**Alt 6** (acres)
Prosser Reservoir #1 (Boat Launching)	0-400 meters	0	5.4	5.4
	400-800 meters	0	0	0
Prosser Reservoir #2 (Dam View)	0-400 meters	0	0	0
	400-800 meters	0	1.0	1.0
Prosser Reservoir #12	0-400 meters	0	0	0
	400-800 meters	0	7.8	7.8
Stampede Reservoir Territory				
Stampede Reservoir	0-400 meters	0	0	0
	400-800 meters	0	20.0	0
Stampede Reservoir #8 (South Stampede Cove)	0-400 meters	0	0	0
	400-800 meters	0	17.1	17.1
Total Acres of "Open Areas"				
	0-400 meters	**0**	**12.8**	**5.4**
	400-800 meters	**0**	**68.6**	**30.7**
	Total Acres (0-800 meters)	**0**	**81.4**	**36.1**

Disturbance at a Specific Site (Additions to the NFTS)

Disturbance to bald eagle nest sites from alternatives is analyzed by determining the number of miles of motorized routes added to the NFTS occurring between 0 and 400 meters, and between 400 and 800 meters from each bald eagle territory (Table 3.03-98). Factors associated with motorized routes at a distance between 0 to 400 meters of bald eagle nest sites will likely cause the greatest potential disturbance to nesting bald eagles during the nesting season. Disturbance from motorized routes between 400 and 800 meters away from nest sites will likely have a lesser effect since noise associated with vehicles diminishes at greater distances, but may still modify behavior of nesting eagles, particularly for foraging eagles.

Table 3.03-98 indicates that Alternative 1 poses the greatest risk to nesting bald eagles on the Tahoe NF. Alternative 1 would potentially impact 7 bald eagle territories where continued cross country travel would result in continued use on 3 miles of existing unauthorized routes within 400 meters of bald eagle nest sites. An additional 6 miles would potentially affect bald eagle nest sites between 400 and 800 meters. Territories at Deer Creek, Boca Reservoir, Prosser, and Webber Lake would receive the greatest potential for disturbance associated with motorized use on unauthorized routes totaling between ½ to 1 mile per territory that are located less than 400 meters of a nest site. Roads within close proximity to bald eagle nest sites have the highest likelihood to disturb and disrupt nesting eagles.

All the action alternatives would benefit bald eagle by prohibiting cross country travel on existing unauthorized routes that are in close proximity to nest sites. None of the action alternatives proposes to add any routes to the NFTS within 400 meters of nest sites.

Two of the bald eagle territories (Stampede Dam and Milton) have proposed route additions that are located within the 400 to 800 meter analysis area for bald eagle nest sites. Proposed route TKN-J9

(Alternatives 2, 4, 5, 6, and 7) is located nearly 800 meters from the Stampede Dam nest site. This route should not pose a concern to nesting eagles at Stampede Dam, since the area is forested and the route is not visible from the nest site. Alternative 6 proposes to add route "D_SIE-0301_d," which is a very short spur (0.01 mile) that accesses a dispersed recreation site. Route "D_SIE-0301_d" also is located nearly 800 meters away from the known Milton nest site, and should not pose a concern to nesting eagles at Milton.

Table 3.03-98. Miles of Motorized Routes added to the NFTS within 0 to 400 meters and within 400 to 800 meters of Bald Eagle Nest Site

	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Deer Creek Territory								
0 to 400 meters	Unauthorized routes	**0.4**	0	0	0	0	0	0
400 to 800 meters	Unauthorized routes	**1.5**	0	0	0	0	0	0
Stampede Dam Territory								
0 to 400 meters	Unauthorized routes	**0.1**	0	0	0	0	0	0
400 to 800 meters	Unauthorized routes (Alt 1), TKN-J9 (Alt 2, 4, 5, 6, 7)	**1.3**	**0.1**	0	**0.1**	**0.1**	**0.1**	**0.1**
Stampede at Sagehen Arm Territory								
0 to 400 meters	Unauthorized routes	**0.1**	0	0	0	0	0	0
400 to 800 meters	Unauthorized routes	**0.7**	0	0	0	0	0	0
Boca Reservoir Territory								
0 to 400 meters	Unauthorized routes	**0.9**	0	0	0	0	0	0
400 to 800 meters	Unauthorized routes	**0.8**	0	0	0	0	0	0
Prosser Reservoir Territory								
0 to 400 meters	Unauthorized routes	**1.1**	0	0	0	0	0	0
400 to 800 meters	Unauthorized routes	**0.9**	0	0	0	0	0	0
Webber Lake								
0 to 400 meters	Unauthorized routes	**0.4**	0	0	0	0	0	0
400 to 800 meters	Unauthorized routes	**0.8**	0	0	0	0	0	0
Milton Reservoir Territory (private)								
0 to 400 meters	None	0	0	0	0	0	0	0
400 to 800 meters	D_SIE-0301_d	**0.2**	0	0	0	0	**0.01**	0
Total Motorized Route Additions For All Nest Sites								
	0 to 400 meters	**3.1**	**0**	**0**	**0**	**0**	**0**	**0**
	400 to 800 meters	**6.2**	**0.1**	**0**	**0.1**	**0.1**	**.11**	**0.1**
	Total (0 to 800 meters)	**9.3**	**0.1**	**0**	**0.1**	**0.1**	**0.1**	**0.1**

*Alternative 1 includes existing unauthorized routes that would continue under cross country travel

Changes to the NFTS

Wet Weather Seasonal Restrictions. Under Alternatives 4, 5, and 6, when wet weather restrictions on all native surfaced roads and motorized trails overlap with critical bald eagle nesting periods (overlap January – March), bald eagle would benefit from reduced noise disturbance associated with motorized

use. The remaining alternatives do not impose wet weather restrictions, and therefore would not benefit bald eagle during critical nesting periods.

Reopened ML 1 Roads. None of the alternatives proposes to reopen any ML 1 Roads in bald eagle habitat, therefore, no effects to bald eagle would occur from reopening closed ML 1 Roads.

Summary of Direct and Indirect Effects

Table 3.03-99 summarizes the overall net direct and indirect effect of the alternatives from motorized route additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and changes in class of vehicles.

Table 3.03-99. Bald Eagle - Summary of Overall Net Direct and Indirect Effects

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
400 meters of nests	**Trend of Effect**	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Acres Cross Country Travel Prohibited	0	814 acres	814 acres	814 acres	814 acres	814 acres	814 acres
800 meters of nests	**Trend of Effect**	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Acres Cross Country travel Prohibited	0	3,299 acres	3,299 acres	3,299 acres	3,299 ac	3,299 ac	3,299 acres
Motorized Route Additions to NFTS								
400 meters of nests	**Trend of Effect**	Negative	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Miles	3.1	0	0	0	0	0	0
800 meters of nests	**Trend of Effect**	Negative	Negligible Effect	No Effect	Negligible Effect	Negligible Effect	Negligible Effect	Negligible Effect
	Miles	9.3	0.07	0	0.07	0.07	0.08	0.07
Establishment of "Open Areas"								
Acres	**Trend of Effect**	N/A	Negative, 2nd most impactive	No Effect	No Effect	No Effect	Negative, 3rd most impactive	No Effect
	0-400 meters of nests	N/A	12.8	0	0	0	5.4	0
	400-800 meters of nests	N/A	68.6	0	0	0	30.7	0
Changes to the NFTS	**Wet Weather Restrictions**	No effect	No effect	No effect	Beneficial - reduced disturbance during nesting season.	Beneficial - reduced disturbance during nesting season.	Beneficial - reduced disturbance during nesting season.	No effect
	Change in Class of Vehicles	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Reopened ML 1 Roads	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Amendments to Forest Plan		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions							
Cross Country Travel	Negative impacts primarily from continued cross country travel, on 814 to 3,299 acres	Benefits from reduced nesting disturbance as a result of cross country travel prohibited on 814 to 3,299 acres.	Benefits most from reduced nesting disturbance as a result of cross country prohibited travel on 814 to 3,299 acres.	Benefits from reduced nesting disturbance as a result of cross country prohibited travel on 814 to 3,299	Benefits from reduced nesting disturbance as a result of cross country prohibited travel on 814 to 3,299 acres	Benefits from reduced nesting disturbance as a result of cross country prohibited travel on 814 to 3,299 acres	Benefits from reduced nesting disturbance as a result of cross country prohibited travel on 814 to 3,299 acres
Motorized Route Additions	Adverse effect of continued cross country travel on 3 miles of unauthorized routes within close proximity to nest sites	Negligible effect of 0.1 mile added within outer 800 meter radius of nest affecting 1 nest site.	No routes added	Negligible effect of 0.1 mile added within outer 800 meter radius of nest affecting 1 nest site	Negligible effect of 0.1 mile added within outer 800 meter radius of nest affecting 1 nest site	Negligible effect of 0.1 mile added within outer 800 meter radius of nest affecting 2 nest sites	Negligible effect of 0.1 mile added within outer 800 meter radius of nest affecting 1 nest site
Wet Weather Restrictions	Negative Effects from season long motorized use	Negative Effects from season long motorized use	Negative Effects from season long motorized use	Reduced disturbance from wet weather restrictions	Reduced disturbance from wet weather restrictions	Reduced disturbance from wet weather restrictions	Negative Effects from season long use

*Alternative 1 includes existing unauthorized routes that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects to Nesting Bald Eagles

Cumulative effects to the bald eagle include the cumulative effects of all motorized routes occurring on NFS and private lands within the Tahoe NF.

Cumulative Effects Boundary

Bald eagle cumulative effects include all the bald eagle nest territories and surrounding bald eagle habitat that occur within the boundary of the Tahoe NF including both NFS lands and private lands. This geographic boundary is sufficient large enough to analyze cumulative effects to bald eagles since their home ranges lie entirely within the boundary of the Tahoe NF. The spatial timeframe for analyzing cumulative effects goes back approximately 50-100 years into the past and approximately 20 to 50 years into the future.

Cumulative Effects Summary of Past, Present, and Reasonably Foreseeable Actions

The development of reservoirs across the Forest on both NFS and non-NFS lands have created bald eagle foraging habitat. Cumulative effects to the bald eagle habitat around these reservoirs include disturbance from a variety recreational activities including developed and dispersed camping, hiking, fishing, boating, motorized vehicle use, and others. Seasonal closures at Boca and Bullards Bar reservoirs have been instituted to mitigate potential adverse recreational disturbance to nesting bald eagles. Bald eagles appear to be able to adapt to a certain amount of human disturbance and appear to be increasing on the Forest. Historic vegetation management activities have removed a considerable amount of bald eagle nesting habitat particularly on the east side of the Forest around Boca, Stampede and Prosser Reservoirs (i.e. large diameter trees used for nesting). The loss of nesting and foraging habitat from high levels of disease and drought related bark beetle infestations have also affected the quality and quantity of bald eagle habitat. Present and future fuels and vegetation management prescriptions are designed to retain the larger tree component, so that bald eagle nest tree components should be available. In addition, large snags used for roost trees would also be retained. Forest thinning and fuels treatment projects are designed to prevent loss of bald eagle habitat over the long-term.

Miles of Motorized Routes within 0 to 400 Meters of Nest Sites

The direct and indirect effects of the alternatives contribute to two of the four risk factors described above - degradation of wintering or breeding habitat through human development or habitat alteration, and disturbance at nest and roost sites.

Under Alternative 1, cross country travel would continue, including travel on approximately 3 miles of existing unauthorized routes within 400 meters of a bald eagle nest site, which would potentially result in direct disturbance to nesting bald eagles (Table 3.03-100). In addition, under Alternative 1, wet weather closures would not be proposed on native surfaced roads and motorized trail, and could result in decreases in water quality of bald eagle foraging habitat. Because Alternative 1 does not prohibit motor vehicle cross country travel, it is highly likely that future route proliferation and associated cumulative impacts

would likely increase, and therefore the effects of Alternative 1, when combined with the effects of current and future recreation, may result in significant adverse cumulative effects to nesting bald eagles.

None of the action alternatives would result in direct or indirect effects to known nest sites within 400 meters from the addition of routes to the NFTS or reopening of ML 1 roads, and therefore they do not contribute to existing cumulative impacts. In addition, alternatives 4, 5, 6 provide some added benefit to bald eagle foraging habitat from wet weather seasonal closures.

For all the action alternatives, future cross country motorized travel would be prohibited, including motorize use on approximately 3 miles of existing unauthorized routes within 400 meters of nest sites. Cross country travel on 814 acres within 400 meters of bald eagle nest sites would benefit bald eagles by preventing direct disturbance to nesting bald eagles on the Tahoe NF. However, non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on these routes. Some impacts to bald eagles may be expected from non-motorized use in the future, but may be less or more than motorized use depending on the type and intensity of disturbance. Bald eagle response to non-motorized disturbance also depends upon any individual bald eagle's ability to become habituated to certain types of disturbance. Furthermore, as these existing unauthorized routes become re-vegetated and recover either through active or passive restoration efforts, overall bald eagle disturbance from human activity is expected to diminish in the future.

Table 3.03-100. Cumulative Effects of Motorized Routes within 0 to 400 meters of Bald Eagle Nest Sites

Miles	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized route additions to the NFTS	0	0	0	0	0	0	0
Unauthorized routes with continued cross country travel (negative impact)[1]	3.1	0	0	0	0	0	0
Reopened ML 1 Roads	0	0	0	0	0	0	0
Existing unauthorized routes prohibited to cross country travel (positive impact)	0	3.1	3.1	3.1	3.1	3.1	3.1
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Existing motorized routes on private land - non-NFS lands (negative impact)	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Existing non-motorized routes (negative impact)	0	0	0	0	0	0	0
Decommissioned and Closed ML 1 Roads (positive impact)	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Net Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**5.6**	**1.7**	**1.7**	**1.7**	**1.7**	**1.7**	**1.7**

[1]Alternative 1 includes existing unauthorized routes that would continue with the continuance of cross country travel.

Table 3.03-101 displays the number of route miles which may contribute to disturbance to nesting eagles between 400 and 800 meters, though probably to a lesser extent than routes within closer proximity to nest sites (i.e. routes less than 400 meters). Motorized routes beyond 400 meters of nest sites,

potentially can add to existing cumulative impacts to bald eagle nesting success. As stated earlier, some studies have shown that eagles responded to disturbance at distances less than 800 meters.

Table 3.03-101 Cumulative Effects of Motorized Route miles within 400 to 800 meters of Bald Eagle Nest Sites

Miles	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized Route additions to the NFTS (negative impact)[1]	9.3	0.1	0	0.1	0.1	0.1	0.1
Reopened ML 1 roads	0	0	0	0	0	0	0
Unauthorized routes prohibited to cross country travel (positive impact)	0	9.2	9.3	9.2	9.2	9.2	9.2
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Existing motorized routes on private land - non-NFS lands (negative impact)	4.7	4.7	4.7	4.7	4.7	4.7	4.7
Existing non-motorized routes (negative impact)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decommissioned and closed ML 1 roads (positive impact)	1.8	0.4	0.4	0.4	0.4	0.4	0.4
Total Cumulative Effects							
Overall cumulative effects equals the total of all impacts, both positive and negative	**23.0**	**13.8**	**13.7**	**13.8**	**13.8**	**13.8**	**13.8**

[1]Alternative 1 includes existing unauthorized routes that would continue with the continuance of cross country travel.

Sensitive Species Determination

The Biological Evaluation for the Tahoe NF Motorized Travel Management Project, which is hereby incorporated by reference, made a determination that the action alternatives may affect the bald eagle, but do lead to a trend toward federal listing or loss of viability within the Tahoe NF, since current and future cross country travel by motorized vehicles would be prohibited. The prohibition of cross country travel would reduce the potential for disturbance to nesting bald eagles that may be vulnerable to activities associated with motorized use and cross country travel. Alternative 1, no action, may affect individual bald eagles and may lead to a trend toward federal listing due to the continued route proliferation from cross country motorized travel. Alternative 1 does not prohibit cross country motorized use, and may result in increased disturbance to nesting bald eagles.

Willow Flycatcher: Affected Environment

On the Tahoe NF, the willow flycatcher (*Empidonax traillii* ssp. *trailii* and *E.t. brewsteri*) is designated by the Regional Forester as a Sensitive species. In California, the willow flycatcher is a rare to locally uncommon, summer resident in wet meadow and montane riparian habitats at 600-2500 m (2000-8000 ft) in the Sierra Nevada and Cascade Range (CWHR 2005). Willow flycatcher populations in the Sierra Nevada are considered to be at risk (USDA Forest Service 2001). Historically, willow flycatchers were once common throughout the Sierra Nevada. The current distribution of the willow flycatcher has been drastically reduced compared to historic distributions. A ten year demographic analysis indicates the

Sierra Nevada willow flycatcher populations are continuing to decline. With the exception of a few sites, the majority of areas where willow flycatchers have been located support low numbers of breeding territories, and some as low as 1-2 pairs of breeding individuals.

Willow flycatcher breeding habitat is characterized as montane wetland shrub habitat where there is a prevalence of willows and montane meadows with standing or flowing water, or highly saturated soils throughout the nesting season (Green, et al. 2003). A study by Cain (2001 In Cain et al 2003) indicated that meadow wetness may assist in successful nesting by willow flycatcher by inhibiting potential forest and edge predators from accessing willow flycatcher nests. Meadow wetness may also be important for willow flycatcher insect prey species.

The Willow Flycatcher Conservation Assessment (Green et al. 2003) identified roads as one of the leading contributing factors responsible for the loss and degradation of willow flycatcher habitat. Specifically, roads (dirt-surfaced or paved), intercept surface and subsurface hydrological flow. Meadow desiccation occurs when hydrological flows are intercepted and redirected which may result in long-term habitat loss or degradation. Roads may have a negative impact on meadow hydrology, especially when roads bisect meadows and have associated drainage structures to maintain road conditions. Human disturbance associated with road and trail motorized use may also affect willow flycatcher nesting success. Roads also provide increased access to humans which may directly and indirectly affect willow flycatcher productivity. Roads provide access for livestock grazing and often meadows occupied by willow flycatchers are key forage areas for livestock.

Livestock grazing has long been identified as contributing to the decline in willow flycatcher populations as it relates to grazing impacts on willow and meadow habitat, as well as potential direct impacts from cattle coming in direct contact or destroying nest sites. Furthermore, brown-headed cowbirds are strongly associated with cattle. Cowbirds are known to parasitize willow flycatcher nests and ultimately may reduce overall willow flycatcher nesting success.

At least two willow flycatcher breeding sites have received damage from off road vehicle travel on the Tahoe NF in recent years. Wheel tracks leaving ruts within one willow flycatcher meadow was observed on more than one occasion. Several grazing allotments on the Tahoe NF overlap occupied and emphasis willow flycatcher sites.

Willow Flycatcher: Environmental Consequences

Indicators used to Measure Effects

Cross Country Travel: The prohibition of cross country travel is analyzed for their effects to willow flycatcher occupied and emphasis habitat.

Additions to the NFTS (Number of Occupied and Emphasis Willow Flycatcher Sites): To evaluate the effects of motorized route additions to the NFTS on willow flycatcher habitat, the number of willow flycatcher Occupied and Emphasis meadow sites containing motorized route additions to the NFTS is determined. The Sierra Nevada Framework Plan Amendment ROD (2004) designated Occupied and Emphasis Habitats for willow flycatcher. Occupied habitats are sites where willow flycatcher(s) have been detected during the breeding season (between 15 June and August 1) (See SNFPA ROD 2004 for

more detailed definition). Emphasis habitat is defined as meadows within 5 miles of Occupied willow flycatcher sites that are larger than 15 acres that have standing water on June 1 and a deciduous shrub component.

Establishment of "Open Areas": "Open Areas" are analyzed to assess the effects on willow flycatcher occupied and emphasis meadow habitats.

Changes to the NFTS

Change in Class of Vehicles: The changes in class of vehicle was analyzed for their potential to affect willow flycatcher occupied and emphasis habitat, since this action potentially changes the condition of the existing road surface from smoothed surfaced to rough surfaced; which could potentially alter meadow condition where routes intersect meadows or are within close proximity to motorized routes.

Wet weather seasonal restrictions: Wet weather seasonal restrictions on native surfaced roads and motorized trails are analyzed for their potential to benefit willow flycatcher habitat through the reduction of erosion and sedimentation that could occur from wet season motorized use for each of the alternatives.

Reopened ML 1 road: Reopened ML 1 roads are analyzed to assess the effects on willow flycatcher habitat, similar to how effects are analyzed for motorized route additions.

Direct and Indirect Effects

Cross Country Travel

Alternative 1 would pose the greatest risk to willow flycatcher on 3,075 acres (occupied meadows - 1,747 acres, emphasis meadows - 1,328 acres where willow flycatcher meadows would be subject to continued cross country travel, including on existing unauthorized routes.

Table 3.03-102 indicates the willow flycatcher occupied and emphasis meadows that would be prohibited to cross country travel that are currently intersected by unauthorized routes. Under Alternative 1, cross country travel would continue, potentially causing disturbance to willow flycatcher and habitat degradation.

Under the action alternatives, motorized cross country travel would be prohibited on 1,747 acres willow flycatcher occupied meadows, and on 1,328 acres emphasis meadows, totaling 3,075 acres willow flycatcher meadows, including on approximately 4 miles of existing unauthorized routes within 19 to 22 willow flycatcher meadows. Under the action alternatives, active or passive restoration within these meadow sites would benefit willow flycatchers in terms of nesting, foraging, and future reestablishment opportunities.

Table 3.03-102. Willow flycatcher sites with unauthorized routes, prohibited to cross country travel

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Occupied Meadows with unauthorized routes prohibited to cross country travel	0	4	4	4	4	4	4
Miles Unauthorized Routes in Occupied Meadows prohibited to cross country travel	0	1.16	1.16	1.16	1.16	1.16	1.16
Number Emphasis Meadows with unauthorized routes prohibited to cross country travel	0	17	18	16	16	15	18
Miles Unauthorized Routes in Emphasis Meadows prohibited to cross country travel	0	2.70	2.84	2.69	2.57	2.67	2.72
Total Occupied and Emphasis Meadows	**0**	**20**	**22**	**21**	**18**	**17**	**21**
Total Miles in Occupied and Emphasis Meadows Prohibited to Cross Country Travel	**0**	**3.86**	**4.0**	**3.85**	**3.73**	**3.83**	**3.88**

Establish "Open Areas" - Greenhorn and Reservoir Areas

Establishing "Open Areas" at Greenhorn, and at Boca, Stampede, and Prosser reservoirs would have no direct or indirect effect to Occupied and Emphasis meadow habitat for the willow flycatcher. No willow flycatcher habitat occurs within the proposed "Open Areas."

Additions to the NFTS

Direct and indirect effects of the alternatives are evaluated by determining the number of proposed motorized route additions to the NFTS that intersect delineated willow flycatcher meadow meadows on the Tahoe NF.

Number of Occupied and Emphasis Willow Flycatcher Meadows: Table 3.03-103 displays the willow flycatcher Occupied and Emphasis meadow sites on the Tahoe NF that are potentially affected by the alternatives. Under Alternative 1, 22 of 60 (37%) willow flycatcher meadow sites would be intersected by existing unauthorized routes (4.1 miles), which would continue to receive motorized use associated with cross country travel, where direct and indirect disturbance could occur.

Of these sites, 4 out of 19 meadows (21%) identified as Occupied willow flycatcher sites, including approximately 1.2 miles of existing unauthorized routes have the potential to adversely affect breeding willow flycatchers, including both direct disturbance to nesting willow flycatchers and indirect impacts to willow flycatcher habitat through alteration and/or habitat degradation where routes potentially affect meadow vegetation and hydrology.

Alternatives 2, 3, 4, 5, 6, and 7 do not propose motorized route additions to the NFTS within Occupied willow flycatcher habitat where willow flycatchers are known to breed. Therefore, direct and indirect impacts to breeding willow flycatchers under these alternatives are not expected to occur.

Of the action alternatives, Alternative 6 would affect the most Emphasis meadows, totaling just under 0.2 mile, primarily from motorized route additions which access dispersed recreation areas (6 out of 7 routes). Most of these routes which access dispersed sites are very short segments totaling less than 0.01 mile (Table 3.03-103). The ability for willow flycatcher to occupy these emphasis meadows that are potentially affected by the action alternatives is unknown. However, professional judgment would

indicate that these meadows may not actually meet suitability criteria for willow flycatcher occupancy, which is dependent on many factors, including nearby meadows that are occupied by nesting willow flycatchers, capability of the meadow to maintain surface water throughout the breeding season, adequate willow cover, etc. Therefore, although motorized routes may adversely affect meadow vegetation and hydrology, stabilized routes may not necessarily cause meadow degradation at these emphasis meadows.

Following Alternative 6, Alternatives 2, 5, and 7 similarly affect willow flycatcher Emphasis meadow habitat, where 2 meadows (Castle Valley and Loney Meadow) are intersected by about 0.1 mile of proposed route additions (TKN-J5 and D-18-19_b**).** Alternative 4 only proposes to add route D-18-19_b that accesses a dispersed site route which intersects Loney Meadow.

Table 3.03-103. Number of willow flycatcher meadow sites intersected by motorized route additions

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Willow Flycatcher meadow sites intersected by motorized route additions							
Occupied Meadows Intersected by Route Additions (13)	4	0	0	0	0	0	0
Occupied Meadow Miles	1.16	0	0	0	0	0	0
Emphasis Meadows Intersected by Route Additions (30)	18	2	0	1	2	5	1
Emphasis Meadows Miles	2.84	0.13	0	0.02	0.13	0.17	0.12
Total Number Meadows with Route Additions	**22**	**2**	**0**	**1**	**2**	**5**	**1**
Total Miles of Route Additions in Meadows	**4.0**	**0.13**	**0**	**0.02**	**0.13**	**0.17**	**0.12**

*Alternative 1 includes existing unauthorized routes with continued cross country travel.

Table 3.03-104. Miles of Motorized Route Additions with willow flycatcher Emphasis Meadows by Route ID

Meadow Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Unauthorized routes	N/A	2.84	N/A	N/A	N/A	N/A	N/A	N/A
Castle Valley	TKN-J5	0	0.11	0	0	0.11	0.12	0.12
Castle Valley	D_TKN-J5_b	0	0	0	0	0	0.01	0
Castle Valley	D_TKN-J5_c	0	0	0		0	0.01	0
Loney Meadow	D-18-19_b	0	0.02	0	0.02	0.02	0.02	0
Meathouse Meadow	D-350-10	0	0	0	0	0	0.01	0
Nichols Mill	D_15-20	0	0	0	0	0	0.001	0
Sagehen	D_N886-18c	0	0	0	0	0	0.002	0
	Total Miles	**2.84**	**0.13**	**0**	**0.02**	**0.13**	**0.17**	**0.12**

*Alternative 1 includes existing unauthorized routes with continued cross country travel.

Changes to the NFTS

Change in Class of Vehicles: The change in class of vehicle proposed under Alternatives 2, 4, 5, 6, and 7, on some existing NFTS motorized roads may result in some smoothed surfaced roads becoming rough surfaced roads through changed road maintenance. In addition, some existing motorized NFTS roads may receive different maintenance resulting in increased vegetation density at the road margins which would provide additional cover and/or foraging habitat. The resulting roadway condition would depend upon the

amount and type of vegetation present and the type of maintenance any given road receives. For the willow flycatcher existing habitat conditions will dictate whether or not the change in class of vehicle will result in reduced habitat quality. In general, it is not expected that the change in class of vehicle would result in a significant change to willow flycatcher habitat conditions, unless different road maintenance results in increased meadow habitat degradation. No changes in class of vehicle are proposed under Alternatives 1 and 3, which means that some system routes would remain under their current maintenance management strategy. However, in some cases some existing system roads have already become rough surfaced due to changes in maintenance.

Wet Weather Seasonal Restrictions*:* Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails where willow flycatcher occupied and emphasis meadows would be benefited through the reduction of erosion and sedimentation that might otherwise occur during the wet season. Alternative 1, with the greatest miles of motorized routes that intersect the most number of willow flycatcher meadows, which would continue to be impacted by motorized use during the wet weather season, where habitat degradation within willow flycatcher meadows could occur. Roads have often been cited as being the source of resource damage and habitat degradation to meadows including those potentially used by willow flycatchers.

Reopened ML 1 Roads: Only Alternative 5 proposes to reopen ML 1 roads. Alternative 5 proposes to reopen 0.12 miles of ML 1 road (H823-1-1) affecting one willow flycatcher emphasis meadow site at Howard Creek. Alternative 5 does not propose to reopen any ML 1 roads that would affect any willow flycatcher occupied sites, and therefore would not affect any known willow flycatcher nesting sites. Under Alternative 5, reopening ML1 road within one emphasis meadow site at Howard Meadow could adversely affect the meadow vegetation and hydrology that may prevent the reestablishment of willow flycatchers.

Amendments to Forest Plan

The alternatives would not result in affecting willow flycatcher habitat from Amendments to the Forest Plan, since willow flycatcher habitat does not occur in areas where the season of motorized use in deer winter areas would be altered within the Humbug-Sailor Management Area.

Summary of Direct and Indirect Effects

Table 3.03-105 summarizes the overall net direct and indirect effect of the alternatives from cross country travel, establishment of “Open Areas,” motorized route additions to the NFTS, changes to the NFTS, and amendments to the Forest Plan.

Table 3.03-105. Willow Flycatcher - Summary of Overall Net Direct and Indirect Effects

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Occupied Meadows	**Trend of Effect**	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Acres Cross Country Travel Prohibited	**0**	1,747	1,747	1,747	1,747	1,747	1,747
Emphasis Meadows	**Trend of Effect**	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Acres Cross Country Travel Prohibited	**0**	1,328	1,328	1,328	1,328	1,328	1,328
Total acres benefited		**0**	**3,075**	**3,075**	**3,075**	**3,075**	**3,075**	**3,075**
Total Occupied and Emphasis Meadows Prohibited to Cross Country Travel		**0**	**20**	**21**	**19**	**19**	**18**	**20**
Total Miles in Occupied and Emphasis Meadows Prohibited to Cross Country Travel		**0**	**3.87**	**4.01**	**3.86**	**3.74**	**3.84**	**3.89**
Establishment of "Open Areas"		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Motorized Route Additions								
Occupied Meadows	**Trend of Effect**	Negative	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	# Meadows Intersected	4	0	0	0	0	0	0
	Miles	1.16	0	0	0	0	0	0
Emphasis Meadows	**Trend of Effect**	Negative	Negative	No Effect	Negative	Negative	Negative	Negative
	# Meadows Intersected	18	2	0	1	2	5	1
	Miles	2.84 Miles	0.13 Miles	0 Miles	0.02 Miles	0.13 Miles	0.17 Miles	0.12 Miles

			Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Changes to the NFTS									
Wet Weather Restrictions			No Effect	No Effect	No Effect	Beneficial	Beneficial	Beneficial	No Effect
Change in Class of Vehicles			No Effect	Localized negative effects.	No Effect	Minor negative effect.	Localized negative effects.	Localized negative effects.	Minor negative effect.
Reopened ML 1 Roads	**Occupied Meadows**	**Trend of Effect**	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
		# Meadows Intersected	0	0	0	0	0	0	0
		Miles	0	0	0	0	0	0	0
	Emphasis Meadows	**Trend of Effect**	No Effect	No Effect	No Effect	Negative	Negative	No Effect	No Effect
		# Meadows Intersected	0	0	0	0	2	0	0
		Miles	0	0	0	0	0.14	0	0
Amendments to Forest Plan			**No Effect**	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Overall Net Effect of Proposed Actions			Negative effects from continued cross country travel on 22 occupied and emphasis meadows on 4 miles of existing unauthorized routes.	Benefits within 20 occupied and emphasis meadows on 3.86 miles of existing unauthorized routes where cross country travel is prohibited; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.	Benefits within 22 meadows on 4.0 miles of existing unauthorized routes where cross country travel is prohibited; overall reduces disturbance and habitat fragmentation.	Benefits within 21 meadows on approx. 3.85 miles of existing unauthorized routes where cross country travel is prohibited;although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.	Benefits within 18 meadows on 3.7 miles of existing unauthorized routes where cross country travel is prohibited; although minor negative impacts from route additions and reopened ML 1 roads; overall reduces disturbance and habitat fragmentatio.	Benefits within 17 meadows on 3.8 miles of existing unauthorized routes where cross country travel is prohibited although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.	Benefits within 21 meadows on 3.9 miles of existing unauthorized routes where cross country travel is prohibited although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation..

*Alternative 1 includes existing unauthorized routes that would continue with cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects

Cumulative Effects Boundary

The cumulative effects analysis geographic boundary for the willow flycatcher includes all willow flycatcher sites occurring within the Tahoe NF boundary, both within NFS lands and non-NFS lands. See Terrestrial and Aquatic Species Introduction Section for the rationale. The temporal scale for analyzing cumulative effects to willow flycatcher is approximately 20 years into the past and 20 years out into the future.

Overall Cumulative Effects to Willow Flycatcher Meadows

Cumulative impacts to the willow flycatcher include past, present, and future impacts from livestock grazing, roads, and recreational activities. The Forest Service has completed a Conservation Assessment of the Willow Flycatcher in the Sierra Nevada (Green et al. 2003), which identified meadow drying, loss of nesting and foraging substrates (riparian shrubs), increased predator access to meadow interiors, and potential cowbird parasitism as among the key factors likely responsible for the decline of the willow flycatcher. Livestock management, recreation, water developments, and roads are described as causative factors.

Historic livestock grazing has impacted montane meadows and is considered to be a primary factor that has influenced the suitability of willow flycatcher habitat and meadow habitat for birds in the Sierra Nevada (Graber 1996, Green et al. 2003, Menke et al. 1996). Many of the landbird species utilizing these meadows feed upon insects that decline in response to removal of this herbaceous growth (Graber 1996). Poorly managed grazing in riparian areas can impact nesting densities of many bird species, and particularly of habitat specialists such as the willow flycatcher, Lincoln's sparrow, and white-crowned sparrow (RHJV 2004).

Livestock grazing on active allotments currently affects willow flycatcher meadow habitat on the Forest. Trend data from Regional range meadow monitoring was available for 15 willow flycatcher meadow sites on the Tahoe NF. Of the 15 Occupied and Emphasis sites monitored, habitat trend is either up or stable on 73% of sites and trend was down on 27% of the sites.

Non-motorized trails allow for backcountry hiking and camping, which may occur in meadows not accessed by motorized routes, and can adversely affect additional meadow habitat or disturb species. These activities are generally dispersed and of low impact to habitat, particularly in sites most suitable for willow flycatcher, which are typically very wet. Foreseeable future projects listed in the Tahoe Schedule of Proposed Actions do not indicate additional cumulative effects would occur.

Watershed restoration work continues to be a priority on the Tahoe NF. During 2009, watershed restoration at Perazzo Meadows is currently underway, with the intent to increase water storage capabilities and improve vegetation conditions. Perazzo Meadows is an important willow flycatcher breeding site in the Sierra Nevada. Maintaining and improving habitat conditions for the willow flycatcher at Perazzo Meadows and the Little Truckee River meadow system is integral to the long-term

sustainability and viability for this species in the Sierra Nevada. Long-term benefits to the willow flycatcher and its habitat are expected to occur from this watershed restoration effort.

Cumulative Effects from Motorized Routes to Willow Flycatcher Meadows

Factors responsible for the decline of willow flycatcher populations in the Sierra Nevada are primarily thought to be the result of habitat change, particularly the alteration of meadow hydrology, specifically caused by roads (Green et al. 2003).

Table 3.03-106 displays the cumulative impacts of motorized and non-motorized routes within meadows that are designated as either willow flycatcher Occupied or Emphasis habitat. Occupied habitat are sites where willow flycatcher breeding is either known or suspected. Routes intersecting Occupied habitat have the highest potential to impact breeding willow flycatchers. Emphasis habitat are meadows that are currently not occupied by breeding willow flycatcher, but are considered to be suitable willow flycatcher nesting habitat that are within 5 miles of Occupied Sites where dispersing willow flycatchers may nest in the near future. Emphasis habitats are particularly important so that willow flycatchers may have future refugia where their population can be distributed and expand in the future.

Occupied Habitat

Alternatives 1 would contribute to existing cumulative impacts to Occupied willow flycatcher sites. Alternative 1 cumulatively adds, approximately 1.2 miles of existing unauthorized routes, affecting 4 Occupied meadow sites (31% of meadows identified as Occupied) where direct and indirect impacts to meadow vegetation and hydrology could occur. Hydrologic condition is an important habitat component to consider for successful willow flycatcher breeding. Given the uncertainty of future route proliferation under Alternative 1, the future habitat alteration within Occupied meadow sites is potentially at risk, and may ultimately affect willow flycatcher breeding success within Occupied habitats.

The action alternatives (Alternatives 2, 3, 4, 5, 6, and 7) do not add to existing cumulative impacts within occupied willow flycatcher sites, and therefore would not impact breeding willow flycatchers. In addition, all the action alternatives would prohibit the proliferation of new motorized routes through cross country motorized travel that would adversely alter habitat within Occupied sites. Finally, all the action alternatives would benefit willow flycatcher breeding habitat by prohibiting cross country travel, including use on unauthorized routes on approximately 1.2 miles within 3 Occupied meadow sites.

Emphasis Habitat

Emphasis habitats are meadow sites within 5 miles of known breeding sites (Occupied habitat) that are considered to provide suitable nesting habitat for willow flycatcher. Alternative 1 poses the greatest risk to the future colonization by willow flycatcher within Emphasis habitats, since cross country travel would not be prohibited, including use on unauthorized routes that intersect 18 Emphasis sites (60% of all Emphasis sites) for a total of about 2.8 miles.

All the action alternatives would benefit willow flycatcher emphasis habitats by prohibiting cross country travel on existing unauthorized routes. Of the action alternatives, Alternative 5 would benefit

willow flycatcher emphasis sites the least where cross country travel would be prohibited within 17 meadows on 3.7 miles of unauthorized routes. Alternative 5 would add to cumulative impacts within 4 Emphasis sites (13% of all Emphasis sites) from proposed motorized route additions to the NFTS and reopened ML 1 roads, totaling approximately 0.28 miles. Alternatives 6, 4, 2, 7, and 3 benefit willow flycatcher emphasis sites in descending order, ranging from 18-21 meadows where cross country travel would be prohibited on between 3.8 to 4 miles on existing unauthorized routes.

Alternatives 2, 4, 6, and 7 would result in affecting between 1 to 5 Emphasis sites (Alt 7 – the least, Alt 6 – the most) intersected by motorized route additions and/or reopened ML 1 roads, for less than 0.2 mile total for each alternative. Alternative 3 does not add to existing cumulative impacts to Emphasis habitats, since no motorized route additions or reopened ML 1 roads would result in the intersection of any willow flycatcher Emphasis sites.

Summary of Cumulative Effects to Willow Flycatcher Habitat: Occupied and Emphasis Meadows

Alternative 1 poses the greatest overall risk to known nesting sites and potentially suitable nesting sites from all routes including use on existing unauthorized routes associated with cross country travel, existing motorized routes (both NFS and non-NFS), and non-motorized routes. Alternative 1 results in willow flycatcher meadows being intersected 55 times for a total of about 12 miles by routes of any category. Over 30% of meadows identified as Occupied are impacted by existing unauthorized routes, which could substantially alter the meadow vegetation and hydrology and reduce breeding success at known nesting sites of a species that is at risk of extirpation. Therefore, Alternative 1 could contribute to the downward trend of willow flycatcher populations on the Tahoe NF.

Alternative 5 results in the next highest overall cumulative impact where Occupied and Emphasis meadows combined are intersected by a motorized or non-motorized route 39 times totaling about 8.4 miles. The remaining action alternatives do not add to existing cumulative impacts to Occupied habitat, however Alternatives 2, 4, 5, 6, and 7 do contribute to cumulative impacts to 1 to 5 Emphasis meadow sites depending on the alternative where relatively short route segments would intersect a meadow (0.1 to 0.3 mile).

The action alternatives all prohibit cross country travel, including motorized use on between 3.7 miles to 4.0 miles of unauthorized routes (Alt. 5 prohibits the least, Alt. 3 prohibits the most) within suitable willow flycatcher habitats (Occupied and Emphasis meadows). It is expected that non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on these routes in the future. In general, benefits to willow flycatcher habitat would be realized as vegetation and soil impacts from non-motorized use recover over time through active and passive restoration efforts. Under Alternative 1, these benefits would not be realized since cross country travel would not be prohibited and use on existing unauthorized routes would continue and likely proliferate.

Foreseeable future projects on the Tahoe NF include undertaking a variety of meadow restoration projects that would result in benefits to willow flycatcher (i.e. Perazzo Meadows) and its habitat.

Table 3.03-106. Cumulative Effects to Willow Flycatcher Meadows - Occupied and Emphasis Meadows Intersected by Routes

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Number of Willow Flycatcher Sites Intersected by motorized route additions to the NFTS (negative impact)[1]	**22**	**2**	**0**	**1**	**4**	**5**	**1**
Total Miles	**4.0**	**0.13**	**0**	**0.02**	**0.13**	**0.17**	**0.12**
Number of Occupied Sites	4	0	0	0	0	0	0
Miles within Occupied Sites	1.16	0	0	0	0	0	0
Number of Emphasis Sites	18	2	0	1	2	5	1
Miles within Emphasis	2.68	0.13	0	0.02	0.13	0.13	0.12
Total Number Meadows with Reopened ML 1 Roads (negative impact)	**0**	**0**	**0**	**0**	**2**	**0**	**0**
Total Miles of Reopened ML 1 Roads in Meadows (negative impact)	**0**	**0**	**0**	**0**	**0.14**	**0**	**0**
Number of Occupied Sites	0	0	0	0	0	0	0
Miles within Occupied Sites	0	0	0	0	0	0	0
Number of Emphasis Sites	0	0	0	0	2	0	0
Miles within Emphasis	0	0	0	0	0.14	0	0
Total Number of Willow Flycatcher Sites Intersected by Unauthorized Routes prohibited to cross country travel (positive impact)	**0**	**20**	**22**	**21**	**18**	**17**	**21**
Total Miles	**0**	**3.9**	**4.0**	**3.9**	**3.7**	**3.8**	**3.9**
Number Occupied Sites	0	3	3	3	3	3	3
Miles within Occupied	0	1.17	1.17	1.17	1.17	1.17	1.17
Number Emphasis Sites	0	17	18	16	16	15	18
Miles within Emphasis	0	2.70	2.84	2.69	2.57	2.67	2.72
Cumulative effects							
Total Number of Willow Flycatcher Sites Intersected by Existing NFTS motorized routes - NFS lands (negative impact)	**20**	**20**	**20**	**20**	**20**	**20**	**20**
Total Miles	**2.74**	**2.74**	**2.74**	**2.74**	**2.74**	**2.74**	**2.74**
Number Occupied Sites	7	7	7	7	7	7	7
Miles within Occupied	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Number Emphasis Sites	13	13	13	13	13	13	13
Miles within Emphasis	1.69	1.69	1.69	1.69	1.69	1.69	1.69
Total Number of Willow Flycatcher Sites Intersected by Existing motorized routes on - non-NFS lands (private) (negative impact)	**8**	**8**	**8**	**8**	**8**	**8**	**8**
Total Miles	**4.26**	**4.26**	**4.26**	**4.26**	**4.26**	**4.26**	**4.26**
Number Occupied Sites	2	2	2	2	2	2	2
Miles within Occupied	3.83	3.83	3.83	3.83	3.83	3.83	3.83
Number Emphasis Sites	6	6	6	6	6	6	6
Miles within Emphasis	0.43	0.43	0.43	0.43	0.43	0.43	0.43

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Number of Willow Flycatcher Sites Intersected by Existing non-motorized routes (negative impact)	**5**	**5**	**5**	**5**	**5**	**5**	**5**
Total Miles	**1.03**	**1.03**	**1.03**	**1.03**	**1.03**	**1.03**	**1.03**
Number Occupied Sites	1	1	1	1	1	1	1
Miles within Occupied	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Number Emphasis Sites	4	4	4	4	4	4	4
Miles within Emphasis	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Total Number of Willow Flycatcher Sites Intersected by Decommissioned routes (positive impact)	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Total Miles	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**	**0.49**
Number Occupied Sites	1	1	1	1	1	1	1
Miles within Occupied	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Number Emphasis Sites	2	2	2	2	2	2	2
Miles within Emphasis	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Total Number of NFTS Roads Closed by Previous NEPA decisions, pending implementation (positive impact)	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Total Miles	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**
Number Occupied Sites	3	3	3	3	3	3	3
Miles within Occupied	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Number Emphasis Sites	0	0	0	0	0	0	0
Miles within Emphasis	0	0	0	0	0	0	0
Total Cumulative Effects							
Number of Times a Meadow is Intersected by Motorized Routes	**55**	**35**	**33**	**34**	**39**	**38**	**34**
Net Cumulative Impacts = Sum Total Miles of All Routes both positive and negative that Intersect Willow Flycatcher Sites	**11.87**	**8.16**	**8.03**	**8.05**	**8.44**	**8.20**	**8.15**

*Alternative 1 includes the existing unauthorized routes associated with continued with cross country travel, while all action alternatives include motorized route additions.

Sensitive Species Determination

The Biological Evaluation for the Tahoe NF Motorized Travel Management Project (incorporated by reference) made a determination that the proposed action may affect willow flycatchers, but is not likely to lead to a trend toward federally listing or a downward trend in population viability. The action alternatives all prohibit motorized cross country travel, including use of existing unauthorized routes. Furthermore, wet weather seasonal restrictions reduce the likelihood of sedimentation and erosion that may occur from wet weather motorized use for Alternatives 4, 5, and 6.

Compliance with Forest Plan and Other Direction

The Tahoe NF LRMP, as amended by the SNFPA ROD (2004), provides management direction for managing willow flycatcher habitat, including direction for managing meadows, wetlands, and Riparian Conservation Areas that are applicable to willow flycatcher habitat as follows:

- *Locate roads away from meadow edges where alternative routes are available (Tahoe LRMP) (Management Standard & Guideline):*
- *Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.*
- *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) 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 (Management Standard & Guideline 92).*
- *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 (RCO#2, Management Standard & Guideline 100).*

In the above sections, the Proposed Action and alternatives for the Tahoe NF Motorized Travel Management Project were analyzed for their potential effects to willow flycatcher meadow and riparian habitats which addresses the above management standard and guidelines as they apply to willow flycatcher habitats. Mitigation measures for the action alternatives to minimize the risk of sediment and streambank alteration from proposed motorized route additions to the NFTS and existing unauthorized routes are addressed in the Riparian Conservation Objective (RCO) analysis and Appendix A (Site Specific Road, Trail and Open Area Information).

Alternative 1 is least consistent with the above standards and guidelines for managing meadows in terms of maintenance and hydrologic connectivity of meadows, avoidance of roads near and within meadows, and minimizing effects to meadow condition and function. Alternative 1 continues cross country travel, including within 22 willow flycatcher meadows on approximately 4 miles of existing unauthorized routes.

All of the action alternatives meet these standards and guidelines by improving willow flycatcher habitat conditions. The action alternatives all prohibit cross country travel on 3,075 willow flycatcher meadow acres, and reduces the impacts of 18 to 21 willow flycatcher meadows where there would be approximately 3.7 miles to 4.0 miles. All the action alternatives considerably improve meadow function and connectivity for the willow flycatcher, since the project design standards were developed to minimize impacts to willow flycatcher meadows and riparian habitat through the implementation of wet weather seasonal restrictions, does not propose motorized route additions within any Occupied willow flycatcher meadow, and bans cross country motorized travel.

Great Gray Owl: Affected Environment

The great gray owl is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). In the Sierra Nevada, great gray owls are found in mixed coniferous forest from 2,400 to

9,000 feet elevation where such forests occur in combination with meadows or other vegetated openings. Nesting usually occurs within 600 feet of the forest edge and adjacent open foraging habitat. Most nests are made in broken top snags (generally firs), but platforms such as old hawk nests, mistletoe infected limbs, etc. are also used. Nest trees or snags are generally greater than 21 inches dbh and 20 feet tall.

In the Sierra Nevada, pocket gophers and voles appear to be important prey species (Winter 1982, Reid 1989). Meadows appear to be the most important hunting habitat for great gray owls, where approximately 93% of their prey is taken (Winter 1981).

Recent great gray owl sightings in our area include an adult located three miles north of Nevada City (1/96), an adult on private land near the town of Alleghany (5/2006, 4/2007), a vocalization of an adult detected by CDFG and Sierra Pacific industries on the Sierraville RD in 2005 and 2008), and two adults found in the Feather River Ranger District of the Plumas NF (8/97). In recent years, numerous surveys for great gray owl have been conducted on the Tahoe NF, and have only resulted in a handful of single great gray owl detections, with no confirmation of nesting.

Roads and motorized trails can potentially affect great gray owl habitat by affecting the condition of suitable great gray owl habitat in similar ways that affects willow flycatcher habitat, primarily through changes in meadow hydrology or when damage to meadow vegetation occurs. Compaction and meadow drying can cause changes in vegetation composition which can lead to changes in prey species abundance and distribution. Changes in prey availability and abundance can affect reproduction success of great gray owls.

Great Gray Owl: Environmental Consequences

The Tahoe NF LRMP as amended by the SNFPA ROD (2004) provides management direction to establish and maintain Protected Activity Centers (PACs) to include the forested area and adjacent meadow around all known great gray owl nest stands. The desired condition for meadow vegetation in great gray owl PACs supports a sufficiently large meadow vole population to provide a food source for great gray owls through the reproductive period. Although the Tahoe NF does not currently support known great gray owl nesting pairs, potentially suitable great gray owl meadows were analyzed to determine potential impacts from the Tahoe NF Travel Management Project.

Indicators used to Measure Effects

Cross Country Travel: The prohibition of cross country travel is analyzed for their effects to potential great gray owl breeding habitat.

Additions to the NFTS (Number of Great Gray Owl Meadows Intersected): meadows identified as suitable for great gray owl foraging that are adjacent to suitable breeding habitat were assessed to determine the potential impact from proposed motorized route additions. The number of great gray owl meadows that are intersected by motorized route additions to the NFTS are assessed for the alternatives.

Establishment of "Open Areas": The establishment of "Open Areas" at Greenhorn Creek and Reservoir areas (Prosser, Stampeded and Boca) is evaluated for their potential to affect potential great gray owl habitat.

Changes to the NFTS

Change in Class of Vehicles: The changes in class of vehicle was analyzed for their potential to affect potential great gray owl meadow habitat (no known breeding sites, but potentially suitable breeding habitat exists), since this action potentially changes the condition of the existing road surface from smoothed surfaced to rough surfaced; which could potentially alter meadow condition where routes intersect or are within close proximity to motorized routes.

Wet Weather Seasonal Restrictions: In addition to existing deer seasonal restrictions specified in the Tahoe Forest Plan, wet weather seasonal restrictions would apply to specific alternatives. The benefits to great gray owl with these additional wet weather closures are analyzed for the alternatives.

Reopened ML 1 Roads: Meadows identified as suitable for great gray owl foraging that are adjacent to suitable breeding habitat were assessed to determine the potential impact from proposed reopening of ML 1 Roads. The number of great gray owl meadows that are intersected by reopened ML 1 roads are assessed for the alternatives.

Amendments to the Forest Plan: the proposal to remove deer winter range seasonal closures in the Humbug-Sailor area is evaluated to assess potential effects to suitable great gray owl habitat.

Direct and Indirect Effects

Cross Country Travel: Under Alternative 1, cross country travel would not be prohibited on 3,165 acres of potential great gray owl meadow habitat across the Tahoe NF. All the action alternatives prohibits cross country travel on 3,165 acres of potential great gray owl meadow habitat, including on 5-6 miles of unauthorized routes. Therefore, benefits to great gray owl habitat would occur under all the action alternatives, whereas Alternative 1 would potentially result in habitat degradation of suitable great gray owl habitat on the Tahoe NF, including within 21 suitable great gray owl meadows, on nearly 6 miles of unauthorized routes.

Additions to the NFTS: Potential great gray owl habitat has been identified on the Tahoe NF. A total of 41 meadow sites on the Forest are considered suitable foraging habitat areas for the great gray owl. These potential foraging sites were evaluated to determine the potential indirect effects to meadow vegetation and hydrology which may affect the suitability of potential great gray owl nesting/foraging habitat. Alternative 1 poses the greatest risk to potential great gray owl meadows where 21 meadows (51%) are intersected by existing unauthorized motorized routes, where motorized use could continue associated with cross country travel, totaling approximately 6 miles (Table 3.03-107). This amount of motorized routes could alter meadow vegetation and hydrology that would indirectly affect great gray owl breeding habitat where great gray owls forage and where the future to occupy these areas may be limited. Alternatives 5 and 6, each would result in intersecting 5 (12%) great gray owl meadow sites, where the future establishment of great gray owls could be affected. However, Alternative 5 would affect nearly three times the amount of meadow compared to Alternative 6 (0.3 mile vs. 0.1 mile), which would potentially reduce habitat quality in great gray owl meadows from motorized route additions. The remaining action alternatives either do not impact potential great gray owl meadows (Alternative 3), or minimally impacts great gray owl meadows where less than 0.1 miles of meadows would be affected.

Table 3.03-107. Number of Great Gray Owl Meadows Intersected by Motorized Route Additions

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Meadows with Intersections	21	3	0	1	5	5	2
Miles	5.93	0.05	0	0.02	0.27	0.09	0.04

* Alternative 1 includes the existing unauthorized routes associated with cross country travel, while all action alternatives include motorized route additions to the NFTS.

Changes to the NFTS

Change in Class of Vehicles. The change in class of vehicle proposed under Alternatives 2, 4, 5, 6, and 7, on some existing NFTS motorized routes may result in some smoothed surfaced roads becoming rough surfaced roads through reduced road maintenance. In addition, some existing motorized NFTS roads may receive different maintenance resulting in increased vegetation density at the road margins which would provide additional cover and/or foraging habitat. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives. For the great gray owl, existing habitat conditions will dictate whether or not the change in class of vehicle will result in reduced habitat quality. In general, it is not expected that the change in class of vehicle would result in a significant change to great gray owl habitat conditions, unless different road maintenance results in increased meadow habitat degradation. No changes in class of vehicle are proposed under Alternatives 1 and 3, which means that some system routes would remain under their current maintenance management strategy. However, in some cases some existing system roads have already become rough surfaced due to different of maintenance.

Wet weather seasonal restrictions. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails. Since no suitable great gray owl meadow habitat would be affected by Alternative 3 wet weather seasonal restrictions would not affect great gray owl habitat. Under Alternatives 5 and 6, great gray owl meadows that are intersected by native, surfaced motorized routes would be benefited through the reduction of erosion and sedimentation that could occur during the wet season. Alternative 1 with the greatest miles intersecting the most number of great gray owl meadows, would continue to be impacted by motorized use during the wet weather season, where habitat degradation within these meadows could occur.

Reopened ML 1 Roads: Only Alternative 5 proposes to reopen any ML 1 roads within suitable great gray owl meadows (Table 3.03-108). Alternative 5 potentially affects two suitable great gray owl meadows totaling 0.21 miles, which may potentially adversely affect meadow vegetation and hydrologic condition within Howard Creek Meadow (Road ID - H823-1-1) and Russel Valley/Dry Creek (Road ID - H889-3-18-5.

Table 3.03-108. Number of Great Gray Owl Meadows Intersected by Reopened ML 1 Roads

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Meadows with Intersections	0	0	0	0	2	0	0
Miles	0	0	0	0	0.21	0	0

Summary of Direct and Indirect Effects

Table 3.03-109 summarizes the overall net direct and indirect effect of the alternatives from cross country travel, motorized route additions to the NFTS, establishment of "Open Areas," changes to the NFTS (wet weather restrictions, changes in class of vehicles, and reopened ML 1 roads), and amendment to the Forest Plan.

Table 3.03-109. Great Gray Owl - Summary of Overall Net Direct and Indirect Effects of the Alternatives

			Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel									
Trend of Effect			Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Cross Country Travel Prohibited			0	3,165	3,165	3,165	3,165	3,165	3,165
Motorized Route Additions to the NFTS									
Trend of Effect			Negative, most impactive alternative	Negative, 4th most impactive alternative	No Effect	Negative, 6th most impactive alternative	Negative, 2nd most impactive alternative following Alt 1	Negative, 3rd most impactive alternative	Negative, 5th most impactive alternative
Number Meadows Intersected			21	3	0	1	5	5	2
Miles			5.9	0.05	0	0.02	0.27	0.09	0.04
Establishment of "Open Areas"			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Changes to the NFTS	**Wet Weather Restrictions**		No Effect	No Effect	No Effect	Beneficial	Beneficial	Beneficial	No Effect
	Change in Class of Vehicles		No Effect	Localized Negative Effects	No Effect	No Effect	Localized Negative Effects	No Effect	Localized Negative Effects
	Reopened ML 1 Roads	**Trend of Effect**	No Effect	No Effect	No Effect	No Effect	Negative	No Effect	No Effect
		Number Meadows Intersected	0	0	0	0	2	0	0
		Miles	0	0	0	0	0.21	0	0
Amendments to the Forest Plan			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negative effect due to continued cross country travel on 3,165 habitat acres within 21 meadows on 5.9 miles of unauthorized routes.	Beneficial – Cross country travel prohibited on 3,165 habitat acres, including within 17 meadow on 5.8 miles of unauthorized routes; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.	Beneficial – Cross country travel.prohibited on 3,165 habitat acres, including within 20 meadows on 5.9 miles of unauthorized routes of unauthorized routes; overall reduces disturbance and habitat fragmentation.	Beneficial – Cross country travel.prohibited on 3,165 habitat acres, including within 18 meadows on 5.4 miles of unauthorized routes; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation..	Beneficial – Cross country travel.prohibited on 3,165 habitat acres, including within 16 meadows on 5.3 miles of unauthorized routes; although minor negative impacts from route additions and reopened ML 1 roads; overall reduces disturbance and habitat fragmentation.	Beneficial – Cross country travel.prohibited on 3,165 habitat acres, including within 16 meadows on 5.7 miles of unauthorized routes; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.	Beneficial – Cross country travel.prohibited on 3,165 habitat acres, including within 19 meadows on 5.9 miles of unauthorized routes; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.

*Alternative 1 includes existing unauthorized routes that would continue with cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects

The geographic boundary for analyzing cumulative effects to great gray owls includes 41 suitable great gray owl meadow habitat sites within the boundary of the Tahoe NF. These meadows fall within a broad geographic distributional range from eastside to westside of the Sierra crest, and they occur within a diversity of vegetation types. The adjacent forest types surrounding these great gray owl meadow areas include eastside pine, eastside mixed conifer, true fir types, and, westside mixed conifer forests.

The action alternatives are analyzed for cumulative effects of motorized and non-motorized routes to suitable great gray owl habitat that may affect the ability for great gray owls to occupy these sites. Cumulative effects include routes that are on both public and private lands. Decommissioned routes are considered positive cumulative effects.

Alternative 1 poses the greatest cumulative risk to suitable great gray owl habitat where suitable great gray owl meadows are intersected by a motorized or non-motorized route on both NFS and non-NFS lands 53 times for a total of 14 miles (Table 3.03-110). Currently 21 great gray owl meadows are affected by approximately 6 miles of existing unauthorized routes. The uncertainty of future motorized route proliferation could alter meadow vegetation and hydrology that would impact habitat conditions for great gray owl prey species in the long term. It is expected that OHV use would continue and increase, therefore Alternative 1 could adversely affect the potential for great gray owls to occupy these sites in the near and distant future. In addition, there are no wet weather restrictions for native surfaced roads and trails that intersect suitable great gray owl meadows.

The remaining action alternatives reduces the impacts to great gray owl meadows by prohibiting cross country travel on between 16 and 20 meadows with existing unauthorized routes, totaling 5.3 to 5.9 miles. Alternative 5 would benefit the least, and Alternative 3 would benefit the most from the proposed actions. Alternative 5 proposes to add or reopen approximately ½ mile of motorized routes within 5 meadows, while the remaining action alternatives proposes to affect between 0 and 5 meadows from 0 to 0.1 mile of motorized route addition. This amount of impact to suitable great gray owl habitat should not limit the distribution of great gray owls in the future.

For all the action alternatives, cross country travel would be prohibited on 3,165 great gray owl meadows, including approximately 6 miles on unauthorized routes within great gray owl meadows which would benefit great gray owl habitat. However, non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on these routes. Some impacts to great gray owl foraging habitat may be expected from non-motorized use in the future. As these routes become revegetated and recover either through active or passive restoration efforts, overall impacts to great gray owl habitat would be expected to recover and diminish in the future.

Table 3.03-110. Cumulative Effects (Great Gray Owl Suitable Sites)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Proposed route additions (negative impact)[1]							
Number of Suitable GGO Meadow Sites Intersected	21	3	0	1	4	5	2
Miles	5.93	0.05	0	0.02	0.27	0.09	0.04
Reopened ML 1 Roads							
Number of Potential GGO Meadow Sites Intersected	0	0	0	0	2	0	0
Miles	0	0	0	0	0.21	0	0
Unauthorized routes prohibited to cross country travel (positive impact)[2]							
Number of Suitable GGO Meadow Sites Intersected	0	17	20	18	16	16	18
Miles	0	5.97	5.93	5.72	5.44	5.83	5.89
Cumulative effects of past and present actions							
Existing motorized routes - NFS lands (negative impact)							
Number of Suitable GGO Meadow Sites Intersected	22	22	22	22	22	22	22
Miles	6.06	6.06	6.06	6.06	6.06	6.06	6.06
Existing routes on private land - non-NFS lands (negative impact)							
Number of Suitable GGO Meadow Sites Intersected	5	5	5	5	5	5	5
Miles	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Existing non-motorized routes (negative impact)							
Number of Suitable GGO Meadow Sites Intersected	5	5	5	5	5	5	5
Miles	1.22	1.22	1.22	1.22	1.22	1.22	1.22
Decommissioned routes (positive impact)							
Number of Suitable GGO Meadow Sites Intersected	2	2	2	2	2	2	2
Miles	0.47	0.47	0.47	0.47	0.47	0.47	0.47
Roads closed by previous NEPA decisions, pending implementation (positive impact)							
Number of Suitable GGO Meadow Sites Intersected	2	2	2	2	2	2	2
Miles	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Total Cumulative Effects							
Number of Times GGO Meadows Intersected by Routes	**53**	**35**	**32**	**33**	**38**	**37**	**34**
Total Miles	**14.0**	**8.1**	**8.08**	**8.10**	**8.56**	**8.17**	**8.12**

[1] Alternative 1 includes the existing unauthorized routes, while all action alternatives include proposed motorized routes.

[2] Includes routes unauthorized to motorized public use (both system and unclassified).

Overall Cumulative Effects from Past, Present, and Reasonably Foreseeable Actions

Cumulative impacts to the great gray owls include past, present, and future impacts from livestock grazing, timber harvest, roads, and recreational activities. Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on private lands within the Tahoe NF boundary. Some, but not all, of these activities would contribute to impacts to the great gray owl within the cumulative effects boundary.

Between 1994 and 2008, several wildfires resulted in burning over 10,000 acres of old forest habitat (CWHR 4M, 4D, 5M, 5D, and 6). Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all have resulted in impacts to great gray owl nesting habitats. Between 2001 and 2008, about 17,000 acres of forest vegetation and fuels thinning and mastication projects were completed, which were designed to reduce the risk of additional habitat loss to wildfires. These treatments generally do not result in habitat removal, but may result in habitat quality changes. Between 1960 and present, private land harvest within the boundaries of the Tahoe NF has resulted in over 87,000 acres of vegetation treatments including clearcuts, sanitation, shelterwood, and thinning. Much of the private land harvest has resulted in the loss or reduction in spotted owl habitat.

These wildfires and vegetation treatment projects may have resulted in a reduction in some great gray owl nesting habitat on the Tahoe NF since 1960.

Thinning projects designed to reduce hazardous fuels will continue to be the primary activity affecting forested habitat on the Tahoe (see Appendix H, Reasonably Foreseeable Projects and Cumulative Effects). Although these treatments may reduce habitat quality (i.e. nesting habitat reduced to foraging habitat), it expected that suitable habitat would be maintained, and it is anticipated that these treatments would reduce the amount of forested habitat potentially lost from future stand replacing wildfires (USDA Forest Service 2004). The California Department of Forestry and Fire Protection currently lists approximately 12,000 acres of private land within the Tahoe NF 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 in a suitable condition for great gray owls.

Historic livestock grazing has impacted montane meadows and is considered to be a primary factor that has influenced montane meadow habitat for birds in the Sierra Nevada (Graber 1996, Green et al. 2003, Menke et al. 1996). Many of the landbird species utilizing these meadows feed upon insects that decline in response to removal of this herbaceous growth (Graber 1996). Poorly managed grazing in riparian areas can impact nesting densities of many bird species, and particularly of habitat specialists such as the great gray owl, willow flycatcher, Lincoln's sparrow, and white-crowned sparrow (RHJV 2004).

Current livestock grazing on active allotments may affect a number of suitable great gray owl meadow habitats on the Forest. However, standards and guidelines for grazing in the Sierra Nevada Forest Plan Amendment generally are designed to minimize grazing impacts and maintain montane meadow habitat in a suitable condition for great gray owls. Non-motorized trails allow for backcountry hiking, camping, and equestrian use which may occur in meadows not accessed by motorized routes, and can adversely affect additional meadow habitat or disturb species. These activities are generally dispersed and of low impact to habitat. Foreseeable future projects listed in the Tahoe Schedule of Proposed Actions do not indicate additional effects. Perazzo Meadow on the Sierraville Ranger District, where great gray owl detections have been documented, is currently underway for watershed restoration efforts to improve the hydrologic and vegetation conditions that would benefit great gray owl foraging conditions.

Urban development and encroachment into the Sierra foothills continues to be a concern and could be a cumulative impact to great gray owls, especially considering the checkerboard ownership pattern and

accessibility of the Tahoe NF landscape. Great gray owls are rare and attract the attention of many professional and amateur bird watchers alike. These avid birders hoping to catch a glimpse of the elusive species may unintentionally disturb and cause harm to individual birds which could affect reproductive status and ultimately affect the abundance and distribution of this very rare species.

Alternative 1 poses the greatest cumulative risk to suitable great gray owl foraging habitat where these suitable great gray owl meadows are intersected by a motorized or non-motorized route on both NFS and non-NFS lands 53 times for a total of 14 miles. Continued motorized route proliferation in the future could alter meadow vegetation and hydrology that would impact habitat conditions for great gray owl prey species in the long term, and could adversely affect the potential for great gray owls to occupy these sites in the near and distant future. In addition, there are no wet weather restrictions for native surfaced roads and trails that intersect suitable great gray owl meadows.

Sensitive Species Determination

The Biological Evaluation for the Tahoe NF Motorized Travel Management Project EIS, which is hereby incorporated by reference, determined that the action alternatives may affect great gray owl, but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the Tahoe National Forest. In the absence of a range wide viability assessment, this viability determination is based on local knowledge of this species as discussed previously in this evaluation, and professional judgment.

Incidental great gray owls have been detected on the Sierraville Ranger District and on private land adjacent to NFS lands within the boundary of the Tahoe NF on the west side of the Forest. The addition of motorized routes to the NFTS would not directly, indirectly or cumulative affect known locations of great gray owls since no motorized route additions are proposed in the vicinity of the documented owl sightings that would potentially disturb them.

Alternative 6, the Preferred Alternative, would result in less than 0.1 mile intersecting suitable great gray owl meadow sites within 5 of 41 suitable great gray owl meadow sites across the Tahoe NF. This amount of habitat affected by motorized routes would pose a relatively low risk to great gray owl breeding habitat.

Compliance with Forest Plan and Other Direction

The Tahoe NF LRMP as amended by the SNFPA ROD (2004) provides management direction to establish and maintain Protected Activity Centers (PACs) to include the forested area and adjacent meadow around all known great gray owl nest stands. The desired condition for meadow vegetation in great gray owl PACs supports a sufficiently large meadow vole population to provide a food source for great gray owls through the reproductive period. Although the Tahoe NF does not currently support known great gray owl nesting pairs, potentially suitable great gray owl meadows were analyzed to determine potential impacts from the Tahoe NF Travel Management Project.

In addition the Tahoe NF LRMP provides management direction for managing meadows, wetlands, and Riparian Conservation Areas that are applicable to suitable great gray owl meadow as follows:

- *Locate roads away from meadow edges where alternative routes are available (Tahoe LRMP) (Management Standard & Guideline).*
- *Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.*
- *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) 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 (Management Standard & Guideline 92).*
- *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 (RCO#2, Management Standard & Guideline 100).*

In the above sections, the Proposed Action and alternatives for the Tahoe NF Motorized Travel Management Project were analyzed for their potential effects to great gray owl meadows which address the above management standard and guidelines as they apply to great gray owl habitat. Mitigation measures for the action alternatives to minimize the risk of sediment and streambank alteration from proposed motorized route additions and existing unauthorized routes are addressed in the RCO analysis and Appendix A (Site Specific Road, Trail and Open Area Information).

Alternative 1 is least consistent with the above standards and guidelines for managing meadows in terms of maintenance and hydrologic connectivity of meadows, avoidance of roads near and within meadows, and minimizing effects to meadow condition and function. Alternative 1 continues cross country travel, including within 21 great gray meadows on approximately 6 miles of existing unauthorized routes.

All of the action alternatives are consistent with the Standards and Guidelines since they reduce the potential effects to great gray owl meadows. All the action alternatives would prohibit cross country travel on 3,185 great gray owl meadow acres, and reduces the impacts of 16 to 20 great gray owl meadows (Alternative 5 reduces the least, Alternative 3 reduces the most) from 5.4 miles to 6 miles of existing routes unauthorized to motorized public use. All the action alternatives considerably improve meadow function and connectivity for the great gray owl, since the project design standards were developed to minimize impacts to meadows and riparian habitat through the implementation of wet weather seasonal restrictions, and the prohibition of cross country travel.

Greater Sandhill Crane: Affected Environment

Introduction: The greater sandhill crane is a California State Threatened species and is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). California pairs of sandhill cranes generally nest in wet meadow, shallow lacustrine, and fresh emergent wetland habitat,

with nests constructed of large mounds of water plants over shallow water (Zeiner et al. 1990, California Department of Fish and Game 1994). Studies in California during 1988 showed water depths averaging 2.3 inches (California Department of Fish and Game 1994). Open meadow habitats are also used (Littlefield 1989). On dry sites, nests are scooped-out depressions lined with grasses (Zeiner et al. 1990).

In the Tahoe National Forest, a breeding population of approximately 12 pair occurs within Carman Valley, Kyburz Flats, and Perazzo Meadow on the Sierraville Ranger District (Tahoe NF Biological Evaluation). In addition, sandhill cranes are known to breed in the Sardine Valley area on private land north of Stampede Reservoir.

Disturbance and/or Mortality from vehicles: Road and trail-associated factors can disrupt sandhill breeding activities which can ultimately cause a loss in productivity. Motorized activities off of roads and trails during the breeding season can cause direct mortality of young sandhill cranes.

Habitat Degradation: routes across meadow sites can also indirectly affect sandhill cranes by damaging or degrading meadow or wetland habitat required for breeding.

Greater Sandhill Crane: Environmental Consequences

Indicators used to Measure Effects

Cross Country Travel. The prohibition of cross country travel is analyzed for their effects to sandhill crane breeding habitat.

Establishment of "Open Areas": The establishment of the Stampede Reservoir "Open Area" is analyzed for the potential to affect Sandhill cranes. Establishment of "Open Areas" at Boca and Prosser Reservoir and Greenhorn Area would not affect Sandhill crane, since the sandhill crane habitat does not occur there and is not known to nest at these sites.

Additions to the NFTS: Sandhill crane breeding sites were analyzed to determine the number of miles of motorized route additions to the NFTS that intersects sandhill crane breeding sites.

Change in Class of Vehicles: The changes in class of vehicle was analyzed for their potential to affect sandhill crane breeding habitat, since this action potentially changes the condition of the existing road surface from smoothed surfaced to rough surfaced; which could potentially alter meadow condition where routes intersect or are within close proximity to motorized routes.

Wet weather seasonal restrictions: Wet weather seasonal restrictions on native surfaced roads and motorized trails are analyzed for their potential to benefit sandhill cranes for each of the alternatives.

Reopened ML 1 Roads: Reopened ML 1 Roads are analyzed for their potential to benefit sandhill cranes for each of the alternatives.

Direct and Indirect Effects

Cross Country Travel

Cross country travel is not prohibited under Alternative 1, at Kyburz Flat, Carman Valley, and Perazzo Meadow where unmanaged cross country travel may impact breeding sandhill cranes where breeding productivity could be at risk from disturbance of motorized activity. All the action alternatives would

prohibit cross country travel, and therefore, would benefit sandhill cranes at Kyburz Flat, Carman Valley, and Perazzo Meadow.

Breeding Sites Intersected by Motorized Route Additions to the NFTS

On the Tahoe NF, three sandhill crane breeding sites are located at Kyburz Flat, Carman Valley, and Perazzo Meadow on the Sierraville Ranger District. For all the action alternatives, motorized routes added to the NFTS would not intersect known breeding sites at Kyburz Flat or Carman Valley on NFS lands, and therefore, no direct or indirect effects would occur from the addition of motorized routes to the NFTS.

Establishment of "Open Areas"

Stampede Reservoir "Open Areas": Alternatives 2 and 6 propose to establish "Open Areas" for motorized access to the shoreline below the high water mark on dry soils to allow for recreational fishing, water play, etc. Sandhill cranes have been documented to occur on the north shore of Stampede Reservoir, but nesting has not been documented in this area. However, a known breeding population of sandhill cranes occurs at Sardine Valley on private land just north of Stampede Reservoir. Motorized access to the shoreline could potentially disturb sandhill cranes using the area north of Stampede Reservoir. Under Alternative 1 cross country travel would continue, where the potential to disturb sandhill cranes may occur, including the Stampede Reservoir area. The remaining action alternatives do not allow access to these reservoirs, and therefore, sandhill cranes would not be directly disturbed by motorized use adjacent to Stampede Reservoir.

Changes to the NFTS

Change in Class of Vehicle. The change in class of vehicles would potentially affect sandhill crane habitat under Alternatives 2, 5, and 7 within Carman Valley (Knutsen Meadow), where different maintenance standards could result in changes to road surface type and potentially increase erosion and sedimentation risk. In general, it is not expected that the change in class of vehicle would result in a significant change to sandhill crane habitat conditions, since the road through Carman Valley is already rough surfaced. In the long term, road condition could deteriorate and cause localized effects. Since Carman Valley recently underwent major meadow restoration efforts including a culvert improvement project specifically designed to enhance meadow condition, any adverse effects of road maintenance changes would likely be minimal, especially considering that Carman Valley is a large meadow system and the road condition is currently stable. None of the other sandhill crane breeding sites are affected by the change in class of vehicles.

Wet Weather Seasonal Restrictions. Wet weather seasonal restrictions on native surfaced roads and motorized trails would likely benefit sandhill cranes at Kyburz Flat and Carman Valley under Alternatives 4, 5, and 6, since motorized use on native surfaced routes adjacent to Kyburz and Carman Valley breeding sites would be prohibited during the wet weather season. The prohibition of motorized use on these routes during the wet season would prevent the potential for meadow habitat degradation through vegetation and

soil loss at sandhill crane breeding sites. For the remaining alternatives, sandhill crane breeding sites at Carman Valley, Kyburz Flat, and Perazzo Meadow could be subject to an increase in the risk of meadow vegetation degradation through the loss of riparian vegetation and soil erosion from motorized use during the wet weather season, particularly in the spring months after snowmelt (April to early June).

Reopened ML 1 Roads: None of the alternatives proposes to reopen any ML 1 roads within or adjacent to sandhill crane habitats at Kyburz, Carman Valley, or Perazzo Meadow. Therefore sandhill cranes or their nesting habitat would not be directly or indirectly affected by this action.

Summary of Direct and Indirect Effects

Table 3.03-111 summarizes the overall net direct and indirect effect of the proposed actions from motorized route additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-111. Sandhill Crane - Summary of Overall Net Direct and Indirect Effects of the Alternatives

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel	Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Nesting habitat at Kyburz, Carman Valley, and Perazzo Meadow	Cross Country Travel Continued	Cross country travel prohibited	Cross country travel prohibited	Cross country travel prohibited	Cross country travel prohibited	Cross country travel prohibited	Cross country travel prohibited
Establishment of "Open Areas"	**Trend of Effect**	Negative	Negative	No Effect	No Effect	No Effect	No Effect	No Effect
	Stampede Reservoir (no effect at all other "Open Areas")	Unmanaged shoreline access continued	Open motorized access to Stampede on dry soil, including north shore where sandhill cranes observed	No motorized access to shoreline	No motorized access to shoreline	No motorized access to shoreline	No motorized access to Stampede Reservoir at known sandhill crane location at north shore of Stampede	No motorized access to shoreline
Motorized route additions	**Trend of Effect**	Negative	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
	Miles	Unauthorized routes continue	0	0	0	0	0	0
Changes to the NFTS	**Wet Weather Restrictions**	No effect	No effect	No effect	Positive benefit to habitat	Positive benefit to habitat	Positive benefit to habitat	No effect
	Change in Class of Vehicles	No effect	Localized negative effects at Carman Valley due to maintenance level downgrades.	No effect	No Effect	Localized negative effects at Carman Valley due to maintenance level downgrades	No Effect	Localized negative effects at Carman Valley due to maintenance level downgrades.
	Reopened ML 1 Roads	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect.
Amendments to Forest Plan		No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negative effect to habitat where cross country travel continued.	Least beneficial to habitat from adverse effects of "open area" establishment at Stampede Res.	2nd most beneficial to habitat (shared with Alts 5 & 7) due to prohibition of cross country travel.	Most Beneficial to habitat (shared with Alt 6) due to prohibition of cross country travel, with added benefits from wet weather restrictions.	2nd most beneficial to habitat (shared with Alts 2 & 7) due to prohibition of cross country travel, with added benefits from wet weather restrictions.	Most beneficial to habitat (shared with Alt 4) due to prohibition of cross country travel, with added benefits from wet weather restrictions.	2nd most beneficial to habitat (shared with Alts 3 & 5) due to prohibition of cross country travel.

*Alternative 1 includes existing unauthorized routes that would continue with cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects

Spatial and Temporal Cumulative Effects Boundary

Breeding sandhill cranes are known to breed at three sites on the Tahoe NF, at Kyburz Flat and Carman Valley - all are located on the eastside of the Forest on the Sierraville Ranger District. A fourth breeding site is located on private land in Sardine Valley just to the north of Stampede Reservoir. Therefore, the cumulative effects of the alternatives are analyzed in the vicinity of these four sites because they represent the spatial extent of breeding sandhill cranes on the Tahoe NF. Past and reasonably foreseeable cumulative impacts are analyzed within 20 years in the past and out 20 years into the future. This represents a reasonable timeframe for analyzing cumulative impacts since any longer timeframe for analyzing cumulative project impacts may be uncertain and speculative.

Cumulative Effects of Additions to the NFTS, Establishment of "Open Areas," Prohibition of Cross Country Travel, Wet Weather Restrictions, and Change in Class of Vehicles

For Alternative 1, unmanaged cross country travel in the future may impact breeding sandhill cranes where breeding productivity could be at risk from disturbance of motorized activity. The rate of increased OHV use on the Tahoe NF is expected to increase in the future. All the action alternatives would prohibit unmanaged cross country travel, and therefore, would not likely contribute to existing cumulative impacts in the future and potentially benefit sandhill cranes. However, under both Alternative 1 and 2, cumulative adverse impacts could be added at Stampede Reservoir, adjacent to a known breeding population of sandhill crane on private land at Sardine Valley.

Overall Cumulative Effects to Sandhill Crane from Past, Present and Reasonably Foreseeable Actions

Past cumulative impacts for the four sandhill crane breeding sites at Carman Valley, Kyburz Flat, Perazzo Meadow, and Sardine Valley include historic grazing practices, meadow vegetation and hydrologic function impacts from roads, railroad logging, diversions, past timber harvest practices, and recreational activities. A list of recent past, present, and future projects is provided in Appendix H (Reasonably Foreseeable Projects and Cumulative Effects). Some, but not all of these projects may have impacts to the sandhill crane. Current grazing standards and guidelines as directed in the Sierra Nevada Forest Plan Amendment Record of Decision (2004) are designed to minimize impacts to riparian resources from grazing. Some conifer encroachment into these sites has occurred from the lack of fires in the past 100 years. Recent and future vegetation management and fuels reduction projects are designed to prevent the loss of forested habitat from large-scale, stand replacing catastrophic fire events.

Carman Valley

The Carman Valley area is currently recovering from a recent series of large-scale watershed restoration efforts to restore a highly degraded stream and riparian system using the plug and pond method. Prior to recent restoration efforts, numerous past attempts at improving watershed conditions were made dating back to the early part of the century, but were largely ineffective. The Carman Valley area falls within the

Beckwourth Peak Allotment which is grazed by sheep. Additional and ongoing restoration efforts will continue to improve riparian resources and watershed conditions, which will enhance breeding habitat for the sandhill crane.

Kyburz Flat

Kyburz Flat located east of Highway 89 north of Truckee, CA receives high recreational use from snowmobile use and cross country travel. The Kyburz Flat area was a part of the Boca, Kyburz, Sagehen, and Summit Allotment Management Plan (BKSS) where grazing management planning would reduce grazing impacts from sheep and improve riparian resource condition, and therefore, benefit breeding sandhill crane habitat at Kyburz Flat.

Perazzo Meadow

Perazzo Meadow is located on the Sierraville RD within the Perazzo Meadows Livestock Grazing Allotment. During the last 15 to 20 years, a variety of management efforts have been undertaken to improve riparian conditions and to reduce impacts from livestock grazing at Perazzo Meadows, including reducing livestock numbers, developing interim grazing management strategies, small watershed restoration efforts (structures), and others. Watershed degradation at Perazzo Meadows can be attributed not only to livestock grazing, but also to off-highway activities, loss of a bridge during the 1997 storm event, and other factors. Efforts to improve riparian watershed condition are currently underway, including through partnerships with local watershed groups, development of a grazing allotment management plan, and large-scale, watershed restoration efforts.

Sensitive Species Determination

The Biological Evaluation for the Tahoe NF Motorized Travel Management Plan, which is hereby incorporated by reference, made a determination that the all the action alternatives may impact sandhill cranes, but are not likely to lead to a trend toward federally listing, and do not contribute to a downward trend for sandhill crane population viability.

Compliance with Forest Plan and other Direction

The Tahoe NF LRMP, as amended by the SNFPA ROD (2004), provides management direction for managing meadows, wetlands and riparian habitats, and Riparian Conservation Areas that are applicable to sandhill crane habitat as follows:

- *Locate roads away from meadow edges where alternative routes are available (Tahoe LRMP) (Management Standard & Guideline).*
- *Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.*
- *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) 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 (Management Standard & Guideline 92).

- *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 (RCO#2, Management Standard & Guideline 100).*

In the above sections, the Proposed Action and alternatives for the Tahoe NF Motorized Travel Management Project were analyzed for their potential effects to sandhill crane breeding habitat which addresses the above management standard and guidelines as they apply to sandhill crane breeding habitat. Mitigation measures for the action alternatives to minimize the risk of sediment and streambank alteration from proposed motorized routes and existing unauthorized are addressed in the RCO analysis and Appendix A (Site Specific Road, Trail and Open Area Information).

Alternative 1 is least consistent with the above standards and guidelines for managing meadows in terms of maintenance and hydrologic connectivity of meadows, avoidance of roads near and within meadows, and minimizing effects to meadow condition and function. Alternative 1, continues cross country travel, including within Kyburz Flat, Perazzo Meadows, and Carman Valley (Knutsen Meadow) (known sandhill crane breeding sites).

All of the action alternatives are consistent with the above standards and guidelines since they reduce the impacts to sandhill cranes. The action alternatives all prohibit cross country travel on all three sandhill crane breeding sites, and reduces the impacts to these meadows. No motorized route additions to the NFTS are proposed within any sandhill crane breeding areas. Alternative 2 proposes changes in class of vehicles to a road that is adjacent to Knudsen Meadow, where small, localized effects may result from different maintenance standards.

Yellow Warbler: Affected Environment

The yellow warbler was selected as the MIS for riparian habitat in the Sierra Nevada. The Sierra Nevada Forest MIS Report and the Tahoe NF Motorized Project-level MIS Report are incorporated by reference. The yellow warbler is usually found in riparian deciduous habitats in summer (cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland) (CDFG 2005). Yellow warbler is dependent on both meadow and non-meadow riparian habitat in the Sierra Nevada (Siegel and DeSante 1999). On the Tahoe NF, CWHR montane riparian habitat (MRI) provides suitable habitat for the yellow warbler.

Disturbance from Vehicles: road and trail associated factors can disrupt warbler breeding activities, which can ultimately cause a loss in breeding activity.

Habitat Degradation: motorized routes across meadow and riparian habitat can indirectly affect yellow warblers by damaging or degrading or meadow montane riparian habitat required for breeding.

Yellow Warbler: Environmental Consequences

Habitat Factor(s) for the Analysis: The habitat factor used to assess direct and indirect effects of motorized routes for the yellow warbler were montane riparian habitat acres affected by motorized route additions to the NFTS. Habitat acres were determined by the length of the route multiplied by the width of the route. Route width is assumed to be a maximum of 8 feet. In some cases, route width may be less; therefore, impacts may be somewhat over-emphasized.

Current Condition of the Habitat Factor(s) in the Project Area: The Tahoe NF has approximately 5,131 acres CWHR montane riparian habitat (MRI).

Direct and Indirect Effects to Habitat

Cross Country Travel. Under Alternative 1, cross country travel would continue, potentially affecting 3,525 acres of montane riparian habitat (~5 acres directly affected by continued use on existing unauthorized routes), potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the yellow warbler. For the action alternatives, cross country travel would be prohibited on 3,525 acres, where disturbance, avoidance, abandonment would be reduced or eliminated. Of these 3,525 acres, approximately 5 acres of yellow warbler habitat would directly benefit of the prohibition of cross country travel on existing unauthorized routes.

Additions to the NFTS. Table 3.03-112 displays the acres of montane riparian habitat directly and indirectly affected by the alternatives. Alternative 1 affects the greatest amount of montane riparian habitat, suitable for yellow warbler, where unauthorized routes would result in a loss or reduction in montane riparian habitat within about 5 out of 5,131 acres or 0.1% of Tahoe NF montane riparian habitat. The action alternatives all reduces overall impacts to yellow warbler habitat by eliminating cross country travel on existing unauthorized routes that potentially may degrade yellow warbler habitat. Alternative 6 would benefit yellow warbler habitat the least, where motorized route additions would affect approximately 0.5 acre out of 5131 acres yellow warbler habitat on the Tahoe NF. The majority of proposed route additions (9 of 11) under Alternative 6 are short spur routes which access dispersed recreation areas. Alternatives 2, 4, 5, and 7 would result in minimal local effects to montane riparian habitat, where motorized route additions would result in less than 0.2 acres of 5,131 acres or 0.003% of Tahoe NF yellow warbler habitat. Alternative 3 does not propose motorized additions within or adjacent to yellow warbler habitat, and therefore would not affect any montane riparian habitat.

Table 3.03-112. Proportion of Yellow Warbler MIS habitat affected by Motorized Route Additions

Yellow Warbler MIS Habitat	Yellow Warbler Habitat Acres	Alt1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Montane Riparian Habitat		4.96	0.16	0.00	0.16	0.17	0.49	0.16
Proportion of Sierra Nevada Habitat	29,000	0.017%	0.001%	0%	0.001%	0.001%	0.002%	0.001%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat	5,131	0.09%	0.003%	0%	0.003%	0.003%	0.01%	0.003%
Habitat Security Risk in Tahoe NF		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

*Alternative 1 includes existing unauthorized routes associated with cross country travel.

Change in Class of Vehicles. The change in class of vehicle on some existing NFTS motorized roads may result in some smoothed surfaced roads becoming rough surfaced roads through changed road maintenance. In addition, some existing motorized NFTS roads may different maintenance resulting in increased vegetation density at the road margins which would provide additional cover and/or foraging habitat. The resulting roadway condition would depend upon the amount and type of vegetation present and the type of maintenance any given road receives. For the yellow warbler, existing habitat conditions will dictate whether or not the change in class of vehicle will result in reduced habitat quality. In general, it is not expected that the change in class of vehicle would result in a significant change to yellow warbler habitat conditions, unless changed road maintenance results in increased montane riparian habitat degradation.

Wet Weather Seasonal Restrictions. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where montane riparian habitats for the yellow warbler would be benefited through the reduction of erosion and sedimentation that could occur from wet season motorized use on routes, especially motorized routes that are within close proximity to yellow warbler habitat. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, yellow warbler habitat would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of stream crossings and highest RCA route densities that could potentially delivery sediment to montane riparian habitats from motorized use on native surfaced routes during the wet weather season.

Reopened ML 1 Roads. Except for Alternative 5, none of the alternatives proposes to reopen any ML 1 roads within yellow warbler habitat, and therefore would have no effect to yellow warbler habitat. Alternative 5 would only affect a very small proportion of yellow warbler habitat (less than 0.1 ac) that would not alter the trend in yellow warbler habitat at either the bioregional or Forest-wide scale (Table 3.03-113).

Table 3.03-113. Proportion of Yellow Warbler MIS habitat affected by Reopened ML 1 Roads

Yellow Warbler MIS Habitat	Yellow Warbler Habitat Acres	Alt 1, 2, 3, 4, 6, 7	Alt 5
Acres Montane Riparian Habitat		0	0.07
Proportion of Sierra Nevada Habitat	29,000	0%	0.0002%
Habitat Security Risk in Sierra Nevada		None	None
Proportion of Tahoe NF Habitat	5,131	0%	0.001%
Habitat Security Risk in Tahoe NF		None	None

Summary of Direct and Indirect Effects

Table 3.03-114 summarizes the overall net effect to the yellow warbler habitat from the motorized route additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-114. Yellow Warbler Montane Riparian Habitat - Summary of Overall Net Direct and Indirect Effects

			Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel									
Trend of Effect			Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Prohibited			0	3,525	3,525	3,525	3,525	3,525	3,525
Motorized Route Additions to the NFTS									
Trend of Effect			Negative	Small localized effects	No Effect	Small localized effects	Small localized effects	Small localized effects, mostly from routes to dispersed recreation areas	Small localized effects
Acres Affected			4.96	0.16	0.00	0.16	0.18	0.49	0.16
Establishment of "Open Areas"			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Changes to the NFTS	**Wet Weather Restrictions**		No Effect	No Effect	No Effect	Positive Benefit to habitat.	Positive Benefit to habitat.	Positive Benefit to habitat.	No effect
	Change in Class of Vehicles		No Effect	Minor, localized negative effect	No Effect	Minor, localized negative effect	Minor, localized negative effect	Minor, localized negative effects	Minor, localized negative effect
	Reopened ML 1 Roads	**Trend of Effect**	No Effect	No Effect	No Effect	No Effect	Negative, small localized effects	No Effect	No Effect
		Acres	0	0	0	0	0.07	0	0
Amendments to the Forest Plan			No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negative – Cross country travel continued on 3,525 acres and within **5.1 acres** directly affected by unauthorized routes.	2nd most beneficial alternative. Cross country travel prohibited on 3,525 acres and within **4.9 acres** directly affected by unauthorized routes; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.	Most benefical alternative. Cross country travel prohibited on 3,525 acres and within **5.1 acres** directly affected by unauthorized routes; overall reduces disturbance and habitat fragmentation..	3nd most beneficial alternative, shared with Alt 7. Cross country travel prohibited on 3,525 acres and within **4.96 acres** directly affected by unauthorized routes; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.	4th most beneficial alternative. Cross country travel prohibited on 3,525 acres and within **4.87 acres** directly affected by unauthorized routes; although minor negative impacts from route additions and reopened ML 1 roads; overall reduces disturbance and habitat fragmentation	Least beneficial alternative. Cross country travel prohibited on 3,525 acres and within **4.6 acres** directly affected by unauthorized routes; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.	3rd most beneficial, shared with Alt 4. Cross country travel prohibited on 3,525 acres and within **4.96 acres** directly affected by unauthorized routes; although minor negative impacts from route additions; overall reduces disturbance and habitat fragmentation.

*Alternative 1 includes existing unauthorized routes that would continue with cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects to Habitat in the Analysis Area

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on NFS and private lands within the Tahoe NF boundary. Some, but not all, of these activities have or will contribute to impacts to the montane riparian habitat for the yellow warbler within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Generally, vegetation/fuels management projects have not affected habitat within montane riparian habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Many recent, current, and future vegetation and fuels reduction projects are designed to minimize effects to montane riparian habitats by following "riparian conservation objectives" as prescribed in the Sierra Nevada Forest Plan Amendment Record of Decision (2004). Between 1994 and 2008, approximately 94,000 acres burned on the Tahoe NF, some of which have resulted in substantial changes in montane riparian habitat. In many cases, montane riparian habitat that was severely burned during a stand-replacing wildfire resulted in changes to or loss of riparian vegetation, loss of shade, cover, and structural diversity. In some cases, some riparian areas recovered post-fire and were significantly enhanced (i.e. aspen habitats in the Cottonwood Fire of 1994).

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increased impact to montane riparian habitats because humans are attracted to these areas for their beauty and scenic quality. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased impacts to montane riparian habitat would be expected, particularly during the summer months. Table 3.03-115 lists the reasonably foreseeable future projects and the associated direct, indirect, and cumulative impacts that are planned to occur on the Tahoe NF.

Table 3.03-115. Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impact to Yellow Warbler	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, mastication	~30	Short-term disturbance from harvest activities only when adjacent to montane riparian yellow warbler habitat.	Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Aspen enhancement	8	Short-term disturbance during implementation. Long-term cover and forage habitat improvement	Long-term beneficial cumulative effects from improved habitat conditions
Hazard tree removal	4	Minimal impact. Short-term disturbance during harvest if adjacent to montane riparian habitats.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve riparian and meadow habitat quality used for forage and reproduction.	Beneficial cumulative impact by improving long-term forage and nesting habitat conditions.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	None	None
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

Alternative 1, no action, cumulatively affects the greatest amount of yellow warbler habitat (5 acres out of 5,131 acres or 0.1%) on the Tahoe NF from continued use on unauthorized routes. All the action alternatives reduces overall cumulative effects of existing unauthorized routes within yellow warbler habitat, where cross country travel would be prohibited on between 4 ½ to 5 acres. Alternative 6 would result in a loss or reduction in approximately 0.5 acres yellow warbler habitat, primarily from the addition of motorized routes which accesses dispersed recreation areas. Alternative 3 does not add to existing cumulative effects from motorized route additions.

The remaining action alternatives affect an insignificant amount of yellow warbler habitat from motorized route additions. Alternatives 2, 4, 5, and 7 would alter less than 0.003% of yellow warbler habitat (0.2 acres out of 5,131 acres Tahoe NF habitat). None of the alternatives would be expected to alter the trend in yellow warbler habitat from the addition of motorized routes or from reopening ML 1 roads (Alt 5 only).

In general, it is not expected that the change in class of vehicle would result in a significant change to yellow warbler habitat conditions, unless changed road maintenance results in increased montane riparian habitat degradation for Alternatives 2, 4, 5, 6, and 7.

Wet weather seasonal restrictions on all native surfaced roads and motorized trails under Alternatives 4, 5, and 6 would benefit montane riparian habitat for the yellow warbler through the reduction of erosion and sedimentation. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, montane riparian habitat for the yellow warbler would not benefit from wet weather seasonal restrictions.

Finally, Alternative 1 would pose the greatest risk on 3,525 acres of yellow warbler habitat, where cross country travel would not be prohibited causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the yellow warbler. For the action alternatives, cross country travel would be prohibited on 3,525 montane riparian acres, where disturbance, avoidance, abandonment would be reduced or eliminated. Overall, none of the alternatives would alter the existing trend in yellow warbler habitat. However, Alternative 1, which allows cross country motorized travel to continue, could alter yellow warbler population trend.

Summary of Yellow Warbler Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the yellow warbler; hence, the riparian habitat effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the yellow warbler. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 29,000 acres of riparian habitat on NFS lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. The yellow warbler has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including Lassen NF (Burnett and Humple 2003, Burnett et al. 2005) and Inyo NF (Heath and Ballard 2003) point counts; on-going California Partners in Flight monitoring and studies (CPIF 2004); 1992 to 2005 – Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that yellow warblers continue to be present at these sample sites, and current data at the range wide, California, and Sierra Nevada scales indicate that the distribution of yellow warbler populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Yellow Warbler Trend. Alternative 1 would result in the greatest amount of suitable yellow warbler habitat (5 acres of 29,000 acres or 0.02% of Sierra Nevada-wide habitat) affected by cross country travel, including use on existing unauthorized routes. The action alternatives would benefit yellow warbler habitat by prohibiting cross country travel, and result in less than 1 acre out of 29,000 Sierra Nevada yellow warbler habitat acres affected by motorized route additions or reopened ML 1 roads. Based on the insignificant percentage of yellow warbler habitat affected by the proposed alternatives, the Tahoe NF Motorized Travel

Management Project would not alter the existing habitat trend, nor would it lead to a change in the distribution of yellow warbler across the Sierra Nevada bioregion.

Compliance with Forest Plan and Other Direction

The Tahoe NF LRMP, as amended by the SNFPA ROD (2004), provides management direction for managing meadows, wetlands and riparian habitats, and Riparian Conservation Areas that are applicable to yellow warbler habitat as follows:

- *Locate roads away from meadow edges where alternative routes are available (Tahoe LRMP) (Management Standard & Guideline).*
- *Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.*
- *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) 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 (Management Standard & Guideline 92).*
- *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 (RCO#2, Management Standard & Guideline 100).*

In the above sections, the Proposed Action and alternatives for the Tahoe NF Motorized Travel Management Project were analyzed for their potential effects to yellow warbler montane riparian habitat which addresses the above management standard and guidelines as they apply to yellow warbler habitat. Mitigation measures for the action alternatives to minimize the risk of sediment and streambank alteration from motorized route additions to the NFTS and existing unauthorized routes are addressed in Appendix I (Riparian Conservation Objectives) and Appendix A (Site Specific Road, Trail and Open Area Information).

Alternative 1 is least consistent with the above standards and guidelines for managing montane riparian habitat in terms of maintenance and hydrologic connectivity of streams, meadows, and wetlands, avoidance of roads near and within meadows, and minimizing effects to montane riparian condition and function. Alternative 1 would continue cross country travel montane riparian habitats important to yellow warblers, including on 10 acres of montane riparian habitat resulting from travel on existing unauthorized routes.

All of the action alternatives are consistent with the above Standards and Guidelines. All the action alternatives would reduce the impacts to these habitats by prohibiting cross country travel on within yellow warbler habitats, including on about 4½ to 5 acres of montane riparian habitat affected by existing unauthorized routes.

Aquatic Species and Habitat

Introduction

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 In Guldin 2004, Clinton and Vose 2003). Other factors that contribute to in-channel sediment delivery include the number of stream crossings on a channel, the condition of the stream approach, and the road length draining into the stream channel crossing.

Indicators used to Measure Effects

Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential effects to aquatic habitat factors from motorized cross country travel.

Additions to the NFTS: Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized route additions to the NFTS, and the miles motorized route additions within Riparian Conservation Areas (RCAs) for perennial and intermittent streams, and lakes, ponds, and reservoirs.

Establishment of "Open Areas": The establishment of "Open Areas" at Greenhorn area and at Stampede, Boca, and Prosser reservoirs is analyzed for their effects to aquatic species.

Changes to the NFTS including Change in Class of Vehicles, Change in Season of Use, and Reopened Maintenance Level (ML) 1 Roads.

- **Change in Class of Vehicles***:* Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough-surfaced) (see Chapter 3.02, Watershed Resources: Geology, Soil, Hydrology)**.**
- **Change in Season of Use***:* Proposed wet weather seasonal restrictions on native surfaced routes were analyzed for the alternatives in terms of all aquatic species and their habitats. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to aquatic species habitats.
- **Reopened ML 1 Roads***:* Reopened ML 1 roads are assessed for their potential effects aquatic species as motorized route additions are analyzed above.

Amendments to the Forest Plan: The removal of seasonal restrictions for wintering deer within the Humbug-Sailor Management Area 84 is analyzed for the potential effects to aquatic species.

Effects Common to All Aquatic Species

Establishment of Motorized "Open Areas": Cross country travel would continue under Alternative 1 on at least 2,649 acres at Greenhorn and at Boca, Stampede, and Prosser reservoirs, where effects to aquatic species and their habitats would be adversely affected, including changes in water chemistry, increased temperature, changes to vegetation, and increased sedimentation and erosion. Only Alternatives 2 and 6 propose to establish motorized "Open Areas." The remaining action alternatives would not affect aquatic species.

Alternative 2 proposes to establish 60 acres at Greenhorn and 2,589 acres at Boca, Stampede, and Prosser reservoirs. Alternative 2 would likely adversely affect important aquatic habitat conditions including water chemistry, temperature, and physical habitat at Greenhorn Creek. Since the "Open Areas" at the reservoirs are essentially under water during the wettest part of the year, no vegetation is present. However, sedimentation could increase and affect water quality within the reservoirs, especially considering the entire circumference of the reservoirs would be opened to motorized use.

Alternative 6 does not propose establishing the Greenhorn area as an "Open Area," and therefore, would not affect aquatic species. Alternative 6 proposes to establish 244 acres within discrete areas to provide motorized access on dry soils. Sedimentation and erosion should not be at an accelerated rate on the 244 acres designated "Open Areas" at Stampede, Prosser, and Boca reservoirs, since the proposed areas are stable and armored (Chapter 3.03-2). Generally, Alternative 6 benefits aquatic species habitats and improves existing conditions where currently the reservoirs are not prohibited to cross country motorized travel on at least 2,589 acres at the three reservoir areas.

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced routes were analyzed for the alternatives in terms of all aquatic species and their habitats. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to aquatic species habitats.

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized routes, where fish and other aquatic species would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially motorized routes that are within close proximity to or cross streams or other riparian aquatic habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather seasonal restrictions on native surfaced motorized routes and therefore, aquatic riparian dependent species would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of motorized stream crossings and highest RCA route densities that could potentially delivery sediment to aquatic and riparian habitats from wheeled motorized use on native surfaced routes during the wet weather season.

Amendments to the Forest Plan: Changing the season of use by removing deer winter closures in Management Area 84 Humbug-Sailor would not likely affect aquatic species since wet weather seasonal restrictions on native, surfaced roads would offset potential erosion or sedimentation that may otherwise occur from removing the deer seasonal restriction. Therefore, no effects to aquatic species would occur from this action.

Fisheries (trout) and Macroinvertebrates: Affected Environment

Aquatic or Benthic Macroinvertebrates (BMI) were selected as the MIS for riverine and lacustrine habitat in the Sierra Nevada. They have been demonstrated to be very useful as indicators of water quality and aquatic habitat condition (Resh and Price 1984; Karr et al. 1986; Hughes and Larsen 1987; Resh and Rosenberg 1989). They are sensitive to changes in water chemistry, temperature, and physical habitat; aquatic factors of particular importance are: flow, sedimentation, and water surface shade.

Fisheries (trout) and Macroinvertebrates: Environmental Consequences

Direct and Indirect Effects to Fisheries (trout) and Macroinvertebrates

Habitat Factor(s) for the Analysis: Flow; Sedimentation; and Water surface shade

Flow: this habitat factor will be evaluated by assessing changes in the miles of perennial stream flow and intermittent stream flow, and changes in acres of lakes and ponds.

Sedimentation: this habitat factor will be evaluated by assessing miles of stream and acres of lake potentially affected by sediment discharge as a result of native surfaced route crossings on streams and proximity of routes to streams, lakes and ponds. Sedimentation will be measured by route density within RCAs and Stream crossing density within RCAs.

Water surface shade: this habitat factor will be evaluated by assessing changes in water surface shade as a result of motorize route additions to the NFTS and reopened ML 1 roads that cross streams or are adjacent to streams, lakes and ponds. This change will serve to indicate changes in water surface shade to perennial and intermittent streams, and lakes and ponds.

Current Condition of the Habitat Factor(s) in the Project Area

Flow: There are currently 1,398 miles of perennial streams, 941 miles of intermittent streams, and approximately 11,599 acres of lakes, ponds, and reservoirs on Tahoe NF including on National Forest System lands. These miles of perennial and intermittent streams, and acres of lakes, ponds, and reservoirs comprise the habitat for aquatic macroinvertebrates across the Forest.

Sedimentation: Native surfaced, motorized stream crossings and motorized routes within close proximity to riverine and lacustrine habitats can be a considerable source of sediment delivery to aquatic habitats important to macroinvertebrates (See Chapter 3.02, Watershed Resources: Geology, Soil, and Hydrology). There are currently 2,462 native surfaced, stream crossings, and 1,081 miles of roads and trails within RCAs on the Tahoe NF. There are 3 water bodies on the Tahoe NF that are listed as impaired for sediment on the EPAs 303(d) List. These are Truckee River, Humbug Creek, and Squaw Creek.

Water surface shade: Water surface shade varies tremendously on the Tahoe NF depending on the type and amount of vegetation, topographic features, floodplain type, etc. that the watercourse falls within.

Cross Country Travel

Under Alternative 1, no action, motorized cross country travel would continue on approximately 149,277 acres within Riparian Conservation Areas (RCAs), where the potential for adversely affecting aquatic macroinvertebrate habitat factors through increases in sedimentation and alteration of water surface shade. Under the action alternatives, prohibitions on cross country travel on 149,277 acres within RCA's would likely reduce the potential for sedimentation and alteration of water surface shade, and therefore benefit aquatic riverine and lacustrine habitat quality.

Establishment of Motorized "Open Areas"

The establishment of motorized "Open Areas" is analyzed under "Effects Common to All Aquatic Species."

Additions to the NFTS

Number of Native Surfaced, Stream Crossings. The number of native surfaced, stream crossings is assessed for the alternatives, and provides a way to compare changes in sediment into riverine and lacustrine habitats for aquatic macroinvertebrates (Table 3.03-115). Alternative 1 poses the greatest risk of increased sedimentation where 848 stream crossings are affected by the continuance of cross country travel on existing unauthorized motorized routes.

All of the action alternatives would result in significantly reducing the number of native surfaced stream crossings and thereby significantly benefiting riverine and lacustrine habitats for aquatic macroinvertebrates across the Tahoe NF. Of the action alternatives, Alternative 5 results in the greatest number of native surfaced, stream crossings (79 crossings) associated with proposed motorized route additions, followed by Alternatives 2, 6, 7, and 4, in descending order. Alternative 3 does not add motorized routes to the NFTS, and therefore macroinvertebrate habitat factors of sedimentation or water surface shade would not be affected.

Table 3.03-116. Number of Native Surfaced, Stream Crossings Associated with Additions to the NFTS

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed additions to the NFTS (negative impact)	0	28	0	14	79	40	15
Stream Crossings that would remain with the continuance of cross country travel on existing unauthorized routes (negative impact)	848	0	0	0	0	0	0
Crossings prohibited to cross country travel (positive impact)	0	820	848	834	769	808	833
Crossings Closed by previous NEPA decisions, pending implementation (positive impact)	54	54	54	54	54	54	54

Miles of Route Additions within RCAs. The miles of proposed motorized route additions to the National Forest Transportation System (NFTS) within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into riverine and lacustrine habitats for aquatic macroinvertebrates (Table 3.03-117). Alternative 1 poses the greatest risk to increased sedimentation potential from 327 miles of unauthorized routes within RCAs that would remain due to not prohibiting cross country travel. Similar to stream crossing numbers, Alternative 5 would also result in the greatest number (31 miles) of motorized routes within RCAs that would be added, followed by Alternatives 6, 2, 7, and 4, in descending order. As stated above, Alternative 3 does not add motorized routes to the NFTS, and therefore changes to macroinvertebrate habitat factors including sedimentation or water surface shade would not occur.

Table 3.03-117. Miles of Route Additions within Riparian Conservation Areas (RCAs)

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
RCA miles of motorized route additions to the NFTS (negative impact)	327.3	12.3	0	5.6	31.0	18.2	6.8
Existing unauthorized RCA route miles prohibited to cross country travel (positive impact)	0	315.0	327.3	321.7	296.3	309.1	320.5
Miles closed by previous NEPA decisions, pending implementation (positive impact)	26.4	26.4	26.4	26.4	26.4	26.4	26.4

*Alternative 1 includes existing native surfaced routes, unauthorized to motorized use, while all the other Alternatives include motorized route additions to NFTS.

Changes to the NFTS

Change in Class of Vehicle. The change in class of vehicle may change the impacts to soil and water resources due to the potential change from smoothed surfaced route to native (rough) surfaced route (See Chapter 3.02, Watershed Resources: Geology, Soil, Hydrology). If the route changes from smoothed surfaced to native surfaced, the change in class of vehicle would potentially result in increased sediment and erosion risk to riverine and lacustrine habitats. The analysis of the change in class of vehicles indicates Alternatives 2, 5, and 6 would result in an increase in the number of high risk crossings (Alternatives 2 and 5 – 103 crossings, Alternative 6 – 78 crossings) and RCA route miles (Alternative 2 – 34.3 mi, Alternative 5 – 25.2 mi, Alternative 6 – 13.9 mi) (Table 3.03-118). No change in class of vehicles would occur in Alternatives 1 and 3, and small increases in high risk routes (4 crossings, 2 RCA miles) would occur in Alternatives 4 and 7.

Table 3.03-118. Change in Class of Vehicle Impacts to Riverine and Lacustrine Habitats

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced Crossings	0	103	0	4	103	78	4
RCA Miles of Native Surfaced Routes	0	34.3	0	2.0	25.2	13.9	2.0

Reopened ML 1 Roads. Only Alternatives 5 and 6 would propose to reopen native surfaced, ML 1 roads where the potential to capture and deliver sediment to riverine and lacustrine habitats could occur. Alternative 5 would potentially impact the greatest amount of riverine and lacustrine habitats where 46 crossings and 14.8 miles within RCAs would be reopened. Alternative 6 would affect a much lesser extent of riverine and lacustrine habitats, where 3 crossings and 2.2 RCA miles would be reopened and potentially increasing sediment delivery to streams and lake habitats. The remaining alternatives would not affect riverine and lacustrine habitats (Table 3.03-119).

Table 3.03-119. Riverine and Lacustrine Habitat Effects from Reopened ML 1 Road

	Alt 1*, 2, 3, 4, 7	Alt 5	Alt 6
Number of Native Surfaced Crossings	0	46	3
RCA Miles of Reopened ML 1 Roads	0	14.8	2.2

*Alternative 1 includes existing native surfaced routes, unauthorized to motorized use, while all the other Alternatives include motorized route additions to NFTS.

Summary of Direct and Indirect Effects to Macroinvertebrate Habitat Factors

Tables 3.03-120 and 3.03-121 summarizes the direct and indirect effects of macroinvertebrate habitat factors for the alternatives from proposed motorized route additions to the National Forest Transportation System and cross country travel, including existing unauthorized motorized routes. None of the action alternatives are expected to measurably change the amount of habitat within intermittent, perennial streams, lakes, ponds, and reservoirs. Flows within intermittent and perennial streams are expected to remain in existing conditions. Habitat quality would be affected from changes to sedimentation and to water surface shade. The following actions are assessed for their potential to affect sedimentation, and to a lesser degree to water surface shade. Native surface road and motorized route crossings and within close proximity to watercourses have the potential to alter riparian habitat and therefore change the amount of water surface shade. These factors are measured by assessing the miles of native surface roads and motorized routes within the Riparian Conservation Areas (RCAs) and the number of stream crossings within RCAs. RCAs are defined as the area within 150 feet on each side of intermittent streams and 300 feet of perennial streams. Lakes, ponds, and reservoirs are considered perennial and have a 300-foot RCA. Water surface shade would be generally be reduced or lost by a very limited amount where shade has been removed by the proposed route crossings. Water surface shade alteration will depend upon the width of the crossing and the type of vegetation present at the crossing. Within some watercourses, water surface shade would either not be altered or only minimally reduced, such as, crossings within forested habitats. Crossings through riparian vegetation (herbaceous meadow plants and woody riparian shrubs) have resulted in a reduction of some water surface shade. The amount of water surface shade will depend on the width of the crossings and the number of crossings.

Table 3.03-120. Summary of Effects from Motorized Route Additions to the NFTS, Reopened ML 1 Roads and Changes in Maintenance Levels

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions to the NFTS							
Native Surface Crossings	848	28	0	14	79	40	15
RCA Miles	327.3	12.3	0	5.6	31.0	18.2	6.8
Reopened ML 1 Roads							
Number of Native Surfaced Crossings	0	0	0	0	46	3	0
RCA Miles	0	0	0	0	14.8	2.2	0
Change in Maintenance Level from smooth surfaced to rough surfaced							
Number of Native Surfaced Crossings	0	103	0	4	103	78	4
RCA Miles of Native Surfaced Routes	0	34.3	0	2.0	25.2	13.9	2.0

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions to the NFTS							
Native Surface Crossings	848	28	0	14	79	40	15
RCA Miles	327.3	12.3	0	5.6	31.0	18.2	6.8
Reopened ML 1 Roads							
Number of Native Surfaced Crossings	0	0	0	0	46	3	0
RCA Miles	0	0	0	0	14.8	2.2	0
Change in Maintenance Level from smooth surfaced to rough surfaced							
Total Native Crossings from proposed alternatives	**848**	**131**	**0**	**18**	**228**	**121**	**19**
Total Native Surface RCA Miles	**327.3**	**46.6**	**0**	**7.6**	**71.0**	**34.3**	**8.8**

*Alternative 1 includes existing native surfaced, stream crossings and unauthorized routes, while all the other Alternatives include additions of motorized routes and crossings and reopened ML 1 roads.

Table 3.03-121. Summary of Effects to Aquatic Macroinvertebrate Habitat Factors for the Alternatives

Alternatives	Changes in habitat quality in miles of Stream and Acres of Lakes/ Ponds/ Reservoirs	Changes in Sediment Levels	Changes in Water Surface Shade
Alt 1*	Low	Increases the greatest (327.3 RCA unauthorized route miles, 848 unauthorized crossings)	Decreases
Alt 2	Low	Decreases more than Alt 5 (46.6 RCA route miles, 131 crossings)	Increases compared to Alt 1
Alt 3	Low	Decreases the most compared to Alt 1 (Adds no RCA miles or crossings)	Increases the most compared to Alt 1
Alt 4	Low	Decreases more than Alt 7 (7.6 RCA miles, 18 crossings)	Increases 2nd most compared to Alt 1
Alt 5	Low	Decreases the least (71.0 RCA miles, 228 crossings)	Increases the least compared to Alt 1
Alt 6	Low	Decreases more than Alt 2 (34.3 RCA miles, 121 crossings)	Increases compared to Alt 1
Alt 7	Low	Decreases more than Alt 6 (8.8 miles, 19 crossings)	Increases compared to Alt 1

*Alternative 1 includes existing native surfaced, stream crossings and unauthorized routes, while all the other Alternatives include additions of motorized routes and crossings and reopened ML 1 roads.

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to aquatic macroinvertebrates include all perennial, intermittent streams, lakes, ponds, and reservoirs located within the boundary of the Tahoe NF. The temporal boundary is approximately 20 years in the past and 20 years into the future.

Past and current cumulative effects to aquatic macroinvertebrate habitat that have affected the habitat factors of flow, sedimentation, and surface shade include current and historic grazing along watercourses; loss of habitat (shade) and increased sedimentation through catastrophic wildfires; timber and fuels management where sedimentation has increased and cover has been reduced or removed; mining and

dredging, urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on NFS and private lands within the Tahoe NF boundary. Some, but not all, of these activities would contribute to impacts to the aquatic macroinvertebrates within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to aquatic macroinvertebrate habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Many recent, current, and future vegetation and fuels reduction projects are designed to minimize affects to stream and riparian habitats by following “riparian conservation objectives” as prescribed in the Sierra Nevada Forest Plan Amendment. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which may have resulted in changes in flow, increased sedimentation, and loss in surface cover.

Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increased impact to aquatic macroinvertebrate habitats particularly during the summer months because humans are attracted to streams, lakes, ponds, and reservoirs.

Cumulative Effects Conclusion

For the action alternatives, generally, changes in flow and water surface shade would be too small to be measured. When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from grazing, vegetation/fuels projects, wildfires, mining, and recreation, Alternative 1 poses the greatest risk to the riverine and lacustrine habitats on the Tahoe NF, where cross country travel would continue on 149,277 acres within Riparian Conservation Areas with the highest potential to reduce habitat quality by increasing sediment delivery and alter water surface shade to aquatic macroinvertebrate habitats. Sedimentation of macroinvertebrate habitats would be greatest under Alternative 1, where 848 stream crossings and 327 RCA miles would continue to have use on unauthorized routes since cross country would not prohibited.

For the action alternatives, Alternative 5 would result in the greatest cumulative number of native surfaced, stream crossings and RCA miles, followed by Alternatives 2, 6, 7, 4, and 3, in descending order from the addition of motorized routes, changes in maintenance level, and reopened ML 1 roads. Alternative 3 does not add any stream crossings, reopen any ML 1 roads, or change maintenance levels, and therefore Alternative 3 would not add any cumulative impacts to aquatic macroinvertebrate habitats.

Wet weather seasonal restrictions under Alternatives 4, 5, and 6 on all native surfaced routes would benefit macroinvertebrate habitat through the reduction of erosion and sedimentation that could result

from wet season wheeled motorized use on routes, especially wheeled motorized routes that are within close proximity to macroinvertebrate habitats.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Tables 3.03-122 and 3.03-123 summarizes the direct, indirect, and cumulative effects of all native surfaced motorized route crossings and miles within RCAs, including existing routes, motorized route additions to the NFTS, changes in class of vehicles, and prohibition of cross country travel. See Chapter 3.02 (Watershed Resources: Geology, Soil, Hydrology) for more detailed information and assumptions.

Table 3.03-122. Net Direct, Indirect, and Cumulative Effects to Number of Native Surfaced, Stream Crossings from Motorized Route Crossing Additions, Cross Country Travel, and Change in Maintenance Level, and Reopened ML 1 Roads

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Crossings Prohibited to Cross Country Travel (positive)	0	820	848	834	769	808	833
Existing NFTS Motorized Crossings (negative)	2,462	2,462	2,462	2,462	2,462	2,462	2,462
Motorized Crossing Additions (negative)	848	28	0	14	79	40	15
Change in maintenance level (smooth to rough surfaced) (negative)	0	103	0	4	103	78	4
Reopened ML 1 Roads (negative)	0	0	0	0	46	3	0
Crossings Closed by Previous NEPA decisions, pending implementation (positive)	54	54	54	54	54	54	54
Net Direct, Indirect, and Cumulative Effect = Total Native Surface Motorized Crossings	**3,310**	**2,593**	**2,462**	**2,480**	**2,644**	**2,580**	**2,481**

*Alternative 1 includes existing native surfaced, stream crossings unauthorized to motorized use, while all the other Alternatives include motorized crossing additions.

Table 3.03-123. Net Direct, Indirect, and Cumulative Effects to Native Surfaced, RCA Miles from Motorized Route Additions to the NFTS, Prohibition of Cross Country Travel, and Change in Class of Vehicles

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing RCA Motorized Miles (negative)	472.7	472.7	472.7	472.7	472.7	472.7	472.7
Miles of Native Surfaced Motorized RCA Additions (negative)	327.3	12.3	0	5.6	31.0	18.2	6.8
Miles of Native Surfaced Routes Prohibited to Country Travel (positive)	0	315.0	327.3	321.7	296.3	309.1	320.5
Change in Maintenance Level from smooth surfaced to rough surfaced (negative)	0	34.3	0	2.0	25.2	13.9	2.0
RCA Miles of Reopened ML 1 Roads (negative)	0	0	0	0	14.8	2.2	0
Net Direct, Indirect, and Cumulative Effect = Total Motorized RCA Miles	800.0	519.3	472.7	480.3	543.7	507.0	481.5

*Alternative 1 includes miles of existing native surfaced, unauthorized routes, while all the other alternatives include miles of motorized route additions.

Summary of Aquatic Macroinvertebrate Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale Index of Biological Integrity and Habitat monitoring for aquatic macroinvertebrates; hence, the lacustrine and riverine effects

analysis for the Tahoe NF Motorized Travel Management Project must be informed by these monitoring data. The sections below summarize the Biological Integrity and Habitat status and trend data for aquatic macroinvertebrates. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat and Index of Biological Integrity Status and Trend. Aquatic habitat has been assessed using Stream Condition Inventory (SCI) data collected since 1994 (Frasier et al. 2005) and habitat status information from the Sierra Nevada Ecosystem Project (SNEP) (Moyle and Randall 1996). Index of Biological Integrity is assessed using the River Invertebrate Prediction and Classification System (RIVPACS) and macroinvertebrate data collected since 2000 (see USDA Forest Service 2008). These data indicate that the status and trend in the RIVPACS scores is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Aquatic Macroinvertebrates Habitat Trend. The Tahoe NF Motorized Travel Management Project would affect the greatest amount of macroinvertebrate habitat under Alternative 1, through increased sedimentation and decreased surface shade, where approximately 327 miles of existing unauthorized motorized routes would continue to occur under the continuance of cross country travel within RCAs. These existing unauthorized routes would effectively result in the continued use of 848 native surfaced, stream crossings that could adversely affect the quality of macroinvertebrate habitats through increased sediment delivery and decreased surface water shade.

Of the action alternatives, Alternative 5 would result in the greatest amount impact to macroinvertebrate habitats, though the potential increase in sedimentation and decrease in surface water shade from motorized stream crossings and RCA route miles (71 RCA miles, 228 crossings), followed by Alternatives 2, 6, 7, 4, and 3, in descending order from the motorized additions, reopened ML 1 roads, and changes to maintenance level. Alternative 3 does not add any stream crossings or motorized routes within RCAs because no motorized route additions to the NFTS are proposed under this alternative.

The action alternatives would not alter the existing trend in macroinvertebrate habitat, nor would it lead to a change in the distribution of macroinvertebrates across the Sierra Nevada bioregion. This is based on the relatively low amount of lacustrine and riverine habitat affected, the prohibition of cross country travel within 149,277 RCA acres, including on between 296 and 327 motorized RCA miles, and on between 769 and 848 stream crossings.

Cumulative Effects of Past, Present, and Future Actions

The cumulative effects boundary includes all Forest Service System lands and private lands within the boundary of the Tahoe NF. This includes all major 7th field watersheds, which sufficiently analyzes cumulative effects to all perennial, intermittent, and ephemeral streams within the Forest boundary. Any larger boundary would be cumbersome and potentially dilute any cumulative effects.

Past, present, and future cumulative effects to aquatic organisms on both National Forest System lands and private lands includes a host of activities including timber management and the large network of roads associated with it; fuels projects including prescribed burning; recreation activities including

camping, fishing, hiking, off-highway travel, and sight-seeing; historic and present day mining activities have had significant impacts to fisheries; water diversions including dams and hydroelectric projects; livestock grazing both historic and current have greatly impacted the fisheries resource; and last, but not least urbanization on the Tahoe NF represented by the checkerboard ownership pattern has and continues to affect landscape connectivity of streams on the Tahoe NF.

Alternative 1 would add the greatest cumulative impacts to aquatic resources on the Tahoe NF from highest route densities within Riparian Conservation Areas and the highest proportion of stream crossings. All action alternatives would decrease the potential risk to fisheries and macroinvertebrate populations by decreasing the amount of motorized used on native surface routes. Alternative 5 would decrease the potential effects the least. Alternatives 3 and 4 would decrease the risks the most. Roads on private lands add considerable cumulative effects to the aquatic resources. Unmanaged cross country travel would continue to occur and increase at an unknown rate under Alternative 1 where impacts to aquatic resources are uncertain. Under all the action alternatives, cross-country travel would be prohibited. Over time, benefits to aquatic would be realized once these routes are revegetated and rehabilitated.

Lahontan Cutthroat Trout: Affected Environment

Introduction: The Lahontan cutthroat trout (LCT) was listed by the U.S. Fish and Wildlife Service (USFWS) as an endangered species in 1970 (Federal Register Vol. 35, p. 13520). The listing was reclassified to threatened status in 1975 to facilitate recovery and management efforts and authorize regulated angling (Federal Register Vol. 40, p. 29864). Currently, no Critical Habitat has been designated for the LCT (USFWS 1995).

Historically, LCT was thought to occupy approximately 360 miles of the Truckee River, 300 miles of the Carson River, and 360 miles of the Walker River in northern California and western Nevada (Somer 1998). Lahontan cutthroat trout historically occurred in Tahoe, Cascade, Fallen Leaf, Upper Twin, Lower Twin, Pyramid, Winnemucca, Summit, Donner, Walker, and Independence Lakes (Moyle 1976, Gerstung 1988). Currently, LCT recovery populations on the Tahoe NF occupy one lake and five streams. The Tahoe National Forest has designated the lake (Independence Lake) and the stream flowing into it (Upper Independence Creek) as a Critical Aquatic Refuge (CAR).

The Truckee River Basin Recovery Implementation Team (TRRIT) has established recovery objectives for various reaches of the Truckee River and its tributaries. Important recovery areas that the TRRIT has initially identified as having immediate potential include: Independence Creek, upstream of Independence Lake; Pole Creek; Hunter Creek; Donner Creek; Perazzo Creek; Prosser Creek; and the Truckee River from its confluence with Donner Creek to the State line; Upper Truckee River; Truckee River from Tahoe Dam to Donner Creek; and, Independence Creek downstream from Independence Lake to the Little Truckee River. The TRRIT has identified Macklin and East Fork Creeks and an unnamed tributary to the East Fork Creek in the Yuba River system as necessary for recovery of LCT because they contain remnants of indigenous Truckee River Basin strains.

The LCT currently occupies eleven 7th field watersheds on the Tahoe NF: Middle Truckee River-Pole Creek, Independence Lake, Middle Yuba River-Milton Reservoir, and East Fork. In addition, Lahontan cutthroat trout have been re-introduced into the Truckee River for recreational sport fishing. In 2006, Lahontan cutthroat trout were released into Sagehen Creek as part of research project.

Habitat attributes considered important for Lahontan cutthroat trout include:

- Cool water temperatures
- Stable stream banks
- Sufficient coarse woody debris
- Spawning gravel with low percentages of sand/silt
- Deep pools
- 1:1 pool to riffle ratio

Route Associated Risk Factors: Potential road and trail associated risk factors to the LCT include the immediate loss of individual fish and loss of specific habitat features such as undercut banks used for cover, increases in sedimentation leading to changes in spawning bed capacity, and the loss of riparian vegetation necessary to maintain adequate temperature regime (SNFPA 2001).

Lahontan Cutthroat Trout: Environmental Consequences

In 2006, the U.S. Forest Service entered into programmatic consultation with the U.S. Fish and Wildlife Service for route designation (travel management) for motor vehicles in 14 National Forests in California. The BE for the Tahoe NF Motorized Travel Management Project and this programmatic consultation is incorporated by reference. Project design criteria were developed jointly, which includes measures to avoid impacts to federally listed species, including the Lahontan cutthroat trout. The U.S. Fish and Wildlife Service has agreed that, by using the Project Design Criteria for each of the Threatened and Endangered species and Critical Habitat, route designation will meet “No Effect” or “May Affect, Not Likely to Adversely Affect” determinations and that they would concur with these determinations on a programmatic basis. Forest consultation can tier to the programmatic consultation with no further consultation. However, the FSW states that these criteria are for the Inyo, Sierra, and Stanislaus Nationals Forests only. The Tahoe and Humboldt-Toiyabe National Forests must have local project consultation for Lahontan cutthroat trout, since the Reno Office has responsibility for Section 7 Consultation on this species for these National Forests. Informal consultation for the LCT with the FWS Reno Office and the Sacramento Office occurred on August 22, 2007 regarding the Tahoe NF Motorized Travel Management Project. The FWS agreed that the Project Design Criteria which were developed through the programmatic consultation process should also be used to achieve a “No Effect” or “May Affect, Not Likely to Adversely Affect” determination for the LCT for the Tahoe NF. As such, the following Project Design Standards for LCT are described and how the Tahoe NF Motorized Travel Management Project is consistent with each Project Design Criteria. More specific information on the effects of the alternatives is described in the sections that follow.

Consistency with Project Design Criteria to Achieve "No Effect" and "Not Likely to Adversely Affect" Determinations

Routes and areas do not cross any stream within the occupied range of Lahontan cutthroat trout.

- There are no proposed route additions to the NFTS that cross any stream occupied by Lahontan cutthroat trout.
- The change in class of vehicles on the Pole Creek Road (Road #5708) that would result in changed maintenance levels proposed in Alternatives 2, 5, and 6 are outside the Pole Creek RCA. Therefore, occupied habitat in Pole Creek would not be affected.

Routes and areas are not located on active landslides and do not re-route surface water onto active landslides within watersheds that provide habitat for Lahontan cutthroat trout.

- There are no proposed route additions that cross any stream occupied by Lahontan cutthroat trout, and therefore, no proposed route additions are located on active landslides within watersheds that provide habitat for LCT.

Within watersheds that provide habitat for Lahontan cutthroat trout, routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream.

- The Travel Management action alternatives do not propose route or area additions that have the potential to capture surface run-off and then deliver sediment into any occupied LCT streams.
- A ½ mile segment of the existing Pole Creek Road (Road #5708) parallels occupied LCT habitat within Pole Creek. This ½ mile road segment is within the Pole Creek RCA and would be maintained at the current Maintenance Level 3 standard, and therefore would not increase sediment delivery to occupied Lahontan cutthroat trout habitat at Pole Creek.
- Established Motorized "Open Areas" are located outside of Riparian Conservation Areas that are within watersheds that provide habitat for Lahontan cutthroat trout.
- The action alternatives do not propose motorized area additions or reopen ML 1 roads that are within watersheds or Riparian Conservation Areas that provide habitat for Lahontan cutthroat trout.

Within watersheds that provide habitat for Lahontan cutthroat trout, "motorized routes" avoid Riparian Conservation Areas.

- The action alternatives do not propose motorized route additions, reopening ML 1 roads, or would result in changed maintenance standards within watersheds or Riparian Conservation Areas that provide habitat for Lahontan cutthroat trout.

Indicators used to Measure Effects

Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to occupied LCT streams from motorized cross country travel.

Additions to the NFTS (LCT 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings

additions associated with motorized route additions to the National Forest Transportation System, and the miles motorized route additions to the NFTS within Riparian Conservation Areas (RCAs) for occupied LCT streams.

Site-specific Physical Impacts and Disturbance to occupied Lahontan cutthroat trout streams: Proposed motorized route additions to the NFTS were evaluated to determine site-specific impacts to occupied LCT streams for each of the alternatives. Native surfaced routes that cross or intersect LCT streams and lakes have the greatest potential to disturb LCT, kill and crush LCT egg masses (redds) and to alter stream banks and deliver sediment which can degrade LCT habitat condition. In addition, motorized route additions to the NFTS within the Riparian Conservation Areas (RCAs) of occupied LCT streams/lakes were also evaluated by the alternatives.

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced route are analyzed under the section "Effects Common to All Aquatic Species."

Change in Class of Vehicles: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02, Watershed Resources: Geology, Soil, and Hydrology). If the route changes from smoothed surfaced to native surfaced, the change in class of vehicle may result in increased sediment and erosion risk to occupied LCT streams. The change in class of vehicle and associated maintenance downgrades is evaluated for their potential to affect occupied LCT streams.

Reopened ML 1 Roads: The alternatives are analyzed for their potential to affect LCT habitat by reopening ML 1 Roads.

Route Density within Riparian Conservation Areas (RCAs): Route densities of native surfaced routes within RCAs were evaluated to compare the overall effects of all motorized routes (including existing routes and routes unauthorized to motorized public use) for the alternatives within each 7th field watershed occupied by LCT. According to Chapter 3.02 (Watershed Resources: Geology, Soil, Hydrology), Level 2 roads and below have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes route density of all native surfaced motorized routes (including existing NFTS and unauthorized routes). Route density provides a relative index to measure the potential indirect effects to occupied habitat of LCT from increased sedimentation from routes. Thresholds for route density have not been established, however, route density provides a relative way to compare the effects of the alternatives.

Stream Crossing Density within RCAs: The 7th field watersheds occupied by LCT were evaluated for the crossing density of native surfaced motorized routes within RCAs to compare direct and indirect effects of motorized routes for the alternatives. Route crossing density provides a way to measure the potential direct and indirect effects to LCT and habitat. Direct effects include potential LCT mortality as a result of use of motorized crossings of occupied LCT streams. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Thresholds for motorized crossing route density have not been established, however, route crossing density provides a relative way to compare the effects of the alternatives.

Direct and Indirect Effects

Cross Country Travel

Under Alternative 1, no action, motorized cross country travel would continue on approximately 15,437 acres within Riparian Conservation Areas (RCAs) of occupied LCT streams, where the potential for adversely affecting occupied LCT habitat could occur by increasing sedimentation and altering water surface shade. The prohibition of cross country travel results in reducing motorized use on approximately 50 RCA miles and on 48 crossings for all the action alternatives, and continues under Alternative 1. Under the action alternatives, prohibitions on cross country travel on 15,437 acres within RCA's of occupied LCT streams (50 RCA miles and 48 stream crossings) would likely reduce the potential for sedimentation and alteration of water surface shade, and therefore benefit LCT habitat quality.

NFTS Additions and "Open Areas" – Stream Crossings and Miles of Motorized Route Additions

Number of Native Surfaced, Stream Crossing Additions within LCT 7th Field Watersheds. At the 7th field watershed scale (HUC7), the number of native surfaced, crossing additions are assessed for the alternatives, and provides a way to compare changes in sediment into occupied LCT habitats at the HUC 7 watershed scale where LCT streams are located. Alternative 1 poses the greatest risk of increased sedimentation where 48 stream crossings are affected by the continuance of cross country travel on unauthorized motorized routes. All the action alternatives would result in reducing the number of high risk (native surface) crossings within LCT HUC7 watersheds within the Truckee River or within Macklin Creek.

Alternative 6 would result in adding a total of 4 stream crossings within two HUC7 watersheds (Middle Truckee River-Lower Prosser Creek and Middle Yuba River-Milton Reservoir). None of the crossings would deliver sediment to the Occupied LCT streams (Table 3.03-124).

Alternatives 2, 4, 5, and 7 would result in adding 3 stream crossings within the Stampede Reservoir HUC7 watershed. These 3 crossings are located in the northeastern portion of the HUC7 and would not contribute sediment into Lower Sagehen Creek which drains into Stampede Reservoir at the southern and western edge of the watershed. Therefore, no effects to LCT within Lower Sagehen Creek would occur from these added crossings.

Alternative 3 does not add motorized crossings to the NFTS, and therefore sedimentation or water surface shade would not be affected within any LCT HUC7 watershed, or to any occupied LCT streams.

Table 3.03-124. Lahontan cutthroat trout 7th Field Watersheds - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions to the NFTS

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions to the NFTS (negative impact)	0	3	0	3	3	4	3
Number existing motorized unauthorized routes not prohibited to cross country travel (negative impact)	48	0	0	0	0	0	0

Miles of Proposed Route Additions within RCAs of LCT 7th Field Watersheds. The miles of proposed motorized route additions to the NFTS within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into streams within LCT HUC 7 watersheds (Table 3.03-125). Alternative 1 poses the greatest risk to increased sedimentation potential from 28.2 RCA miles of unauthorized routes that would remain due to the continuance of cross country travel.

All the action alternatives would reduce the number of RCA miles within LCT HUC7 watersheds. Alternatives 2, 4, 5, 6, and 7 propose to add between 0.9 – 1.6 miles within RCAs of LCT HUC7 watersheds. As stated above, **none of the added RCA miles would directly affect RCAs within occupied LCT streams**. Alternative 3 does not add motorized routes to the NFTS, and therefore changes to sedimentation or water surface shade would not occur within any LCT HUC7 watershed.

Table 3.03-125. Miles of Proposed Route Additions within LCT HUC7 Riparian Conservation Areas (RCAs)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
RCA Miles of motorized route additions (negative impact)	0	1.6	0	1.6	1.6	0.9	1.6
RCA Miles of existing unauthorized routes not prohibited to cross country travel (negative impact)	28.2	0	0	0	0	0	0

Site-specific Physical Impacts and Disturbance to occupied Lahontan cutthroat trout streams

As mentioned above, the LCT occupies eleven 7th field watersheds (HUC7) on the Tahoe NF, as follows:

- Middle Truckee River-Lower Prosser Creek
- Middle Truckee River-Cabin Creek
- Middle Truckee River-Pole Creek
- Middle Truckee River-Silver Creek
- Upper Middle Truckee River
- Independence Lake
- Middle Yuba River-Milton Reservoir
- East Fork
- Upper Sagehen Creek
- Lower Sagehen Creek
- Stampede Reservoir

Alternative 1 poses the greatest risk to LCT where existing unauthorized routes have the potential to adversely affect occupied LCT habitat. All the action alternatives do not directly or indirectly affect occupied LCT streams, since they do not propose motorized route additions that cross or have the potential to delivery sediment to occupied LCT streams. A brief summary of potential direct and indirect effects are described for each 7th field watershed that is occupied by LCT.

Middle Truckee River-Lower Prosser Creek, Middle Truckee River-Cabin Creek, Middle Truckee River-Silver Creek, and Upper Middle Truckee River: Recreational LCT occupy these four

watersheds within the Truckee River. The description of potential impacts of motorized route additions within these watersheds is described below.

Middle Truckee River-Lower Prosser Creek: Two proposed routes fall within the Middle Truckee R.-Lower Prosser Creek watershed (TKN-M1, TKN-PP). Both routes are located near Prosser Creek Reservoir, and are located over 1 mile away from the mainstem of the Truckee River. Sediment from these motorized route additions would not deliver sediment to the Truckee River, and therefore would not affect recreational LCT populations.

Middle Truckee River-Cabin Creek: Proposed route addition TKS-M9 falls within the Middle Truckee River-Cabin Creek watershed, but this motorcycle route is parallel to the Truckee River, and is over ½ mile east of the Truckee River up on the Sawtooth Ridge area. This single track route would not contribute sediment to the mainstem of the Truckee River, and would therefore not affect recreational LCT fisheries.

Middle Truckee River-Silver Creek: Approximately 1 ½ mile of the Truckee River flows through the middle of this watershed. No proposed route additions occur within the Middle Truckee R.-Silver Creek watershed, and therefore no impacts to the LCT fisheries in the Truckee River would occur.

Upper Middle Truckee River: No proposed route additions occur within the Upper Middle Truckee River watershed, and therefore no impacts to the LCT fisheries in the Truckee River would occur.

Middle Truckee River-Pole Creek. Pole Creek is currently occupied by LCT and falls within the Middle Truckee River-Pole Creek watershed. In addition, recreational LCT occupies the mainstem of the Truckee River which bisects the eastern portion of the Pole Creek watershed. No route additions are proposed within this watershed under any of the action alternatives. Two existing routes unauthorized to motorized public travel would remain under cross country travel in Alternative 1. However, these routes do not have the potential to deliver sediment to Pole Creek or to the Truckee River where LCT are located.

Independence Lake 7th field watershed. LCT within Independence Lake and upper Independence Creek has a high risk of being directly and indirectly affected by Alternative 1 and 5 where approximately 3 miles of routes unauthorized to motorized public use borders the north side of Independence Lake. The remaining action alternatives do not propose motorized route additions within the Independence Lake watershed. Existing routes unauthorized to motorized public use bordering the south side of Independence Lake on private land would also increase the risk of to LCT from factors associated with motorized use from potential sediment delivery into Independence Lake.

Middle Yuba River-Milton Reservoir 7th field watershed. In the Middle Yuba River-Milton Reservoir watershed, LCT occupies Macklin Creek. Under Alternative 1, one unauthorized route (~¼ mile) within the watershed does not cross, but parallels the headwaters of Macklin Creek, potentially delivering sediment into the stream. None of the action alternatives would directly affect LCT within Macklin Creek, since they do not propose routes additions within the Middle Yuba River-Milton Reservoir.

East Fork Creek 7th field watershed. Within the East Fork Creek watershed, LCT occupies East Fork Creek. There would be no direct or indirect effects to LCT within East Fork Creek, since no route

additions are proposed under any of the action alternatives. Under Alternative 1, an existing route unauthorized to motorized public use is located outside the Riparian Conservation Area that parallels the north side of East Fork Creek connecting two smooth surfaced roads. Sediment delivery into East Fork Creek from this route is unlikely.

Upper Sagehen Creek, Lower Sagehen Creek, and Stampede Reservoir watersheds: Three small short route segments that provide access to dispersed recreation occurs within the Lower Sagehen Creek watershed. These three route segments are stabilized and would not delivery sediment to Sagehen Creek. No other routes are proposed for addition within these three watersheds, therefore no effects to LCT would occur.

Establishment of Motorized "Open Areas"

The establishment of motorized "Open Areas" would not affect any occupied LCT streams, since none of the proposed motorized "Open Areas" would deliver sediment or are located within the RCA of any occupied LCT streams, including the Greenhorn area and the reservoir areas at Stampede, Boca, and Prosser. One HUC7 watershed, Stampede Reservoir, contains lower Sagehen Creek which is downstream of where LCT individuals were released during a research project at the Sagehen Experimental Research Forest. The proposed established "Open Areas" at Stampede Reservoir are not connected to and would not affect lower Sagehen Creek, and therefore would not affect any LCT that may be in lower Sagehen Creek.

Changes to the NFTS

Change in Class of Vehicles. For each of the alternatives, Table 3.03-126 displays the effects of proposed change in class of vehicles and the associated maintenance changes that have the potential to increase the risk of delivering sediment to occupied LCT streams. Alternatives 2, 5, and 6 would maintain the changes to road maintenance standards resulting in changes from smooth surfaced roads to rough surfaced roads that are likely to occur.

Under Alternatives 2, 5, and 6, this change in road surface type has a higher potential to result in increased sedimentation within the East Fork Creek HUC 7 watersheds with an occupied LCT stream. These are the East Fork Creek HUC7 watershed. The East Fork Creek watershed is affected by the change in road maintenance standard on one motorized intermittent stream crossing on East Fork Creek, and would result in the change from smooth surfaced to native surfaced motorized crossing. The crossing is associated with the Pinoli Ridge Road, located approximately 2/3 mile south of the occupied LCT stream (un-named tributary to East Fork Creek). The potential for delivering sediment to the occupied LCT stream within the un-named to tributary to East Fork Creek is not expected due to streamflow direction.

For Alternatives 2, 5, and 6, the change in class of vehicles would not result in changed maintenance standards on approximately 0.5 RCA miles on the Pole Creek Road (Road 5708) within a watershed with an occupied LCT stream (Pole Creek). Project design standards are required to maintain the Pole Creek Road at a higher maintenance standard (ML 3) within approximately 0.5 miles adjacent to Pole Creek so

that sediment delivery to Pole Creek would be minimized, therefore, current maintenance standards at Pole Creek would not contribute to accelerated erosion or sedimentation.

Table 3.03-126. Effects to LCT 7th Field Watersheds from Change in Class of Vehicles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced crossings resulting from changes in maintenance from smooth surfaced to native surfaced (Pinoli Ridge)	0	1	0	0	1	1	0

Reopened ML 1 Roads: No ML 1 roads are proposed for reopening within any LCT HUC 7 watersheds under all the alternatives, and therefore LCT would not be affected.

Cumulative Effects

Cumulative Effects Boundary in Time and Space

For this analysis, the geographic boundary used to analyze cumulative effects to LCT is the Truckee River and its tributaries. This scale is an appropriate scale to analyze cumulative effects because the Truckee River watershed including all its tributaries is the historic range of the Lahontan cutthroat trout within the Tahoe NF. Any larger scale may dilute the actual effects of motorized routes and other activities that may potential affect occupied LCT streams. Past cumulative effects currently affecting the distribution and abundance of LCT considered here include 50 to 100 years out. Future cumulative impacts timeframe for reasonably foreseeable actions is approximately 20 years out.

Cumulative Effects of Motorized Routes

Route Density within Riparian Conservation Areas (RCAs). Chapter 3.02 (Watershed Resources: Geology, Soil, Hydrology), analyzed Riparian Conservation Area (RCA) route density for each 7th field watershed on the Tahoe NF, and categorized motorized RCA route density (native surfaced) by four route density categories. The route density categories were highest (8.9 - 27.3 miles/square mile), moderately high (6.3 - 8.8miles/square mile), moderately low (4.3 - 6.2 miles/square mile, and lowest (0.2 - 4.2 miles/square mile).

Figure 3.03-9 shows the number of HUC7 watersheds occupied by LCT by RCA motorized route density by density category. Alternative 1 poses the greatest risk to LCT where 6 LCT HUC7 watersheds falls within the highest route density category, 3 in the moderately high, 1 in the moderately low, and 1 in the lowest. All the action alternatives would result in reducing route densities within RCAs. Alternatives 2 and 5 are similar in RCA route densities where 4 HUC7 watersheds are within route density categories of highest, 5 within moderately high, 1 within moderately low, and 1 within lowest. Alternative 6 would further reduce RCA route density where 4 watersheds fall in the highest and moderately high density categories, 1 in the moderately low, and 2 in the lowest. Alternatives 3, 4, and 7 have the least potential for effects from cumulative motorized routes within HUC7 watersheds with occupied LCT streams where 3 watersheds falls within the moderately highest, 4 in the moderately high, 1 in the moderately low, and 3 in the lowest RCA route density category.

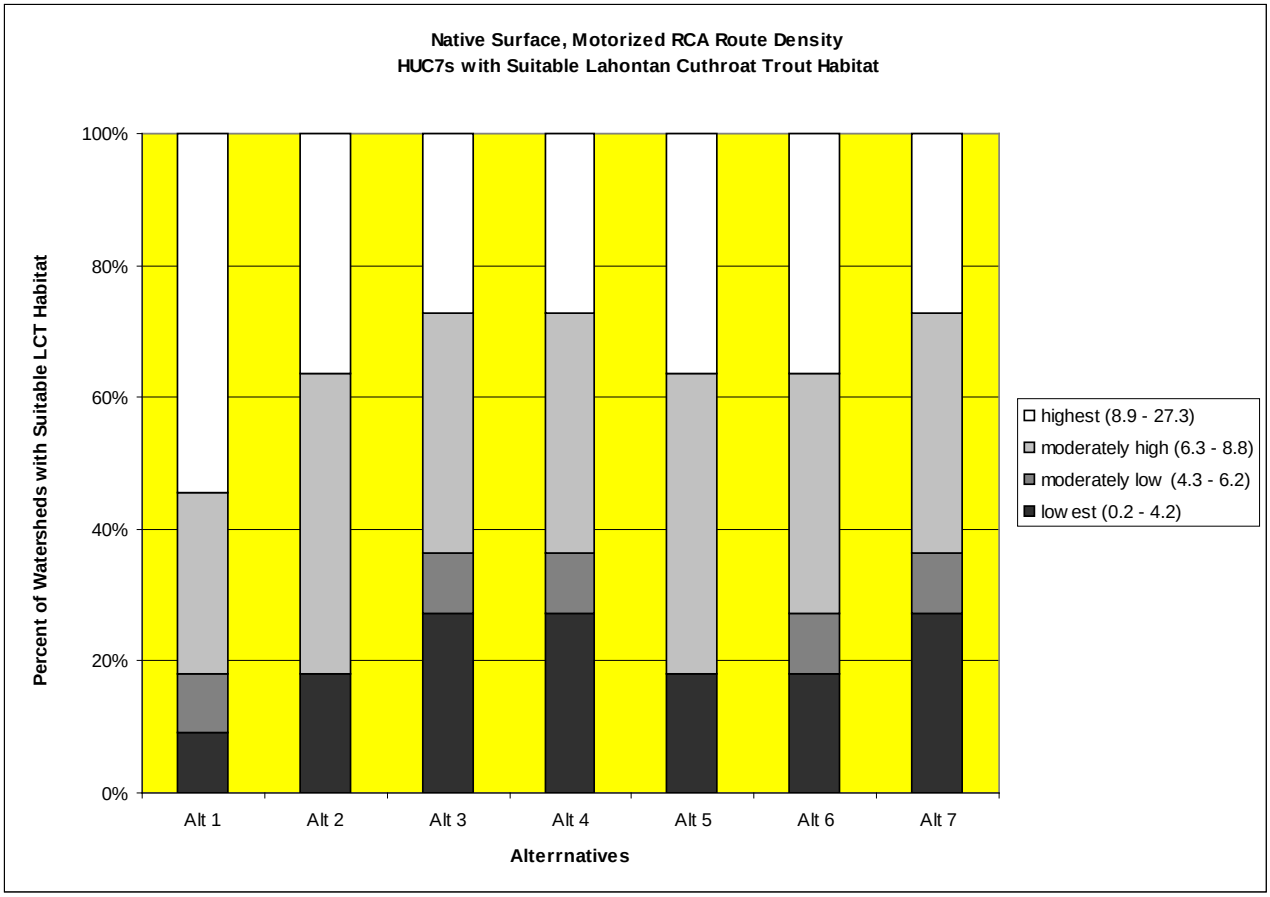

Figure 3.03-9. Number of HUC7 Watersheds with Occupied LCT streams by Route Density Categories of Lowest, Lower, Higher, and Highest

Stream Crossing Density within RCAs

RCA stream crossing density categories (native surfaced routes) were determined for each 7th field watershed with occupied LCT streams on the Tahoe NF by four route density categories. The route density categories were highest (5.1-19.7 crossings/sq. mile), moderately high (3.1-5.0) crossings/sq. mile), moderately low (1.8-3.0 crossings/sq. mi.), and lowest (0-1.7 crossing/sq. mi.). Figure 3.03-10 displays motorized crossing density within HUC7 watersheds with occupied LCT habitat for each of the alternatives.

Alternative 1 poses the greatest risk to LCT streams from potential sediment delivery, since 6 of 11 HUC7 watersheds occupied by LCT would fall within the highest, 4 within the moderately high, and 1 within moderately low categories for route crossing densities.

Alternatives 2 and 5 pose the next greatest risk to LCT from sedimentation from stream crossings where the 4 of 11 HUC7s falls within highest, 4 within moderately high, 2 within moderately low (2), and none in the lowest crossing density category. Alternative 6 would result in stream crossing densities where 4 watersheds would be in the highest, 5 in moderately high, none in moderately low, and 2 in the lowest crossing density categories. Alternative 3 followed by Alternatives 4 and 7 would result in the least risk to

LCT watersheds where the least amount of sediment delivery and stream habitat alteration would likely occur within LCT watersheds compared to all the other alternatives.

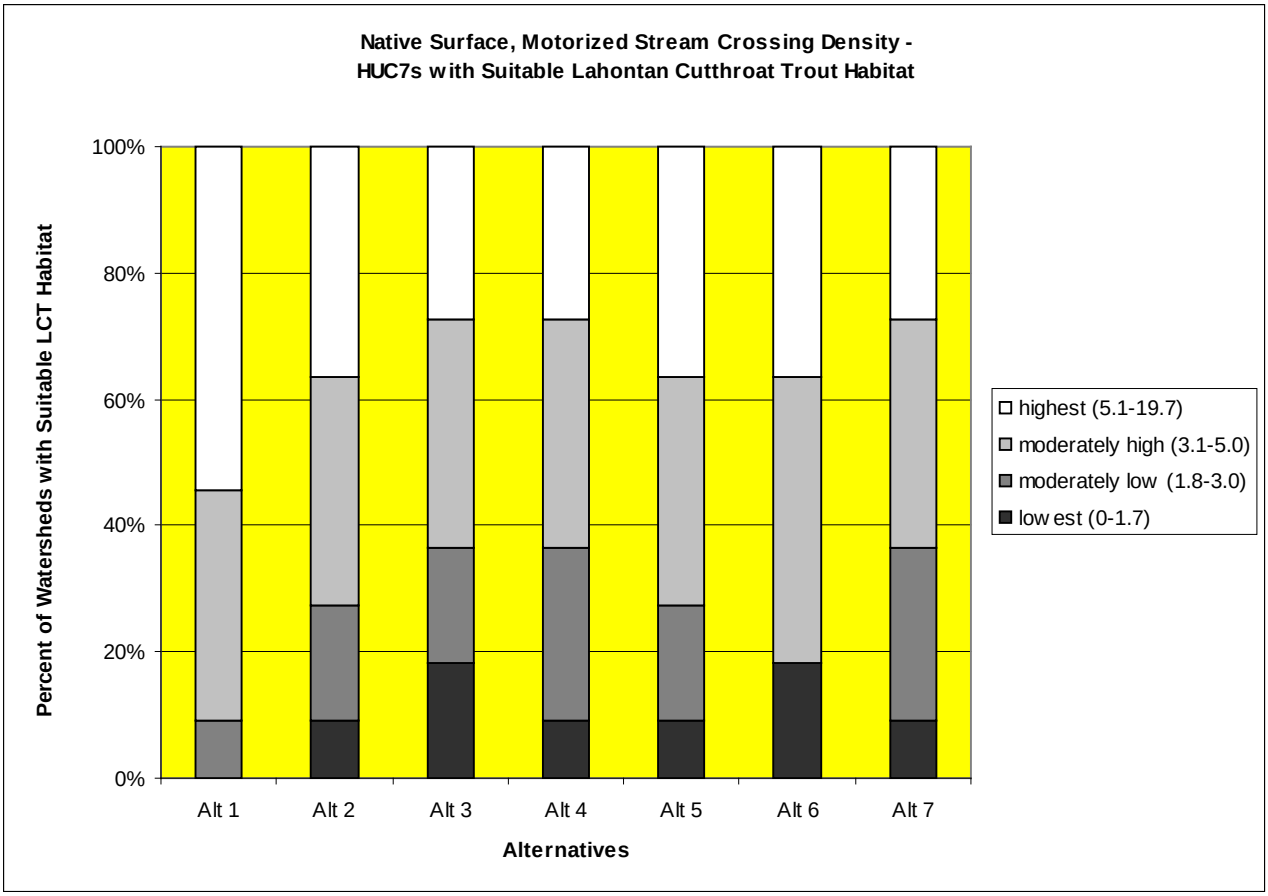

Figure 3.03-10. Number of HUC7 Watersheds with occupied LCT streams by Motorized Crossing Density Categories

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Tables 3.03-127 and 3.03-128 summarize the direct, indirect, and cumulative effects to native surfaced, motorized route crossing within LCT HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 (Watershed Resources: Geology, Soil, Hydrology) for more detailed information and assumptions.

Table 3.03-127. LCT 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Stream Crossings

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
RCA Acres Prohibited	0	15,437	15,437	15,437	15,437	15,437	15,437
Unauthorized Motorized Stream Crossings Prohibited to cross country travel	1	46	49	46	46	45	46
Motorized Stream Crossings							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Existing NFTS Native Surfaced, Stream Crossings	45	45	45	45	45	45	45
Native Surfaced, Motorized Route Crossing Additions*	0	3	0	3	3	4	3
Unauthorized Crossings that would continue with cross country travel	48	0	0	0	0	0	0
Reopened ML 1 Road Crossings	0	0	0	0	0	0	0
Change in Class of Vehicles resulting in changed maintenance standards resulting in smooth surfaced to native surfaced within occupied RCA stream	0	1	0	0	1	1	0
Net NFTS Native Surfaced, Stream Crossings	93	55	45	48	55	55	48
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Routes	None	None	None	Beneficial - Wet Weather Restrictions would be implemented on 13 crossings	Beneficial - Wet Weather Restrictions would be implemented on 15 crossings	Beneficial - Wet Weather Restrictions would be implemented on 14 crossings	None

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
NET Cumulative Effect	Negative cumulative effects. Cross country travel prohibited on "0" LCT RCA acres. Motorized travel continued on 48 unauthorized native surfaced, crossings No additional protection to occupied LCT streams from wet weather restrictions.	Least beneficial to LCT—results in 55 crossings in LCT watersheds. Cross country travel prohibited on 15,437 LCT RCA acres. No additional protection to occupied LCT streams from wet weather restrictions.	3rd Most beneficial alternative. Results in the least number of native surfaced crossings (45). Cross country travel prohibited on 15,437 LCT RCA acres. No additional protection to occupied LCT streams from wet weather restrictions.	Most beneficial alternative — results in 48 crossings in LCT watersheds. Cross country travel prohibited on 15,437 LCT RCA acres. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions.	2rd most beneficial alternative, shared with Alt 6—results in 55 crossings in LCT watersheds. Cross country travel prohibited on 15,437 LCT RCA acres. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions.	2rd most beneficial alternative, shared with Alt 5—results in 55 crossings in LCT watersheds. Cross country travel prohibited on 15,437 LCT RCA acres. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions.	4th most beneficial alternative, results in 48 crossings in LCT watersheds. Cross country travel prohibited on 15,437 LCT RCA acres. No additional protection to occupied LCT streams from wet weather restrictions

Table 3.03-128. LCT 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized RCA Motorized Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
RCA Acres Prohibited	0	15,437	15,437	15,437	15,437	15,437	15,437
Miles Prohibited	1.6	28.3	29.9	28.3	28.3	28.9	28.3
Native Surfaced, Motorized RCA Routes							
Trend of Effect	Negative	Beneficial	Most Beneficial alternative	Beneficial	Beneficial	Beneficial	Beneficial
Existing Native Surfaced RCA Miles	22.8	22.8	22.8	22.8	22.8	22.8	22.8
Native Surfaced RCA Miles Added to NFTS	28.2	1.6	0	1.6	1.6	0.9	1.6
Native Surfaced RCA Miles resulting from changed maintenance levels (outside RCA at Pole Creek)	0	0.5	0	0	0.5	0.5	0
Net NFTS Native Surfaced, RCA motorized route miles	51.0	24.9	22.8	24.4	24.9	24.2	24.4
Wet Weather Seasonal Restrictions on all Native Surfaced Routes	None	None	None	Beneficial - Wet Weather Restrictions would be implemented	Beneficial - Wet Weather Restrictions would be implemented	Beneficial - Wet Weather Restrictions would be implemented	None
NET Cumulative Effect	Most negative alternative. Cross country travel continues on 15,437 LCT RCA acres, including on 51 RCA miles. No additional protection from wet weather restrictions.	6th most beneficial alternative. Cross country travel prohibited on 15,437 LCT RCA acres. 24.9 NFTS RCA miles available. No additional protection from wet weather restrictions.	4th most beneficial alternative. Cross country travel prohibited on 15,437 LCT RCA acres 22.8 NFTS RCA miles available. No additional protection from wet weather restrictions.	2nd Most beneficial alternative. Cross country travel prohibited on 15,437 LCT RCA acres. 24.4 NFTS RCA miles. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	3rd most beneficial alternative. Cross country travel prohibited on 15,437 LCT RCA acres 24.9 NFTS RCA miles.available. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Most beneficial alternative. Cross country travel prohibited on 15,437 LCT RCA acres 24.2 NFTS RCA miles available. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	5th most beneficial alternative. Cross country travel prohibited on 15,437 LCT RCA acres 24.4 NFTS RCA miles available. No additional protection from wet weather restrictions.

Overall Cumulative Effects of Past, Present, and Reasonably Foreseeable Future Actions

Past management activities have had severe, adverse cumulative effects on LCT distribution and population trends as a result of numerous factors including hybridization and competition with introduced trout species; alteration of stream channels and morphology; loss of spawning habitat due to pollution and sediment inputs from past logging, mining, and historic grazing, and urbanization; and loss of connectivity. LCT was particularly affected within the Truckee River watershed by loss of habitat connectivity from water diversions and dam construction (Gerstung 1986 and 1988 and Coffin 1988, In USFWS 1995). The Truckee River basin has more than 40 potential barriers to fish migration which have impeded LCT migration to historic spawning and rearing habitats. In addition, the resulting reservoirs helped to establish a number of non-native fish species known to be detrimental to LCT through predation and/or competition.

Livestock grazing has the potential to affect most of the important habitat attributes listed above by reducing near-stream vegetation and de-stabilizing stream banks, which can lead to increased stream temperature, fine sediment input, and filling of pools. The current occupied LCT recovery streams on the Tahoe NF fall within two active livestock allotments - the English Allotment (cattle) and the Sierra Crest Allotment (sheep). An Allotment Management Plan for the English Allotment was completed in 1996. The Sierra Crest Allotment Management Plan was recently completed. Grazing within the Sierra Crest Allotment has not occurred since the early 1990s. Therefore, Austin Meadows and Macklin Creek are the only occupied LCT streams that are currently grazed by livestock. Streambank disturbance from livestock monitoring at both Austin and Macklin Creek indicate streambank disturbance by livestock have generally been within the maximum 10% streambank disturbance guideline for most years monitored, with a few exceptions.

The Sierra Nevada Forest Plan Amendment (2004) provides management direction and standards and guidelines for livestock utilization and streambank disturbance. Implementation and monitoring of these standards and guidelines will likely reduce the potential habitat impacts of livestock grazing. In summary, livestock grazing could cumulatively affect LCT habitat and should be limited to Macklin Creek and Austin Meadows Creek, though management requirements specific to these activities should limit these impacts.

Ongoing and planned vegetation and fuels management projects on National Forest land should not add cumulative impacts to effects due implementation of Best Management Practices and Riparian Conservation Objectives for Riparian Conservation Areas.

The continuance of cross country travel, including on existing routes unauthorized motorized public use, under Alternative 1 poses the greatest risk of adding direct and indirect impacts to existing cumulative impacts to streams occupied by LCT within the Independence Lake and the Middle Yuba River-Milton Reservoir HUC7 watersheds . Under Alternative 1, HUC7 watersheds occupied by LCT would have the highest RCA route densities and the highest route crossing densities as a result of unauthorized routes within Riparian Conservation Areas. Under Alternative 1, unauthorized route proliferation would likely continue and increase at an accelerated rate in the future, potentially increasing

sediment delivery and alteration of streambank vegetation and hydrologic condition which may affect the abundance of LCT within localized areas in the future. None of the action alternatives proposes to add motorized routes or areas to the NFTS within watersheds with occupied LCT streams. Cumulative impacts would be added to existing impacts through the change in class of vehicles under Alternatives 2, 5, and 6, where 0.5 RCA miles and 1 stream crossing could contribute to adverse effects from increased sediment delivery. For all the action alternatives, future unmanaged cross country motorized travel would be prohibited. In addition, the prohibition of cross country travel would reduce impacts on routes unauthorized for motorized public use and benefit LCT in the long-term once these routes are rehabilitated through obliteration or other means.

Federally Listed Species Determination

The Biological Assessment, which is incorporated by reference, determined that Alternatives 2, 5, and 6 may affect, but not likely to adversely affect the federally threatened Lahontan cutthroat trout within the Middle Truckee River-Pole Creek 7th field watershed. This determination is based on mitigation requirements associated with the proposed change in class of vehicles on 0.5 RCA miles along the Pole Creek Road (Road 5708) which has the potential to increase the risk of sediment delivery into Pole Creek, an occupied LCT stream. Mitigations measures require that road maintenance standards minimizes sediment delivery to Pole Creek. No motorized route or area additions are proposed within any watersheds with streams occupied by LCT.

Lahontan Lake Tui Chub: Affected Environment

The Lahontan Lake tui chub (*Gila bicolor pectinifer*) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). The Lahontan Lake tui chub are a cyprinid subspecies found in Lake Tahoe and Pyramid Lake (Nevada) which are connected to each other by the Truckee River and in nearby Walker Lake (Nevada).

The Lake Tahoe population is the only confirmed population in the Sierra Nevada, with possible populations in Stampede, Boca and Prosser Reservoirs on the Truckee Ranger District of the Tahoe National Forest. These three reservoirs are connected by the Little Truckee River which feeds into the mainstem of the Truckee River. Little study has occurred on the Lake Tahoe population since Miller (1951). Zooplankton levels have changed over this period. Daphnia, an important prey of adult chubs, have been nearly eliminated (Richards et al. 1975) by the introduced Kokanee salmon (*Oncorhynchus nerka*) and opossum shrimp (*Mysis relicta*), both of which feed on zooplankton. Marshland degradation along the lake may be taking away vital spawning and nursery areas.

Based on occurrence within such widely diverse habitats as Lake Tahoe and Pyramid Lake, it is believed this species can tolerate a wide range of physicochemical water conditions. Lahontan Lake tui chub are known as a mid-water feeder. In Lake Tahoe, larger fish (>16 cm TL) occur in deeper water (>50m) during the day, moving into shallower water areas at night (Miller 1951). Young fish generally occur in shallow water. It has also been noted that a seasonal migration occurs within the water column. Deeper water in often utilized during winter months and summer months show use of upper portions

(Snyder 1917, Miller 1951). Algal beds in shallow inshore areas seem necessary for spawning, egg hatching, and larval survival.

Lahontan Lake tui chub are schooling fish reaching lengths of 35 to 41 cm FL, which inhabit large, deep lakes (Moyle 1976, In USFWS 1995). Lahontan Lake tui chub feed primarily on zooplankton, especially cladocerans and copepods, but also eat benthic insects when available (Miller 1951, Marrin and Erman 1982). Tui chub are predated upon mostly by large trout, and rarely by birds and snakes (Miller 1951).

In Lake Tahoe, nocturnal spawning occurs during May and June, possibly extending into July (Miller 1951). Tui chub may be serial spawners, reproducing several times during the spawning season (Moyle 1976). Reproductive adults spawn near-shore over beds of aquatic vegetation, to which the eggs adhere (Snyder 1917). Young remain near-shore until winter when body size is 1-2 cm, and then migrate into deeper water. Linear growth of tui chubs occurs within about 4 years, then body mass is accumulated rapidly. The largest documented length in Lake Tahoe is 13.7 cm SL, but longer chub (21 cm) have been found in Walker Lake, Nevada (Miller 1951).

Potential risk factors include but are not limited to water quality, specifically alkalinity due to diversions of inflowing water, change in prey base due to introduced species, and reservoir and wetland management.

Lahontan Lake Tui Chub: Environmental Consequences

The actual presence of the Lahontan Lake tui chub on the Tahoe NF has not been confirmed or verified. Although its presence has not been confirmed, this analysis assumes the species is present within Boca, Stampede and Prosser Reservoirs. Therefore, the analysis for this species was conducted within the three 7th field watersheds within the Prosser Creek Reservoir HUC7, Stampede Reservoir HUC7, and Boca Reservoir HUC7, which includes the three reservoirs and the streams and tributaries that drain into and out of them. In addition, to assess a broader and more inclusive analysis of potential indirect effects, RCA route density and stream crossing density were analyzed within twelve 7th field watersheds which include the three reservoirs and the streams and tributaries that flow into these reservoirs.

Indicators used to Measure Effects

Prosser Creek Reservoir HUC7, Stampede Reservoir HUC7, and Boca Reservoir HUC7

Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate effects to three tui chub 7th field watersheds from motorized cross country travel.

Additions to the NFTS (tui chub 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized route additions to the National Forest Transportation System, and the miles of motorized route additions within Riparian Conservation Areas (RCAs) for tui chub within three 7th field watersheds where the species has a potential to occur—Prosser Creek Reservoir HUC7, Stampede Reservoir HUC7, and Boca Reservoir HUC7.

Establishment of "Open Areas": The establishment of "Open Areas" at Boca, Stampede, and Prosser reservoirs is evaluated under "Effects Common to All Aquatic Species."

Wet Weather Seasonal Closures: Wet weather seasonal closures are evaluated under "Effects Common to All Aquatic Species."

Change in Class of Vehicles: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02, Watershed Resources: Geology, Soil, and Hydrology). If the route changes from smoothed surfaced to native surfaced (rough surfaced), the change in class of vehicle may result in increased sediment and erosion risk to tui chub habitat. The change in class of vehicle and associated maintenance downgrades is evaluated for their potential to affect selected 7th field watersheds that may have suitable habitat for the tui chub.

Twelve HUC7 Watersheds

Route Density within Riparian Conservation Areas (RCAs): Route densities of native surfaced routes within RCAs were evaluated to compare the overall effects of all motorized routes (including existing routes and existing routes unauthorized to motorized public use) for the alternatives within twelve 7th field watersheds with suitable Lahontan Lake tui chub habitat. According to Chapter 3.02 (Watershed Resources: Geology, Soil, Hydrology), native surfaced roads have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes route density of all native surfaced motorized routes. Route density provides a relative index to measure the potential indirect effects to suitable tui chub habitat from increased sedimentation from motorized routes. Thresholds for route density have not been established, however, route density provides a relative way to compare the effects of the alternatives.

Stream Crossing Density: Twelve 7th field watersheds with suitable Lahontan Lake tui chub habitat were evaluated for the crossing density of native surfaced motorized routes within RCAs to compare direct and indirect effects of motorized routes for the alternatives. Route crossing density provides a way to measure the potential direct and indirect effects to the tui chub and habitat. Direct effects include potential tui chub mortality as a result of use of motorized crossings that may affect tui chub habitat. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Thresholds for motorized crossing route density have not been established, however, route crossing density provides a relative way to compare the effects of the alternatives.

Direct and Indirect Effects

Cross Country Travel. Under Alternative 1, no action, motorized cross country travel would continue on 9,689 acres within Riparian Conservation Areas (RCAs) of tui chub HUC7 watersheds, where the potential for adversely affecting tui chub habitat could occur by increasing sedimentation and altering streamside vegetation. The prohibition of cross country travel results in prohibiting motorized use on 9,689 RCA acres, including on existing unauthorized routes on between approximately 27.5 to 29 RCA miles and between 44 to 48 crossings (Alternative 3- the most, Alternative 5 – the least) for the action

alternatives. The prohibition of motorized cross country travel would likely reduce the risk of sedimentation and alteration of streamside vegetation, and therefore benefit potential tui chub habitat.

NFTS Additions and "Open Areas" – Stream Crossings and Miles of Motorized Route Additions

Number of Native Surfaced, Stream Crossing Additions within Three Tui Chub7th Field Watersheds. Within the Prosser, Stampede, and Boca Reservoir HUC7 watersheds, the number of native surfaced, stream crossings is assessed for the alternatives, and provides a way to compare relative changes in sediment into riverine and lacustrine habitats at the HUC 7 watershed scale where potentially suitable Lahontan Lake tui chub habitat occurs. Alternative 1 poses the greatest risk of increased sedimentation where 42 stream crossings are affected by the continuance of cross country travel on unauthorized motorized routes (Table 3.03-129).

All the action alternatives would benefit tui chub by reducing the number of native surfaced stream crossings and motorized route miles within RCAs. Alternatives 2, 4, 5, 6, and 7 would result in the addition of between 2-4 motorized native surfaced crossings. Alternative 3 does not add motorized routes to the NFTS, and therefore sedimentation or water surface shade would not be affected within the three tui chub HUC7 watersheds.

Table 3.03-129. Lahontan Lake tui chub 7th Field Watersheds (Prosser, Stampede, Boca Reservoirs) - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions (negative impact)	48	3	0	3	4	2	3

*Alternative 1 includes existing native surfaced, stream crossings unauthorized to motorized use, while all the other Alternatives include motorized crossing additions.

Miles of Proposed Route Additions within RCAs of Prosser, Stampede, and Boca 7th Field Watersheds. The miles of proposed motorized route additions to the NFTS within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into riverine and lacustrine habitats within tui chub HUC 7 watersheds. Alternative 1 poses the greatest risk to increased sedimentation potential from approximately 29 RCA miles of unauthorized motorized routes that would remain due to the continuance of cross country travel (Table 3.03-130).

Similar to stream crossing numbers, the action alternatives would all benefit tui chub by reducing the number of miles available for motorized use, therefore reducing the potential for adverse habitat effects from erosion and sedimentation. Alternatives 2, 4, 5, 6, and 7 propose to add between 1.0 and 1.7 RCA miles of motorized routes, with Alternative 6 adding the least and Alternatives 2, 5, and 7 adding about the same amount of miles. Alternatives 3 does not add motorized routes, and therefore changes to sedimentation or streamside vegetation would not occur within the three Lahontan Lake tui chub HUC7 watersheds under these alternatives.

Table 3.03-130. Tui Chub - Miles of Proposed Route Additions within Prosser, Stampede, and Boca HUC7 Riparian Conservation Areas (RCAs)

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
RCA Miles of proposed motorized route additions (negative impact)	29.4	1.6	0	1.6	1.7	1.0	1.6

*Alternative 1 includes existing native surfaced, unauthorized routes, while all the action alternatives include motorized route additions.

Changes to the NFTS

Change in Class of Vehicles. For each of the alternatives, Table 3.03-131 displays the effects of proposed changes in class of vehicles and the associated change in maintenance standards that have the potential to increase the risk of delivering sedimentation and erosion to Prosser, Stampede, and Boca Reservoir HUC7 watersheds. Alternatives 2, 5, and 6 would result in the change in road maintenance levels resulting in changes from smooth surfaced roads to rough surfaced roads that are likely to occur in the future with reduced maintenance. This change in road surface type would have a higher potential to result in increased sedimentation to tui chub habitat affected by 3 crossings and 1.1 RCA miles under Alternatives 2 and 5. Alternative 6 would result in less adverse effects to tui chub habitat from 2 native surfaced crossings and 0.1 RCA mile. The remaining alternatives would not affect tui chub habitat from changed maintenance standards.

Table 3.03-131. Lahontan Lake Tui Chub – Effects from Change in Class of Vehicles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced Crossings as a result of changed maintenance standards from smooth surfaced to native surfaced	0	3	0	0	3	2	0
Native surfaced RCA Miles as a result of changed maintenance standards from smooth surfaced to native surfaced	0	1.1	0	0	1.1	0.2	0

Reopened ML 1 Roads: None of the alternatives would reopen any ML 1 roads within the three Lahontan Lake tui chub HUC7 watersheds within the RCA and therefore would not affect the three HUC7 tui chub watersheds.

Tui Chub HUC7 Watersheds

In addition to the motorized routes that can contribute to direct impacts within the three reservoirs, the indirect effects of motorized routes to tui chub habitat are analyzed within twelve HUC7 watersheds that may contribute to water quality within the reservoirs at a broader landscape scale.

Route Density within Riparian Conservation Areas (RCAs): Riparian Conservation Area (RCA) route density for twelve 7th field watersheds on the Tahoe NF are analyzed motorized RCA route density (native surfaced) and categorized by four route density categories. Suitable Lahontan Lake tui chub habitat was identified to occur within twelve 7th field watersheds on the Tahoe National Forest. For each

of the alternatives, Table 3.03-132 and Figure 3.03-11 display the number and percent of 7th field watersheds (HUC7s) with suitable tui chub habitat by RCA route density category of highest (8.9 - 27.3 mi/mi^2), moderately high (6.3 - 8.8 mi/mi^2), moderately low (4.3 - 6.2 mi/mi^2), and lowest (0.2 - 4.2 mi/mi^2).

Alternative 1 poses the greatest direct and indirect effects to suitable tui chub habitat where 67% (8 of 12) tui chub HUC7 watersheds have route densities within the highest, 16% (2 of 12) within moderately high, 17% (2 of 12) within moderately low, and none within the lowest route density categories. All the action alternatives reduce RCA route densities compared to Alternative 1.

Alternatives 2, 5, and 6 would slightly improve route densities compared to Alternative 1, where tui chub HUC7 watersheds would result in 5 watersheds in the highest, 4 in the moderately high, 1 in the moderately low, and 2 in the lowest route density category.

Alternatives 3, 4, and 7 have the lowest route densities of all the action alternatives, where 3 HUC7 watersheds are in the highest route density categories, 5 are in the moderately high, 2 in the moderately low, and 2 are in the lowest density categories.

Table 3.03-132. Number of HUC7 Watersheds with Suitable Lahontan Lake Tui Chub Habitat by RCA Route Density Category

Alternatives	Highest (8.9 - 27.3 mi/mi^2)	Moderately High (6.3 - 8.8 mi/mi^2)	Moderately Low (4.3 - 6.2 mi/mi^2)	Lowest (0.2 - 4.2 mi/mi^2)
Alt 1	8	2	2	0
Alt 2	5	4	1	2
Alt 3	3	5	2	2
Alt 4	3	5	2	2
Alt 5	5	4	1	2
Alt 6	5	4	1	2
Alt 7	3	5	2	2

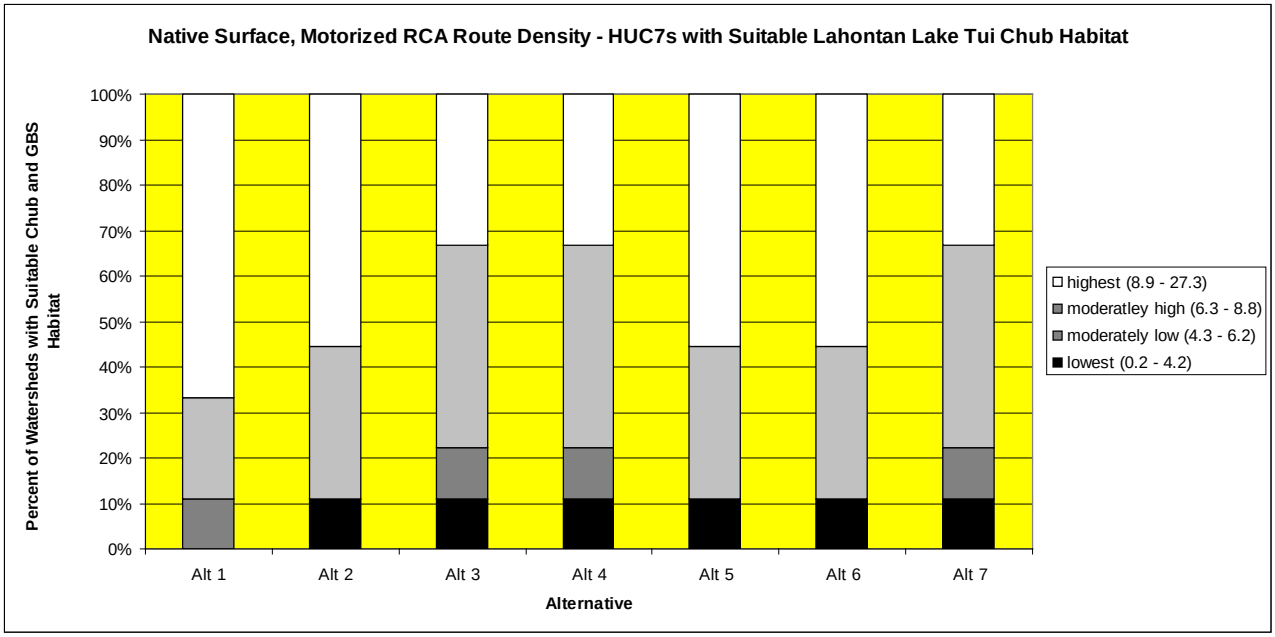

Figure 3.03-11. Proportion of HUC7 Watersheds with Suitable Lahontan Lake Tui Chub Habitat by Motorized RCA Route Density Categories

Stream Crossing Density: Twelve 7th field watersheds (HUC7s) identified as potential habitat for the Lahontan Lake tui chub within the three reservoirs were evaluated by alternative for the number and percentage of HUC7s that are within stream crossing density categories of highest (8.9 – 27.3 crossings/mi^2), moderately high (6.3 - 8.8crossings/mi^2), moderately low (4.3 - 6.2 crossings/mi^2), and lowest (0.2 - 4.2 crossing/mi^2 (Table 3.03-133 and Figure 3.03-12). Alternative 1 poses the greatest risk of direct and indirect effects to Lahontan Lake tui chub habitat through potential sediment delivery from native surfaced, motorized routes. Under Alternative 1, 100% HUC7 watersheds potentially affecting tui chub habitat would have stream crossing densities within the highest and the moderately high route density categories combined.

All the action alternatives would benefit tui chub habitats by reducing the native surfaced crossing densities within the 12 tui chub HUC7 watersheds. Of the action alternatives, Alternative 5 has a higher proportion of tui chub HUC7 watersheds in the highest stream crossing density category (67% or 8 of 12), under Alternative 5, and 2 watersheds each in the moderately high and the moderately low crossing density categories.

The remaining alternatives would further reduce the number of stream crossings within the highest crossing density categories. Alternatives 2 and 7 would have the same proportion of HUC7 watersheds within stream crossing density categories. Alternative 6 follows Alternatives 2 and 7, and Alternative 3 has the lowest stream crossing densities with the highest number of HUC7 watersheds within the moderately low and the lowest crossing density categories compared across all the alternatives.

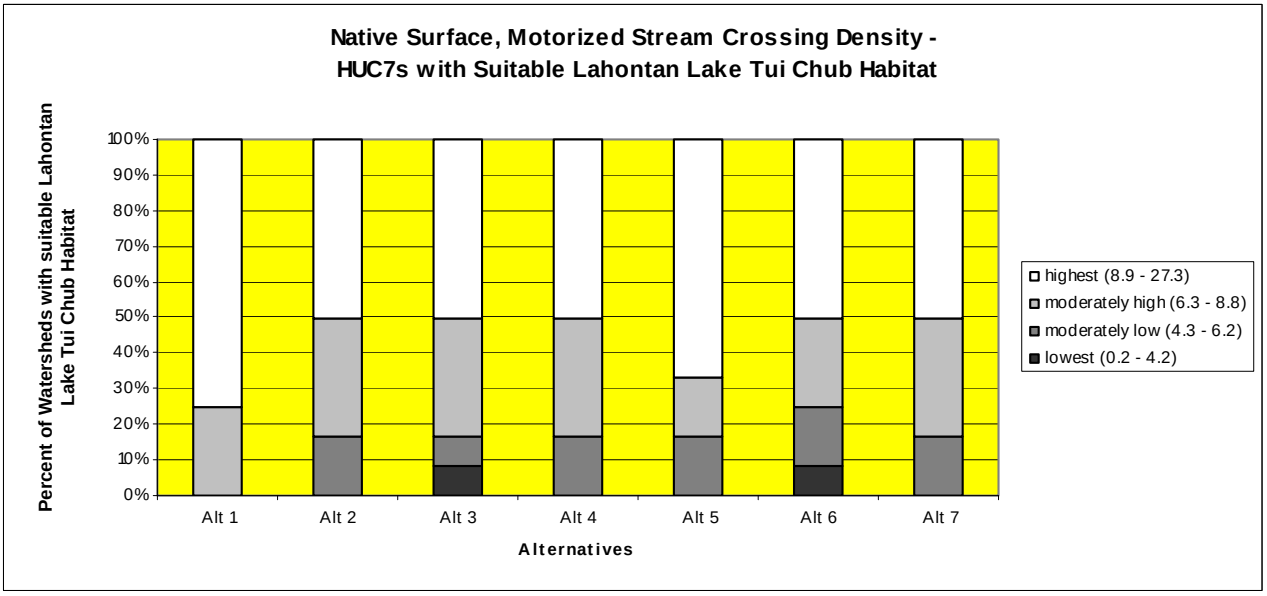

Figure 3.03-12. Number of HUC7 Watersheds with suitable Lahontan Lake Tui Chub Habitat by Motorized Stream Crossing Density Categories

Table 3.03-133. Number and percent of HUC7 Watersheds with Suitable Lahontan Lake Tui Chub Habitat by Native Surfaced, Motorized Stream Crossing Density Category

Alternatives	Highest 8.9 – 27.3 crossings/mi^2)	Moderately High (6.3 - 8.8crossings/mi^2)	Moderately Low (4.3 - 6.2 crossings/mi^2)	Lowest (0.2 - 4.2 crossing/mi^2)
Alt 1	9	3	0	0
Alt 2	6	4	2	0
Alt 3	6	4	1	1
Alt 4	6	4	2	0
Alt 5	8	2	2	0
Alt 6	6	3	2	1
Alt 7	6	4	2	0

Cumulative Effects

Cumulative Effects Boundary in Space and Time

The geographic boundary for assessing cumulative effects to the Lahontan Lake tui chub on the Tahoe NF is within the nine 7th field watersheds that may potentially indirectly impact suitable habitat for the species. Suitable habitat for this species occurs within Stampede, Boca, and Prosser reservoirs and streams that feed or connect to these reservoirs. This cumulative effects boundary is sufficiently large to assess all past, present, and future cumulative impacts to suitable habitat for the Lahontan Lake tui chub. Any larger boundary could dilute the effects of past, present, and future cumulative impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred within the last 50 to 100 years. Reasonably foreseeable future impacts expand out to approximately 20 years into the future.

Cumulative Effects of Past, Present, and Reasonably Foreseeable Actions

The current knowledge of the species distribution on the Tahoe NF is unknown. Suitable habitat for the Lahontan Lake tui chub on the Tahoe NF is considered to be Stampede, Boca, and Prosser Reservoirs and the streams connecting them (Little Truckee River and tributaries). Potential past cumulative effects to this species includes habitat degradations from water diversions, reduced water quality, urbanization, livestock grazing, recreational activities, and others. The fact that the occurrence of the species on the Tahoe NF is unknown makes assessing cumulative effects extremely difficult. Therefore, there is a great deal of uncertainty surrounding the past cumulative effects to this species from past, present, and reasonably foreseeable future activities. Any attempt to actually describe cumulative impacts would be speculative at best, since it is unknown whether or not this species has a historical distribution on the Tahoe NF.

Under Alternative 1, cumulative effects from continued cross country travel, including on 48 native surfaced crossings and approximately 29 miles of unauthorized routes would be greatest where HUC7 watersheds with suitable tui chub habitat would have the highest RCA route densities and the highest route crossing densities. The indirect impacts of potential sediment delivery from existing motorized unauthorized routes in Alternative 1 would add measurable cumulative impacts to suitable Lake Lahontan tui chub habitat where 83% of HUC7 watersheds route densities are within the highest and moderately high route density categories combined. In addition, native surfaced, motorized stream crossing densities would be greatest under Alternative 1 where 100% of the HUC7 watersheds are within the high and moderately highest stream crossing categories combined. The remaining alternatives improve both route density within Riparian Conservation Areas and stream crossing densities with Alternative 5 reducing the least and Alternatives 2, 3, 4, 6, and 7 reducing the most.

For all the action alternatives, future unmanaged cross country motorized travel would be prohibited on 9,689 acres, including on approximately 27-29 RCA miles of existing unauthorized motorized routes and on 44-48 native surfaced, stream crossings (Alternative 5 prohibits the least, Alternative 3 prohibits the most). These cross country prohibitions would likely benefit suitable tui chub habitat in the long-term once these routes are rehabilitated through active or passive restoration efforts.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-134 summarizes the direct, indirect, and cumulative effects to native surfaced, motorized route crossings and RCA miles within Lahontan Lake tui chub HUC 7 watersheds, from existing motorized system routes, motorized route additions, and existing unauthorized routes from the proposed alternatives, wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 (Watershed Resources: Geology, Soil, Hydrology) for more detailed information and assumptions.

Table 3.03-134. Lahontan Lake Tui Chub 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel Prohibitions (acres)	**Trend of Effect**	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
	Acres	0	7,100	9,689	9,689	9,689	9,689	9,689
	Crossings	0	45	48	45	44	46	45
	RCA Miles	1.0	27.8	29.3	27.8	27.6	28.4	27.5
Existing NFTS Native Surfaced, Motorized Routes	**Crossings**	35	35	35	35	35	35	35
	Miles	21.5	21.5	21.5	21.5	21.5	21.5	21.5
Native Surfaced, Motorized Route Additions to the NFTS*	**Trend of Effect**	Negative	3rd most beneficial alternative, shared with Alts 4 and 7.	Most benefical alternative	3rd most beneficial alternative, shared with Alts 2 and 7.	Least beneficial	2nd most beneficial alternative	3nd most beneficial alternative, shared with Alts 2 and 4.
	Crossings	48	3	0	3	4	2	3
	Miles	29.4	1.6	0	1.6	1.7	1.0	1.6
Change in Class of Vehicles Resulting in Changed Maintenance Standards	**Trend of Effect**	No Effect	Negative	No Effect	No Effect	Negative	Negative	No Effect
	Crossings	0	3	0	0	3	2	0
	RCA Miles	0	1.1	0	0	1.1	0.2	0
Reopened ML 1 Roads		0	0	0	0	0	0	0
Total Native Surfaced, Motorized Routes	**Crossings**	**83**	**38**	**35**	**38**	**39**	**37**	**38**
	RCA Miles	**50.9**	**25.2**	**21.5**	**23.1**	**25.3**	**23.6**	**23.1**
Establishment of "Open Areas" (Prosser, Stampede, and Boca Reservoirs)	**Trend of Effect**	Negative – cross country travel continued	Negative	No Effect	No Effect	No Effect	Slight to none, designation on specific areas that have been stabilized or mitigated	No Effect
	Acres	0	2,589	0	0	0	244	0

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Routes	**Trend of Effect**	Negative	Negative	Negative	Beneficial	Beneficial	Beneficial	Negative
	Description	No wet weather restrictions on high risk crossings.	No wet weather restrictions on high risk crossings.	No wet weather restrictions on high risk crossings.	Wet Weather Restrictions would be implemented on native surfaced crossings reducing erosion risk	Wet Weather Restrictions would be implemented native surfaced crossings reducing erosion risk	Wet Weather Restrictions would be implemented native surfaced crossings reducing erosion risk	No wet weather restrictions on high risk crossings.
NET Cumulative Effect		Most negative alternative with motorized 83 crossings and 50.9 RCA miles. Cross country travel continues on 9,689 tui chub RCA acres No additional protection to tui chub habitat from wet weather restrictions.	Least beneficial alternative. Cross country travel prohibited on 9,689 tui chub RCA acres Potentially increases sedimentation to habitat within open reservoir areas No additional protection to tui chub habitat from wet weather restrictions.	4th most benefical alternative. Cross country travel prohibited on 9,689 tui chub RCA acres. No additional protection to tui chub habitat from wet weather restrictions	Most beneficial alternative, shared with Alt 7. Cross country travel prohibited on 9,689 tui chub RCA acres Reduced sedimentation risk to tui chub habitat from wet weather restrictions	3rd most beneficial alternative. Cross country travel prohibited on 9,689 tui chub. RCA acres. Reduced sedimentation risk to tui chub habitat from wet weather restrictions	2nd most beneficial alternative. Cross country travel prohibited on 9,689 tui chub. RCA acres. Reduced sedimentation risk to tui chub habitat from wet weather restrictions	Most beneficial alternative, shared with Alt 4. Cross country travel prohibited on 9,689 tui RCA acres Reduced sedimentation risk to tui chub habitat from wet weather restrictions

*Alternative 1 includes existing native surfaced, stream crossings unauthorized to motorized use, while all the other Alternatives include motorized crossing additions.

Frogs

Potential road and trail associated risk factors to the suitable habitat for frogs, particularly California red-legged frogs, foothill yellow-legged frogs, and mountain yellow-legged frogs, can cause the modification or loss of habitat or habitat components, primarily aquatic and adjacent riparian environments used for reproduction, cover, foraging, and aestivation. Egg survival can be impacted by roads and trails through increases in fine sediments. Stream crossings and roads and trails that are within close proximity to streams and ponds have the potential to impact riparian vegetation, emergent vegetation, nutrient loading, and channel morphology and hydrology that are important habitat components for frog species.

The degree to which trails and roads affect frogs and their habitat depends on many factors such as road density, road type, and traffic intensity. Most studies on road and trail associated factors address other amphibians (e.g., Fahrig et al. 1995, Mazerolle 2003, 2004). Several studies have shown that amphibian densities are inversely related to road density and traffic intensity (see Fahrig et al. 1995, Vos and Chardon 1998).

Direct impacts to frog populations from roads potentially include road mortality, direct loss of habitat, or creation of barriers. 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; see also Trombulak and Frissell 2000). Mortality from vehicles can reduce population size and reduce movement between resources and conspecific populations (Carr and Fahrig 2001). Road mortality is a considerable potential risk factor for foothill yellow-legged frogs because roads are common over the areas encompassing their historical range on the Tahoe NF, many of the roads presently have at least moderate traffic levels; and some observations suggest upslope seasonal movements by frogs likely intersect roads.

Roads can also impact populations of frogs by affecting their riparian or terrestrial habitat. Trombulak and Frissell (2000) identified eight physical characteristics of the environment may be altered by roads: soil density, temperature, soil water content, light, dust, surface-water flow, pattern of run-off, and sedimentation. The presence of roads is highly correlated with changes in the hydrologic and geomorphic processes that affect aquatic and riparian systems (Trombulak and Frissell 2000). Roads can 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). California red-legged frogs, foothill yellow-legged frogs, and mountain-yellow legged frogs breed in streams, which can be affected by fluctuations in the frequency or magnitude of peak and debris flows of adjacent streams. Fluctuations causing reductions or excesses in available water could severely affect recruitment. Hydrologic effects are likely to persist for as long as the road remains a physical feature altering flow routing - often long after abandonment and revegetation of the road surface (Trombulak and Frissell 2000).

Increased sedimentation from roads also impacts riparian habitat used by frogs. 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). The transfer of sediment to streams and other water bodies at road crossings is also 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). This disrupts stream ecosystems by inhibiting aquatic plants, macro-invertebrates, and fish. High concentrations of suspended sediment may directly kill aquatic organisms and impair aquatic productivity (Newcombe and Jensen 1996). The effects are heightened if the sediments contain toxic materials (Maxell and Hokit 1999, In Joslin and Youmans 1999). 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 only data addressing sedimentation effects on foothill yellow-legged frogs are from Oregon, where sedimentation emerged as one of the variables affecting foothill yellow-legged frog occupancy (Borisenko and Hayes 1999).

The spread of chemicals is another way in which roads may impact frog. 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 change of the chemical environment by roads may affect living organisms in several ways. For example, chemicals found in road de-icers may kill (Dougherty 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. Another example is the historical use of lead as a fuel additive that may have affected foothill yellow-legged frogs because lead has been shown to have sub-lethal effects on growth and behavior of northern leopard frog larvae (Chen et al. 2006). No data exist that specifically addresses the effects of road associated chemicals on California red-legged frogs, foothill yellow-legged frogs, or mountain yellow-legged frogs.

California Red-legged Frog: Affected Environment

The U. S Fish and Wildlife Service listed the California red-legged frog (*Rana aurora draytonii*) (CRLF) as federally threatened in 1996. The western portion of the Tahoe National Forest falls within the Sierra Nevada recovery unit (Recovery Unit #1) (USDI Fish and Wildlife Service 2002). The Plumas and Tahoe National Forests share Core Area #2 Yuba River-South Fork Feather River located in Yuba County (USDI Fish and Wildlife Service 2002). This core area includes a portion of the North Yuba River around New Bullards Bar Reservoir. Recovery actions would be focused within core areas. No critical habitat is designated on the Tahoe National Forest (USDI Fish and Wildlife Service 2001) (Federal Register 66 (49): 14626-14758).

The California red-legged frog 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). It is generally found at elevations below 4,000 feet. Suitable California red-legged frog breeding habitat on the Tahoe NF includes all

ponds, lakes and reservoirs on the west slope of the forest that contain water through July in years with average precipitation, and low gradient stream reaches (< 4 percent) that do not receive peak runoff flows from snowmelt during May or June. Sites need to provide: suitable water depth for breeding (most years), presence of still or slow moving water, good water temperature for egg laying and larval development, presence of emergent aquatic vegetation or woody debris for egg deposition braces.

California red-legged frog are not currently known to occur on the Tahoe NF, though four known populations are located adjacent to the Tahoe NF administered lands. In 2000, red-legged frogs were found in Little Oregon Creek, a tributary to New Bullards Bar Reservoir on the Plumas NF. The Little Oregon Creek population is approximately 1 mile from New Bullards Bar Reservoir. In 2001 a single female was located in Spivey Pond on the Eldorado NF on Ralston Ridge, located 1 mile from the Tahoe NF boundary. A third population was found in 2003 on private land within the Rock Creek watershed near Nevada City, within 1/5 miles of the Tahoe NF boundary. In 2006, a fourth site consisting of approximately 50 individuals was discovered on private land near Michigan Bluff in the Big Gun Diggings area. From 1996 to present, suitable California red-legged frog habitat on the Tahoe NF has been surveyed to U.S. Fish and Wildlife Service protocol at approximately 100 sites. To date, no California red-legged frog sites have been detected on lands administered by the Tahoe NF.

Roads in close proximity to streams also increase the potential for human disturbance of aquatic species and their habitats. In general, such disturbance would be correlated to the type of disturbance (e.g., roadside hazard tree removal, collection of aquatic species, behavioral changes in response to noise, etc.), the intensity of that disturbance, and the distance of the road from the stream.

Roads and trails can increase the risk of modification or loss of red-legged frog habitat or habitat components, primarily aquatic and adjacent riparian environments used for reproduction, cover, foraging, and aestivation. Egg survival can be impacted by road and trail associated factors through increases in fine sediments and changes in channel morphology and hydrology (SNFPA 2001), thus adversely affecting habitat and potentially disrupting amphibian reproduction. Effects of increased sediment delivery to aquatic systems include adverse effects to water quality (e.g., increases in turbidity) and changes in substrate composition morphology that potentially could influence in-stream primary production and macroinvertebrate assemblages. Such changes could alter the prey species presence/absence and/or promote changes in habitat that favor non-native species that have a negative effect on the red-legged frog.

California Red-legged Frog: Environmental Consequences

In 2006, the U.S. Forest Service entered into programmatic consultation with the U.S. Fish and Wildlife Service for route designation (travel management) for motor vehicles in 14 National Forests in California. The BE for the Tahoe NF Motorized Travel Management Project and this programmatic consultation is incorporated by reference. Project design criteria were developed jointly, which includes measures to avoid impacts to federally listed species, including the California red-legged frog. The U.S. Fish and Wildlife Service has agreed that, by using the Project Design Criteria for each of the Threatened and Endangered species and Critical Habitat, route designation will meet “No Effect” or “May Affect Not

Likely to Adversely Affect" determinations and that they would concur with these determinations on a programmatic basis. Forest consultation can tier to the programmatic consultation with no further consultation.

The following project design criteria were developed specifically for the California red-legged frog to achieve a "No Effect" or "May Affect Not Likely to Adversely Affect" determination for routes (motorized road or trail) and area additions to the NFTS:

1. Routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream associated with California red-legged frog.
2. In suitable California red-legged frog habitat, routes avoid Riparian Conservation Areas 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 that cross any stream or waterbody within 150 m (500 ft) of known occupied sites of California red-legged frog; and route or area is not within a distance of 150 m (500 ft) from wetlands (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 downsloped toward the stream on both sides.
5. Routes or areas are located outside of Critical Aquatic Refuges, Riparian Conservation Areas, meadows, and wetlands within California red-legged frog habitat.
6. No route or areas are within Critical Aquatic Refuges for California red-legged frog.

Direct and Indirect Effects

There are no known occupied California red-legged frog sites on lands administered by the Tahoe NF. Proposed motorized route and area additions to the NFTS do not directly, indirectly, or cumulatively impact the California red-legged frog. All the action alternatives would be consistent with the above Project Design Criteria, since none of the proposed route or area additions would adversely affect any occupied California red-legged frog sites adjacent to or within the boundary of the Tahoe NF.

The North Bloomfield (Rock Creek) red-legged frog site occurs several miles outside of the Forest boundary just north of Nevada City, and would not be affected by the proposed route and area additions. Two other known red-legged sites are on the Eldorado and Plumas NFs, and would not be affected by this project. The occupied California red-legged frog site near Michigan Bluff is immediately adjacent to the Forest boundary. No routes would be proposed within proximity to the Michigan Bluff site.

- Routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream associated with California red-legged frog.

  No routes would be proposed within proximity to any of the CRLF occupied habitats discussed above.

- In suitable California red-legged frog habitat, routes avoid Riparian Conservation Areas 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.

No routes would be proposed within proximity to any of the CRLF occupied habitat.

- Routes or areas that cross any stream or waterbody within 150 m (500 ft) of known occupied sites of California red-legged frog; and route or area is not within a distance of 150 m (500 ft) from wetlands (i.e. springs, wet meadows, ponds, marshes).

  No routes would be proposed for addition or reopened within proximity to any of the CRLF occupied habitat.

- 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 downsloped toward the stream on both sides.

  No routes would be proposed for addition or reopened within proximity to any of the CRLF occupied habitat.

- Routes or areas are located outside of Riparian Conservation Areas, meadows, and wetlands within California red-legged frog habitat.

  No routes would be added or reopened within proximity to any of the CRLF occupied habitat.

- No route or areas are within Critical Aquatic Refuges for California red-legged frog.

  The two Critical Aquatic Refuges (CARs) on the Tahoe NF, located at Sierra Buttes and Independence Lake, are outside the range of the California red-legged frog.

Cumulative Effects

Cumulative Effects Boundary in Space and Time

The geographic boundary for assessing cumulative effects to the California red-legged frog (CRLF) is the west side of the Tahoe NF below 4,000 feet within ponds and streams with a gradient $\leq$ 4%, since this is within habitat that is considered suitable on the Tahoe NF. This geographic boundary is sufficiently large to encompass historic and potential CRLF habitat on the Tahoe NF. Any larger boundary could dilute the effects of past, present, and future cumulative impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred within the last 50 to 100 years. Reasonably foreseeable future impacts expand out to approximately 20 years into the future.

Cumulative Effects of Past, Present, and Reasonably Foreseeable Future Actions

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 introduction of the bullfrog which have out-competed and predated on the CRLF. A variety of other past cumulative impacts to California red-legged frogs have affected the distribution and abundance of the California red-legged frog on the Tahoe NF, including historic mining and grazing; urban development and mining on private land; road building, water diversions; recreation and non-native species

introduction. All these activities have the potential to alter California red-legged frog habitat through disturbance to vegetation, soils, hydrology, and the potential for introduction of exotic species. Activities on private land that comprise a significant checkerboard pattern on the Tahoe NF will continue to affect the species.

Thirty two of fifty-nine total ponds that have been identified as suitable red-legged frog habitat occur within active livestock allotments on the Tahoe NF. Since occupied CRLF habitat does not currently occur on the Tahoe NF, none of the current active grazing allotments has the potential to contribute to cumulative effects to occupied CRLF habitat. However, suitable California red-legged frog habitat overlaps with 13 active grazing allotments where habitat degradation to suitable habitat could occur.

Although mining activities have the potential to adversely affect this species, suitable habitat has been created for this species (i.e. Michigan Bluff private land historic mine tailing ponds).

The proposed alternatives, including the No Action Alternative, would not directly or indirectly add impacts to any existing cumulative impacts to the California red-legged frog, since no California red-legged frog populations occur on NFS lands within the boundary of the Tahoe NF. The nearest known populations of California red-legged frog occur on private lands adjacent to Forest Service system lands in the vicinity of North Bloomfield, Nevada City, the Michigan Bluff area near the town of Foresthill, and within the Eldorado NF in Spivey Pond.

Foothill Yellow-legged Frog: Affected Environment

Introduction: The foothill yellow-legged frog (*Rana boylii*) (FYLF) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). Foothill yellow-legged frogs are associated with streams in a variety of habitats including riparian, mixed conifer, and wet meadow types (Stebbins 1985). To varying degrees depending on life stage, their habitat requirements are closely linked to seasonal variation in stream habitats and comprise three categories: breeding and rearing habitat, non-breeding active-season habitat; and over wintering habitat. Breeding and rearing habitat is located in gently flowing water. 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 1996a). These frogs prefer partial shade, shallow riffles, and cobble sized or greater substrate (Hayes and Jennings 1988). Occasionally, this species is also found in other riparian habitats, including moderately vegetated backwaters, isolated pools, (Hayes and Jennings 1988, pers. obs.), and slow moving rivers with mud substrates (Fitch 1938). During breeding and summer, FYLF are rarely encountered far from permanent water. During the winter, frogs have been observed in abandoned rodent burrows and under logs as far as 100 meters from a stream (Zeiner et al. 1988).

Private lands comprise the largest fraction (about 50 percent) of historic foothill yellow-legged frog range in the Sierra Nevada. Only about 25 percent of historic FYLF range occurs on NFS lands, they are not documented from Wilderness Areas or National Park lands in the Sierra Nevada, where roads are few. The remaining 25 percent of FYLF habitat lies on state lands, other federal lands (e.g., Bureau of Land Management [BLM], Bureau of Reclamation [BOR]), or tribal lands. On the Tahoe NF suitable habitat

for FYLF is considered to be streams occurring below 6,000 feet elevation on the westside of the Tahoe NF.

Risk factors to the FYLF include disease, introduced fish and other exotic (bullfrog) and native predators, airborne contaminants (including pesticides), livestock grazing, recreational activities (including activities associated with motorized routes), water development and diversion, vegetation and fuels management projects, and habitat loss and fragmentation.

Motorized Route Associated Risk Factors: As indicated above, recreational activities associated with motorized routes has the potential to adversely affect FYLF and their habitat. Roads and trails have the potential to directly affect FYLF populations by road or trail mortality, direct habitat loss, and/or the creation of barriers. Mortality from vehicles can reduce FYLF population size and reduce movement between breeding and over wintering sites. Route associated mortality is a considerable potential risk factor for FYLF because roads are common over the areas encompassing their historical range on the Tahoe NF; and many of the roads presently have at least moderate traffic levels; and some observations suggest upslope seasonal movements by FYLF likely intersect roads.

Foothill Yellow-legged Frog: Environmental Consequences

Indicators used to Measure Effects

Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to FYLF 7th field watersheds from motorized cross country travel.

NFTS Additions and Establishment of "Open Areas" (FYLF 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized route additions to the NFTS and the miles of motorized route additions within Riparian Conservation Areas (RCAs) for FYLF 7th field watersheds. The establishment of motorized "open areas" is also analyzed.

Site-specific Physical Impacts and Disturbance to known foothill yellow-legged frog locations: Proposed motorized route additions were evaluated to determine site-specific impacts to known FYLF locations for each of the alternatives. Native surfaced routes that cross or intersect FYLF streams and ponds have the greatest potential to disturb FYLF, kill and crush FYLF egg masses and to alter stream banks and deliver sediment which can degrade FYLF habitat condition. In addition, any proposed motorized route additions that are within RCAs or has the potential to delivery sediment to known FYLF locations were also evaluated by the alternatives.

Changes to the NFTS

Change in Class of Vehicles: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02, Watershed Resources: Geology, Soil, and Hydrology). If the route changes from smoothed surfaced to native surfaced (rough surfaced), the change in class of vehicle may result in increased sediment and erosion risk to FYLF habitat. The change in class of vehicle and associated

changed maintenance standards is evaluated for their potential to affect selected 7th field watersheds that may have suitable habitat for the FYLF.

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed in the section "Effects Common to All Aquatic Species."

Reopened ML 1 Roads: No ML 1 roads are proposed for reopening within FYLF watersheds that would affect RCAs or would cross any FYLF streams. Therefore, effects to FYLF would not occur from reopening ML 1 roads.

Route Density within Riparian Conservation Areas (RCAs): Route densities of native surfaced routes within RCAs were evaluated to compare the overall effects of all motorized routes (including existing NFTS routes and existing unauthorized routes) for the alternatives within each 7th field watershed occupied by foothill yellow-legged frog (FYLF). According to Chapter 3.02 (Watershed Resources: Geology, Soil, Hydrology), native surfaced motorized routes have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes route density of all native surfaced motorized routes maintained for high clearance vehicles. Route density provides a relative index to measure the potential indirect effects to occupied habitat of FYLF from increased sedimentation from routes. Thresholds for route density have not been established, however, route density provides a relative way to compare the effects of the alternatives.

Stream Crossing Density within Riparian Conservation Areas (RCAs): The 7th field watersheds occupied by FYLF were evaluated for the crossing density of native surfaced motorized routes within RCAs to compare direct and indirect effects of motorized routes for the alternatives. Route crossing density provides a way to measure the potential direct and indirect effects to FYLF and habitat. Direct effects include potential FYLF mortality as a result of use of motorized crossings of occupied FYLF streams. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Thresholds for motorized crossing route density have not been established, however, route crossing density provides a relative way to compare the effects of the alternatives.

Direct and Indirect Effects

Cross Country Travel. Under Alternative 1, no action, motorized cross country travel would continue on 34,092 Riparian Conservation Areas (RCAs) acres within FYLF HUC7 watersheds, where the potential for adversely affecting FYLF habitat could occur by increasing sedimentation and altering streamside vegetation. Alternative 1 would prohibit 8 RCA miles and 19 crossings that were closed from previous NEPA decisions (Table 3.03-135).

The action alternatives would all benefit FYLF habitats from the prohibition of cross country travel and would result in prohibiting motorized use on 34,092 RCA acres. The action alternatives also prohibits motorized use on the 8 RCA miles and 19 crossing that were closed from previous NEPA decisions, but also prohibits cross country travel on existing unauthorized routes for a combined total of 57.0 to 71.2 RCA miles and 186 to 228 motorized crossings (Alternative 5 prohibits the least, Alternative 3 prohibits the most). Cross country travel prohibitions would likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit FYLF habitat.

Table 3.03-135. RCA miles and Stream Crossings Prohibited to Cross Country Travel

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Road miles closed from previous NEPA decisions, pending implementation	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Crossings closed from previous NEPA decisions, pending implementation	19	19	19	19	19	19	19
RCA Miles prohibited to motorized public use with the prohibition of cross country travel (positive impact)	0	68.1	71.2	69.1	57.0	65.8	69.9
Crossings prohibited to cross country travel	0	218	228	220	186	214	224
Total miles of cross country travel prohibited to motorized use	**8.0**	**76.1**	**79.2**	**77.1**	**65.0**	**73.8**	**77.9**
Total crossings prohibited to motorized use	**19**	**237**	**247**	**239**	**205**	**233**	**243**

NFTS Additions and Establishment of "Open Areas" – Motorized Stream Crossings and RCA Miles

Number of Native Surfaced, Motorized Stream Crossing Additions within FYLF 7th Field Watersheds. The number of native surfaced, motorized stream crossings, proposed for addition to the NFTS, are assessed for the alternatives, and provides a useful way to compare potential changes in sediment delivery within FYLF HUC7 watersheds. Alternative 1 poses the greatest risk of increased sedimentation where 228 motorized stream crossings are associated with the continuance of cross country travel on existing unauthorized routes (Table 3.03-136**)**. The action alternatives all would result in reducing the number of crossings potentially contributing to sedimentation within FYLF HUC7 watersheds. In decreasing order, Alternatives 5, 2, 6, 4, and 7 would result in the addition of 42 to 4 native surfaced, motorized route crossings. Alternative 3 does not add motorized route crossings to the NFTS, and therefore sedimentation or streamside vegetation would not be affected within any FYLF HUC7 watersheds.

Table 3.03-136. Foothill Yellow-legged Frog 7th Field Watersheds - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions (negative impact)	228	10	0	8	42	14	4

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing unauthorized routes, while all the action alternatives include motorized crossing additions.

Additions to the NFTS within FYLF 7th Field Watersheds. The miles of proposed motorized route additions to the NFTS within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into FYLF habitats at the HUC7 level. Alternative 1 poses the greatest risk to increased sedimentation potential from 71.3 RCA miles of existing unauthorized motorized routes that would remain due to continued cross country travel (Table 3.03-137**)**. Similar to stream crossing numbers, Alternatives 2, 4, 5, 6, and 7 would add between 1.3 and 14.2 RCA miles (Alternative 5 adds the most, Alternative 7 adds the least) of motorized routes. Alternative 3 does not add

motorized routes to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any FYLF HUC7 watershed.

Table 3.03-137. RCA Miles of Proposed Route Additions within FYLF HUC7 Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized route additions within RCAs* (negative impact)	71.3	3.1	0	2.2	14.2	5.4	1.3

*Alternative 1 includes existing unauthorized routes, while all the action alternatives include motorized route additions.

Establishment of "Open Areas" Alternative 2 would establish 60 acres of motorized open area at Greenhorn Creek where FYLF would potentially be adversely affected through increased erosion and sedimentation. In addition, FYLF could be directly affected from vehicle related mortality, since FYLF are known to occur within Greenhorn Creek. None of the other alternatives would propose establishment of an open area at Greenhorn Creek, and therefore, FYLF would not be affected. Continued cross country travel would continue at Greenhorn Creek, and could adversely affect FYLF in the long-term.

Open Area establishments at Boca, Stampede, and Prosser reservoirs would not affect FYLF, since these reservoirs are outside the known geographic range of FYLF.

Changes to the NFTS

Change in Class of Vehicles. For each of the alternatives, Table 3.03-138 displays the effects of proposed changes in class of vehicles and the associated maintenance changes that have potential to increase the risk of delivering sedimentation and erosion to FYLF HUC7 watersheds. Alternatives 2, 5, and 6 result in the change in road maintenance levels resulting in changes from smooth surfaced roads to rough surfaced roads are likely to occur in the future with reduced maintenance. This change in road surface type has a higher potential to result in increased sedimentation to FYLF habitat affected by 1-2 crossings and from 0.3-0.6 RCA miles motorized routes.

Table 3.03-138. Foothill Yellow Legged Frog – Effects from Change in Class of Vehicles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced Crossings as a result changed maintenance standards	0	2	0	0	2	1	0
RCA Miles of changed maintenance standards from smooth surfaced to rough or native surfaced	0	0.6	0	0	0.6	0.3	0

Reopened ML 1 Roads. Alternative 5 proposes to reopen numerous closed ML1 roads (Cal Ida Network). A few of the ML 1 roads have the potential to directly and indirectly affect FYLF sites within the Cherokee Creek and Fiddle Creek HUC7 watersheds. None of the other action alternatives would affect FYLF habitat.

Cherokee Creek HUC7. ML1 road #N39-7, intersects Young's Ravine, and therefore reopening N39-7 would potentially directly and indirectly affect FYLF within Young's Ravine, an intermittent

stream. Reopening other ML1 roads within the watershed may contribute to sediment, but would likely have a lesser direct and indirect impact to the known FYLF site in Young's Ravine.

Fiddle Creek HUC 7. Reopening ML1 roads on the north side of Fiddle Creek has a small potential to impact the FYLF site in Fiddle Creek from ML1 roads that cross tributaries to Fiddle Creek (e.g., N25-2, N25-2-1, N25-4-2, N25-4-2).

Site-specific Physical Impacts and Disturbance to Known Foothill Yellow-Legged Frog Locations. On the Tahoe NF, FYLF locations occur within forty-two 7th field watersheds. Table 3.03-139 displays the FYLF 7th field watersheds (HUC7) where motorized route additions are located and shows the relationship to known FYLF locations. Potential site-specific adverse and beneficial impacts at the HUC7 watershed scale are described.

Table 3.03-139. Direct and indirect effects of proposed motorized route additions and prohibition of cross country travel in relation to known FYLF locations by 7th field watershed

Watershed Name	Motorized Additions/Route ID	Reopened ML1 Road ID	Direct and Indirect Impacts of motorized additions and reopening ML 1 roads	Prohibition of Cross Country Travel
Bullards Bar Reservoir-Bridger Creek	D_Y-125_a (Alt 2,5,6)	None	Low risk that D_Y-125_a would impact FYLF habitat.	Proposed action alternatives prohibit cross country travel on 3 of 8 intermittent/perennial NFS crossings.
Cherokee Creek	YRN-008 (Alt 2, 5, 6); 491-3-1_p (Alt 5,6), 491-3-2_p (Alt 5,6); N39-6 (Alt 5), D_35_a-b (Alt 2,4,5,6); D_491-6_a-b (Alt 2,4,5,6).	0025-009, 0491-003, 25-9-3_p, 25-9_p, 35-3_p, 35-4-1_p, 35-4_p, 39-9_p, 491-3_p (Alt 5 & 6); H39-12, N25-1-1, N25-3, N25-5, N25-6-1, N25-7, N25-9-1, N25-9-2, N35-1, N35-2, N35-3-1, N35-3-2, N35-6, N35-7, N39-4, N39-5, N39-5-1, N39-5-2, N39-7, N39-8-1, N491-1, N491-3-1, N55-2 (Alt 5).	YRN-008 near the FYLF site and may impact FYLF. D_35_a-b and D_491-6_a-b, not connected and not likely to impact FYLF. Alt 5 may have a cumulative effect to Cherokee Ck. HUC 7 watershed due to the reopening of numerous ML 1 roads. Some of the ML 1 roads proposed for reopening are within the RCA of FYLF habitat and may directly and indirectly affect FYLF.	Proposed action alternatives prohibit cross country travel on up to 18 of 25 intermittent/perennial NFS crossings.
Fall Creek	D_14_b,d (Alt 2,4,5,6); D_14_e,f,h (Alt 6); D_17-6 (Alt 6); D_17_b,c,e (Alt 6); D_18-14_c,d (Alt 2,4,5,6); D_18-14_e,f (Alt 6); D_18_a (Alt 2,4,5,6).	None	Three short routes to dispersed recreation, low risk to FYLF site in mainstem of So. Yuba Rv. These routes are along Fall Creek >2 mi north of FYLF site. 3 routes to dispersed sites are not connected and would not affect FYLF.	Proposed action alternatives prohibit cross country travel on up to 4 of 12 existing intermittent/perennial NFS crossings.

Watershed Name	Motorized Additions/Route ID	Reopened ML1 Road ID	Direct and Indirect Impacts of motorized additions and reopening ML 1 roads	Prohibition of Cross Country Travel
Fiddle Creek	N25-4-10, N27 (Alt 5); D_25-4_a,b,c,d (Alt 6).	0025-009, 25-9_p (Alt 5,6); N25-2, N25-2-1, N25-2-3, N25-4-2, N25-4-2-2, N25-4-3, N25-4-4, N25-4-4-1, N25-4-6, N25-5, N25-8-1-1, N25-8-2, N25-8-4, N25-8-6. N25-8-8, N25-8-9, N25-8-10, N27-1, N27-2, N27-3, N27-4, N35-1, N55-1 (Alt 5).	FYLF site in lower portion of HUC7, N25-4-10; N27.and D_25-4_a,b,c,d in upper HUC7 do not impact FYLF. Reopening over 20 miles of ML 1 roads on the north side of Fiddle Ck has a small potential to impact the FYLF site in Fiddle Ck.	Proposed action alternatives prohibit cross country travel on up to 23 of 36 existing intermittent/perennial NFS crossings.
Fulda Creek	None	None	One FYLF site not affected.	All action alternatives prohibit cross country travel on 2 of 8 existing intermittent/perennial NFS crossings.
Goodyears Creek	H25-18, N27-6-2 (Alt 5).	N25-18-1, N25-19-1, N27-9, N27-10 (Alt 5).	Proposed Alt 5 proposed routes above Snow Creek have small potential to affect FYLF sites in Goodyear's Creek and North Yuba River.	Proposed action alternatives prohibit cross country travel onup to 8 of 20 existing intermittent/perennial NFS crossings.
Greenhorn Creek-South Fork Greenhorn Creek	Greenhorn Creek "Open Area" (Alt 2)	None	Greenhorn "Open Area" could impact FYLF sites in Greenhorn Creek.	Proposed action alternatives prohibit cross country travel on up to 14 of 21 existing intermittent/perennial NFS crossings.
Grizzly Creek	None	H613-8 (Alt 5).	H613-8 on ridge, crosses upper end of intermittant trib. to Grizzly Ck, would not affect FYLF sites in Grizzly Creek.	All action alternatives prohibit cross country travel on 6 of 11 existing intermittent/perennial NFS crossings.
Headwaters Oregon Creek	D_S-300_a,b, D_S-304_a (Alt 2,4,5,6).	None	Two short routes to dispersed recreation areas are on opposite side of ridge from FYLF sites, FYLF sites would not be affected. A third route to dispersed recreation would have no to low potential 3-4 miles away.	Proposed action alternatives prohibit cross country travel on 8 of 10 existing intermittent/perennial NFS crossings.
Humbug Canyon	ARM-7, ARM-5 (Alt 2, 4, 5, 6, 7); D-66, D_66-18 (Alt 2,4,5,6).	None	ARM-5, ARM-7 & D-66, D_66-18 not likely to impact FYLF, ARM-5 up on ridge w/ no connection to frog site.	Proposed action alternative prohibit cross country travel on 2 of 13 existing intermittent/perennial NFS crossings, that were closed from previous NEPA decisions.
Indian Creek	None	None	No effect to one FYLF site.	None
Lower Downie River	D_10E02_a (Alt 2,5,6).	YRN-509 (Alt 2,5,6).	D_10E02_a has low potential to affect FYLF site. YRN-509 is not likely to impact FYLF.	All action alternatives prohibit cross country travel on 1 of 19 existing intermittent/perennial NFS crossings.
Lower Kanaka Creek	None	None	No effects to multiple FYLF sites	All action alternatives prohibit cross country travel on 9 of 24 existing intermittent/perennial NFS crossings.

Watershed Name	Motorized Additions/Route ID	Reopened ML1 Road ID	Direct and Indirect Impacts of motorized additions and reopening ML 1 roads	Prohibition of Cross Country Travel
Lower Middle Yuba River	None	None	One FYLF site, not affected.	All action alternatives prohibit cross country travel on 2 of 6 existing intermittent/perennial NFS crossings.
Lower North Shirttail Canyon	ARM-3r (Alt 2,4,5,6,7).	None	89% FS; RCA ws-1 mi 7.3 (6.7 FS); ARM-3 & ARM-3a are above FYLF sites are not likely impact FYLF; all action alternatives prohibits cross country travel on routes nearest to FYLF streams.	All action alternatives prohibit cross country travel on 13 of 26 existing intermittent/perennial NFS crossings.
Lower Oregon Creek	None	None	Multiple FYLF sites. No effect – no additions or reopened ML 1 roads in HUC7.	All action alternatives prohibit cross country travel on 1of 15 existing intermittent/perennial NFS crossings.
Lower Poorman Creek	None	None	None	All action alternatives prohibit cross country travel on 4 of 34 existing intermittent/perennial NFS crossings.
Middle Yuba River-Indian Creek	None	None	Multiple FYLF sites, no proposals, therefore no impacts.	All action alternatives prohibit cross country travel on 3 of 26 existing intermittent/perennial NFS crossings.
Middle Yuba River-Moores Flat Creek	YRM-M4 (Alt 2,5,6,7), D_10E18_a (Alt 2,5,6).	None	Multiple FYLF sites. YRM-M4 is isolated and not likely to impact FYLF D_10E18_a, short spur to dispersed recreation site is on the mainstem of the Middle Yuba, not likely to affect FYLF sites in tribs.	All action alternatives prohibit cross country travel on 7of 26 existing intermittent/perennial NFS crossings.
Middle Yuba River-National Gulch	None	None	None	All action alternatives prohibit cross country travel on 5 of 24 existing intermittent/perennial NFS crossings.
Middle Yuba River-Studhorse Canyon	None	H613-8 (Alt 5).	Multiple FYLF sites. Reopening ML 1 road H613-8 would not impact FYLF sites in Grizzly Creek.	All action alternatives prohibit cross country travel on 2 of 7 existing intermittent/perennial NFS crossings.
North Fork American River-Giant Gap Gulch	None	None	No impact to single FYLF site	All action alternatives prohibit cross country travel on 0 of 13 existing intermittent/perennial NFS crossings.
North Fork Middle Fork American River -El Dorado Canyon	None	None	Multiple FYLF sites. No route additions or reopened ML 1 proposed.	All action alternatives prohibit cross country travel on 2 of 9 existing intermittnet/perennial NFS crossings.

Watershed Name	Motorized Additions/Route ID	Reopened ML1 Road ID	Direct and Indirect Impacts of motorized additions and reopening ML 1 roads	Prohibition of Cross Country Travel
North Yuba River-Humbug Creek	D_34_a,b,c (Alt 2,4,5,6), N27-6-2 (Alt 5).	H293-19, N27-5 (Alt 5).	Multiple FYLF sites in Humbug Creek Proposed Alt 5 route H293-19 in upper parts of watershed above FYLF sites, very slight potential of impact FYLF.	Proposed action alternatives prohibit cross country travel up to 4 of 15 existing intermittent/perennial NFS crossings.
North Yuba River-Indian Creek	YRM-M3 (Alt 2, 5,6), H34-8-3 (Alt 5), D_49-27_a (Alt 2,5,6).	H34-4, N-39-5, N39-5-3, N39-5-4 (Alt 5).	Multiple FYLF sites. YRN-M3, H34-8-3 and several Alt 5 proposed reopening of ML 1 roads (H34-4, N-39-5, N39-5-3, N39-5-4) are outside of the RCA and would not likely deliver sediment to FYLF sites in Indian Ck. D_49-27_a, short spur accesses dispersed recreation is adjacent to Indian Ck and may impact FYLF habitat.	Proposed action alternatives prohibit cross country travel on 5 (Alts 3,4,6,7) or adds 8 (Alts 2,5) to 19 existing intermittent/perennial NFS crossings.
North Yuba River-New York Ravine	None	None	None	All action alternatives prohibit cross country travel on 3 of 20 existing intermittent/perennial NFS crossings.
North Yuba River-Slug Canyon	None	YRN-509 (Alt 2,5,6).	YRN-509 on ridge above not connected to FYLF site, not likely to directly or indirectly affect FYLF site	All action alternatives prohibit cross country travel on 5 of 12 existing intermittent/perennial NFS crossings.
Oregon Creek-Marion Creek	None	None	None	All action alternatives prohibit cross country travel on 4 of 13 existing intermittent/perennial NFS crossings.
Oregon Creek-Miller Creek	D_S-295_a,b,c (Alt 2,4,5,6), H293-4-18 (Alt 5).	None	H293-4-18 not connected to stream, not likely to impact FYLF. Three short spurs to dispersed recreation sites have low potential to impact FYLF in Oregon Creek. Routes are stable and not eroding.	Proposed action alternatives prohibit cross country travel on 9 (Alts 2,4,5,6) to 10 (Alts 3,7) of 31 existing intermittent/perennial NFS crossings.
Rock Creek-North Yuba River	D_S300_b (Alt 2,4,5,6).	None	D_S300_b not connected to stream, not likely to impact FYLF	All action alternatives prohibit cross country travel on 4 of 11 existing intermittent/perennial NFS crossings.

Watershed Name	Motorized Additions/Route ID	Reopened ML1 Road ID	Direct and Indirect Impacts of motorized additions and reopening ML 1 roads	Prohibition of Cross Country Travel
South Yuba River-Diamond Creek	YRS-SF4 (Alt 2, 5, 6); H29-11, D_18-14_a,b (Alt 5); D_20-16_a (Alt 2,4,5,6); D_738-4_a,b,c,d,e,f,g (Alt 2,5,6).	H20-16-2-7	H29-11 is short route that is not likely to affect FYLF site in Diamond Ck. D_18-14_a,b; D_20-16_a; D_738-4_a,b,c,d,e,f,g has potential to impact So. Yuba River sites. YRS-SF4 may affect FYLF downstream near Diamond Ck. may be affected by sediment into spring near the north end of route YRS-SF4. H20-16-2-7 is a ML 1 road proposed for reopening in Alt 5, not connected, outside of RCA, and would not affect FYLF in Diamond Ck.	Proposed action alternatives prohibit cross country travel on up to 2 of 15 existing intermittent/perennial NFS crossings.
South Yuba River-Jefferson Creek	D_CA-20_a (Alt 6).	H20-8-5 (Alt 5).	Two FYLF sites. Road H20-8-5 ties into NFTS road, and FYLF site south of reopened ML 1 road is not connected, no impact to frog. D_CA-20_a not connected and would not affect FYLF sites.	All action alternatives prohibit cross country travel on 2 of 13 existing intermittent/perennial NFS crossings.
South Yuba River-Logan Canyon	None	None	None	All action alternatives prohibit cross country travel on 4 of 13 existing intermittent/perennial NFS crossings.
South Yuba River-New York Canyon	D_20-3-5_a, D_20-3_a (Alt 6).	H20-3-5-2-3, H20-3-5-2-4 (Alt 5).	D_20-3-5_a, D_20-3_a; H20-3-5-2-3, and H20-3-5-2-4, not connected to FYLF site.	All action alternatives prohibit cross country travel on 2 of 4 existing intermittent/perennial NFS crossings.
South Yuba River-Scotchman Creek	YRS-066 (Alt 2,5,6), YRS-SF6 (Alt 2, 4, 5, 6, 7), YRS-SF6b (Alt 2,4,5,7).	None	Multiple FYLF sites. YRS-066, YRS-SF6, and YRS-SF6b not likely to affect FYLF sites, not connected.	Proposed action alternatives prohibit cross country travel on up to 8 of 11 existing intermittent/perennial NFS crossings.
Upper North Shirttail Canyon	ARM-2 (Alt 2,5,6,7), ARM-5 (Alt 2,4,5,6,7).	None	Multiple FYLF sites. ARM-2 some potential to impact FYLF site, ARM-5 on ridge - no connection and would not impact to FYLF site	All action alternatives prohibit cross country travel on 14 of 30 existing intermittent/perennial NFS crossings.
Upper Poorman Creek	D_843-9_a (Alt 2,5,6).	None	Multiple FYLF sites in Poorman Ck, not likely to be affected by short spur to dispersed recreation ~ ½ mile south of Poorman Ck..	Proposed action alternatives prohibit cross country travel on up to 4 of 29 existing intermittent/perennial NFS crossings.

Watershed Name	Motorized Additions/Route ID	Reopened ML1 Road ID	Direct and Indirect Impacts of motorized additions and reopening ML 1 roads	Prohibition of Cross Country Travel
Upper Shirttail Canyon	ARM-3r (Alt 2,4,5,6,7).	None	Multiple FYLF sites. ARM-3r is not proximal to sites and will not impact FYLF. All action alts prohibits cross country travel on unauthorized routes nearest to FYLF sites	All action alternatives prohibit motorized cross country travel on 5 of 25 intermittent/perennial NFS crossings.
Upper Steephollow Creek	YRS-SF5, YRS-S6 (Alt 2,4,5,6,7,); YRS-B10 (Alt 2,5); D_18_6; D_20-17, D_20-17-1, D_29-5, D-32, D_CA-20_b, D_NEV-329 (Alt 6).	None	Most of YRS-S5, part of YRS-F6 and YRS-B10 above FYLF site - not likely to affect FYLF, YRS-S5 could put sediment into main channel where FYLF site is located. 4 dispersed recreation routes not connected and would not affect FYLF site in Steephollow Ck.	Proposed action alternatives prohibit motorized cross country travel on up to 5 of 16 existing intermittent/perennial NFS crossings.
Willow Creek	H293 (Alt 5); D-Y-122_a,b,c (Alt 2,4,5,6).	None	H293 in southeastern portion of watershed has low risk of affecting FYLF sites. D-Y-122_a,b,c, on Brandy Ck is upstream from FYLF in Brandy and Willow creeks, may affect FYLF	Proposed action alternatives prohibit motorized cross country travel on up to 19 of 28 existing intermittent/perennial NFS crossings.
Wolf Creek	None	None	None	Proposed action alternatives prohibit motorized cross country travel on 5 intermittent/perennial NFS crossings.

Route Density within Riparian Conservation Areas (RCAs): Route density within Riparian Conservation Areas (RCAs) for all native surfaced motorized routes within 7th field watersheds with known observations of foothill yellow-legged frogs was determined for the proposed alternatives. Alternative 1 poses the greatest risk of high route densities within Riparian Conservation Areas (RCAs) (Table 3.03-140, Figure 3.03-13).

Under Alternative 1, 26% (11 of 42) of the HUC7 watersheds with FYLF detections are within route density categories of highest, 35% (9 of 42) are in the moderately high, 36% (15 of 42) are in moderately low, and 17% (70 of 42) are in the lowest density category. The remaining alternatives would reduce the RCA route densities for motorized route density (native surfaced routes) compared to Alternative 1. Alternative 5 would reduce the least, followed by Alternatives 2, 6, 7, 4, and 3, in descending order of high risk route densities within the RCAs that would potentially capture sediment affecting FYLF habitats.

Table 3.03-140. Number and proportion of Foothill Yellow-legged Frog 7th Field Watersheds within Route Density Categories of Highest, Moderately High, Moderately Low, and Lowest or Forty two 7th Field Watersheds (HUC7s) with Foothill Yellow-legged Frog Observations

Alternatives	Highest (8.9 - 27.3 mi/mi^2)	Moderately High (6.3 – 8.8 mi/mi^2)	Moderately Low (4.3 – 6.2 mi/mi^2)	Lowest (0.2 – 4.2 mi/mi^2)
Alt 1	11 (26%)	9 (21%)	15 (36%)	7 (17%)
Alt 2	5 (12%)	8 (19%)	9 (21%)	20 (48%)
Alt 3	3 (7%)	7 (17%)	9 (21%)	23 (55%)
Alt 4	4 (10%)	6 (14%)	9 (21%)	23 (55%)
Alt 5	7 (17%)	7 (17%)	10 (24%)	18 (43%)
Alt 6	4 (10%)	7 (17%)	10 (24%)	21 (50%)
Alt 7	4 (10%)	6 (14%)	9 (21%)	23 (55%)

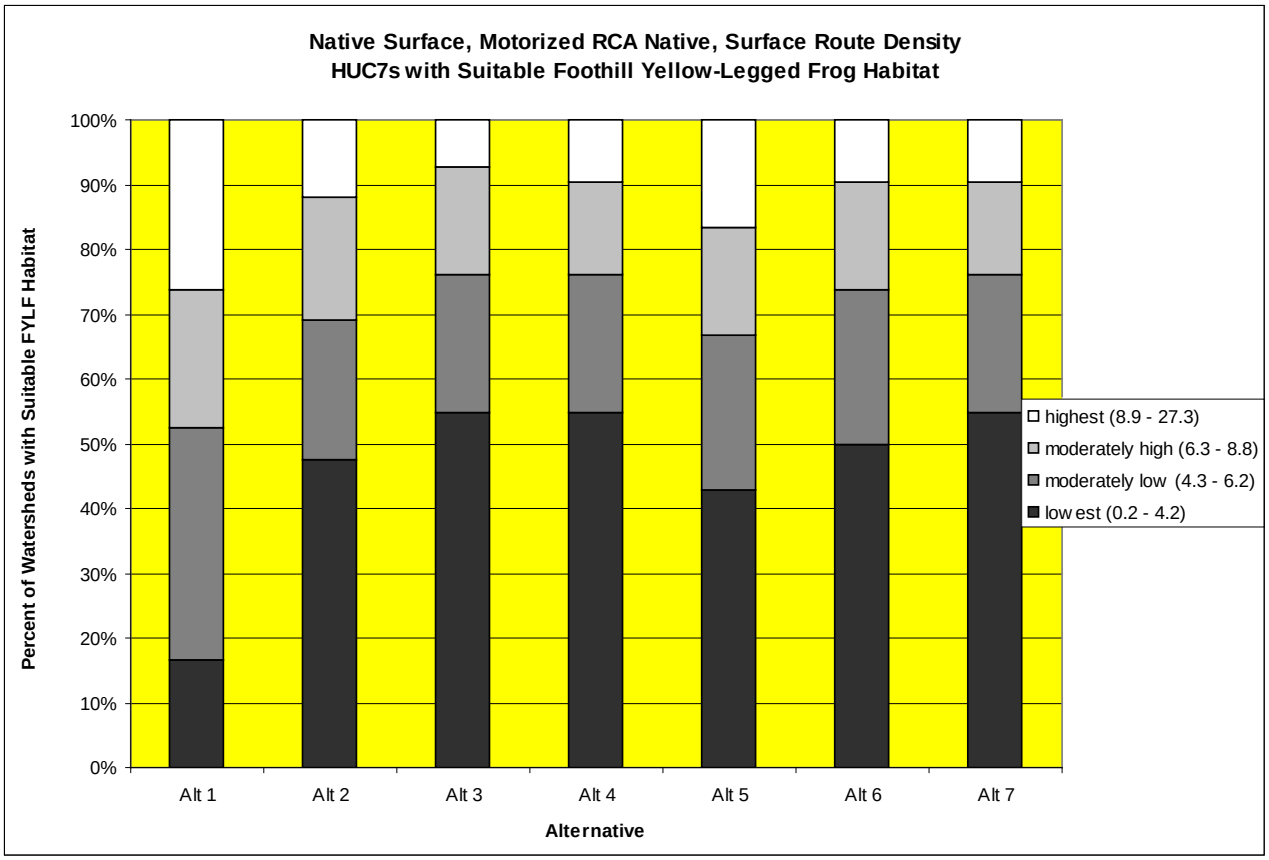

Figure 3.03-13. Number of HUC7 Watersheds with Foothill Yellow-legged Frogs by Route Density Category for Motorized Route Density (Native Surfaced) with Riparian Conservation Areas

Stream Crossing Density within Riparian Conservation Areas (RCAs): RCA stream crossing density was assessed by route density categories of highest (8.9 - 27.3 crossings/mi^2), moderately high (6.3 - 8.8 crossings/ mi^2), moderately low (4.3 - 6.2 crossings/ mi^2), and lowest (0.2 - 4.2 crossings/ mi^2)

within 7th field watersheds (HUC7s) with known foothill yellow-legged frog observations (Table 3.03-141, Figure 3.03-14).

Alternative 1 poses the greatest direct impacts to foothill yellow-legged frogs (FYLF) from stream crossing densities where frogs may be disturbed and/or killed; and FYLF aquatic habitat conditions can be impacted from bank alteration and sediment input associated with motorized route crossings. Under Alternative 1, 62% (26 of 42) of HUC7 watersheds with known FYLF detections are within the highest, 14% (6 of 42) in the moderately high, 12% (5 of 42) in moderately low, and 12% (5 of 42) are in the lowest crossing density categories.

All the alternatives would significantly reduce crossing densities where Alternative 5 would reduce the least, followed by Alternatives 2, 6, 4, 7, and 3, in decreasing order of crossing densities.

Table 3.03-141. Number and Proportion of Foothill Yellow-legged Frog 7th Field Watersheds within Route Crossing Density Categories of Highest, Moderately High, Moderately Low, and Lowest *or* Forty one HUC7s with Foothill Yellow-legged Frog Observations

Alternatives	Highest (8.9 -27.3 crossings/mi^2)	Moderately High (6.3-8.8 crossings/mi^2)	Moderately Low (4.3- 6.2 crossings/mi^2)	Lowest (0.2-4.2 crossings/mi^2)
Alt 1	26 (62%)	6 (14%)	5 (12%)	5 (12%)
Alt 2	16 (38%)	12 (28%)	5 (12%)	9 (21%)
Alt 3	13 (31%)	11 (26%)	9 (21%)	9 (21%)
Alt 4	13 (31%)	12 (28%)	8 (19%)	9 (21%)
Alt 5	17 (40%)	13 (31%)	5 (12%)	8 (19%)
Alt 6	13 (31%)	13 (31%)	8 (19%)	8 (19%)
Alt 7	13 (31%)	11 (26%)	9 (21%)	9 (21%)

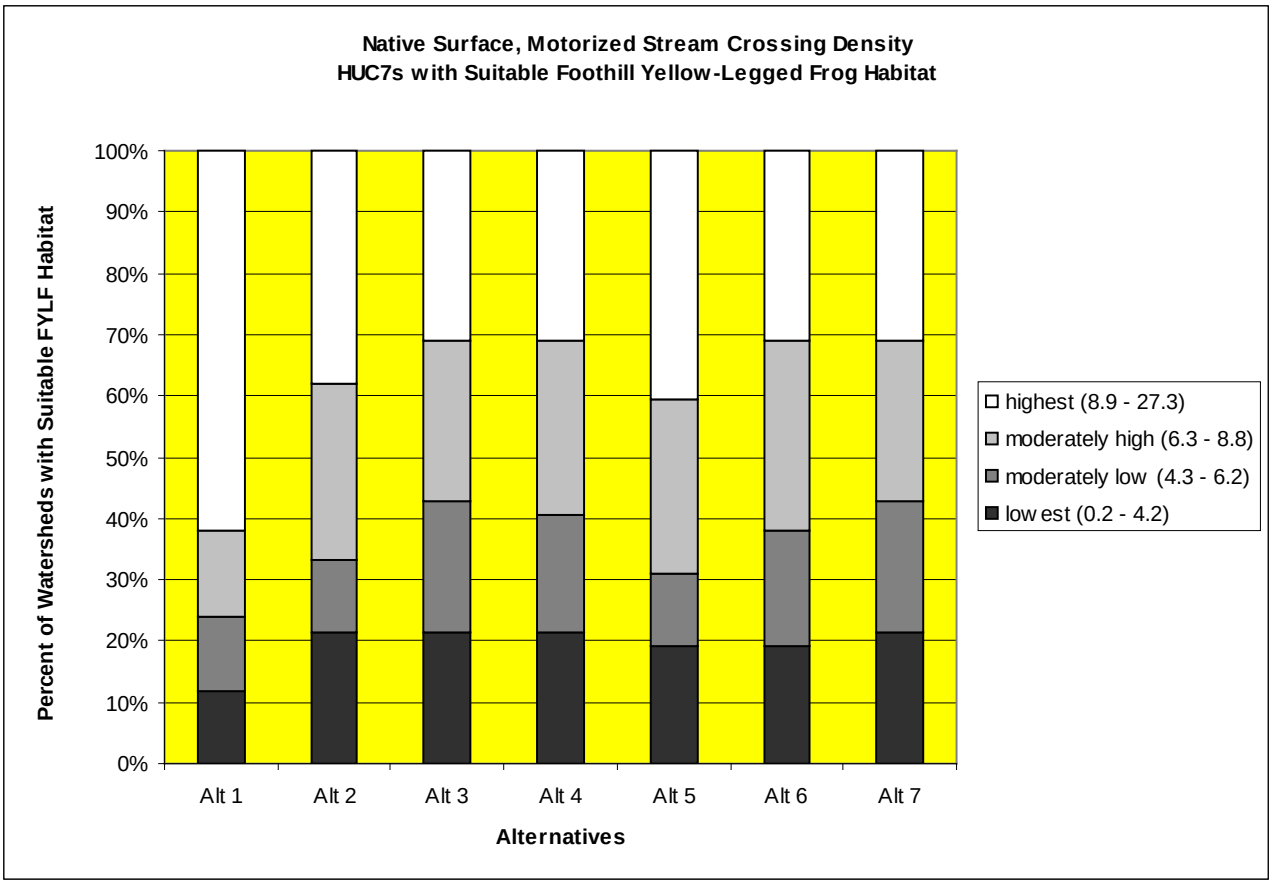

Figure 3.03-14. Number of HUC7 Watersheds with Foothill Yellow-legged Frogs by Route Density Category for Motorized Stream Crossing Density (Native Surfaced) with Riparian Conservation Areas

Cumulative Effects

Cumulative Effects Boundary in Space and Time

The geographic boundary for assessing cumulative effects to the Foothill yellow-legged frog (FYLF) is the westside of the Tahoe NF below 6,000 feet within slow-moving streams, since this is within habitat that is considered suitable on the Tahoe NF. This geographic boundary is sufficiently large to encompass historic and potential FYLF habitat on the Tahoe NF. Any larger boundary could dilute the effects of past, present, and future cumulative impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred within the last 50 to 100 years. Reasonably foreseeable future impacts expand out to approximately 25 years into the future.

Cumulative Effects of Past, Present, and Reasonably Foreseeable Actions

Foothill yellow-legged frogs were once common in streams of the Sierra Nevada, and are now increasingly rare. 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 that FYLF populations (prior to 1980) have disappeared from approximately 51% of their historic range.

Many past cumulative impacts have 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 the stocking of non-native fish species. FYLF previously extended to Sacramento Valley floor. In addition, the introduction of bullfrogs has likely contributed to the decline in the FYLF as well from competition and predation by the bullfrog. Predation on the FYLF from other species includes birds, mammals, and snakes, however, the population effects on the FYLF from predation of these species is unknown.

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 all life stages of FYLF. The greatest potential of mortality risk from livestock trampling is expected to occur when adult FYLF 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 2001). Known of FYLF habitat sites on the Forest currently overlap with 5 active livestock allotments (American Hill, Middle Yuba, Oregon Creek, Sugar Pine and Willow Creek). Suitable foothill yellow-legged frog habitat (no known detections) overlaps with an additional 6 allotments.

Urbanization within private lands makes up the largest fraction (about 50 percent) of historic FYLF range in the Sierra Nevada. Only about 25 percent of historic foothill yellow-legged frog range occurs on National Forest lands, they are not documented from Wilderness Areas or National Park lands in the Sierra Nevada, where roads are few. The remaining 25 percent of foothill yellow-legged frog habitat lies on state lands, other federal lands (e.g., Bureau of Land Management [BLM], Bureau of Reclamation [BOR]), or tribal lands.

Historic vegetation management and fuels reduction projects have likely contributed to past and present cumulative effects, especially if projects occurred adjacent to FYLF 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 Tahoe NF. In general, current vegetation and fuels projects are designed to reduce potential impact on FYLF habitats, and therefore, minimize disturbance to the species. However, as FYLF migrate between breeding sites, and between breeding sites and overwintering sites, 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 FYLF frog habitats on the Tahoe NF should be limited given the timing of FYLF migration which is in the spring.

Hydroelectric projects have likely contributed to the decline of FYLF across its range in the Sierra Nevada and on the Tahoe NF. FYLF egg masses are unable to service regulated pulsed flow events.

Under Alternative 1, HUC7 watersheds occupied by FYLF would have the highest RCA route densities and the highest route crossing densities as a result of continued cross country travel, including on routes unauthorized to motorized public use within Riparian Conservation Areas. Direct and indirect impacts of these motorized routes in Alternative 1 would pose considerable cumulative impacts to known

FYLF sites where approximately 40% of HUC7 watersheds with FYLF observations have high to moderately high RCA route densities that may contribute to habitat degradation from off-site sedimentation. In addition, under Alternative 1, 56% of HUC7 watersheds with known FYLF detections are within the highest or moderately high route density categories which have the potential to degrade stream condition by altering streambank vegetation and stream hydrology. Under Alternative 1, motorized route proliferation would likely continue and increase at an accelerated rate in the future, potentially increasing sediment delivery and alteration of streambank vegetation and hydrologic condition which may affect the abundance and distribution on the Tahoe NF. Declining population trends of this species could be affected by Alternative 1.

Alternative 5 also adds to existing cumulative impacts to the FYLF, though impacts are considerably less than Alternative 1 as a result of the closure of a significant number of miles of motorized routes within RCAs and reduction in the number of route crossings. Under Alternative 5, RCA route densities and route crossing densities are the second highest after Alternative 1, where 32% of the HUC7 watersheds with are within the highest and moderately high RCA route density categories; and 44% of HUC7 watersheds are within the highest to moderately high RCA route density categories. Site-specific impacts from proposed route additions in Alternative 5, directly or indirectly affects FYLF within 20 HUC7 watersheds where proposed route additions have the potential to contribute to FYLF habitat degradation.

Alternatives 2 and 6 are similar in their cumulative impacts to FYLF where known FYLF sites may be directly or indirectly affected within 15-17% FYLF HUC7 watersheds by proposed motorized route additions. The remaining action alternatives are similar in their cumulative effects to the FYLF where a slight potential for cumulative impacts from direct and indirect impacts to known FYLF sites have the potential to occur within 0% (Alternative 3) to 5% (Alternative 7) of FYLF HUC7 watersheds (n=41). FYLF sites are similarly affected by Alternatives 2 and 6, where 7 (17%) and 6 (15%) FYLF HUC7 watersheds are affected by motorized route additions, respectively. Alternatives 2, 4, and 7 affect the least number of FYLF sites within 0 (0%), 1(2%), and 2 (5%) HUC7 watersheds respectively, where FYLF would most benefit from the prohibition of cross country travel, including on unauthorized routes. For all the action alternatives, future unmanaged cross country motorized travel would be prohibited, including on the majority of unauthorized routes, which would benefit FYLF in the long-term once these routes are rehabilitated through obliteration or other means.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-142 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized route crossings within FYLF HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02, Watershed Resources: Geology, Soil, Hydrology, for more detailed information and assumptions.

Table 3.03-142. Foothill Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
RCA Acres Prohibited	0	34,092	34,092	34,092	34,092	34,092	34,092
Crossings Closed in previous NEPA decisions, pending implementation	19	19	19	19	19	19	19
RCA Miles Closed in previous NEPA decisions, pending implementation	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Crossings Prohibited	0	218	228	220	186	214	224
RCA Miles Prohibited	0	68.1	71.2	69.1	57.0	65.8	69.9
Native Surfaced, Motorized Stream Crossings							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Existing	155	155	155	155	155	155	155
Crossing Additions	228	10	0	8	42	14	4
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	2	0	0	2	1	0
Reopened ML 1 Roads	0	0	0	0	0	0	0
Net Native Surfaced, Motorized Crossings	**383**	**167**	**155**	**163**	**199**	**170**	**159**

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Wet Weather Seasonal Restrictions on all Native Surfaced Routes							
Trend of Effect	Negative	Negative	Negative	Beneficial	Beneficial	Beneficial	Negative
	No additional wet weather restrictions	No additional wet weather restrictions	No additional wet weather restrictions	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	No additional wet weather restrictions
Establishment of "Open Areas" at Greenhorn Creek	No Effect	Negative	No Effect	No Effect	No Effect	No Effect	No Effect
Amendments to the Forest Plan	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Adverse cumulative effects from motorized cross country travel continued on 34,092 RCA acres, including on 228 native surfaced, stream crossings unauthorized for motorized use. Continued use on 383 motorized crossings No additional protection to FYLF habitats from wet weather seasonal restrictions.	6th most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on 218 native surfaced, stream crossings. 167 crossings available for motorized use. No additional protection to FYLF habitats from wet weather seasonal restrictions.	4th most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on 228 native surfaced, stream crossings 155 crossings available for motorized use. No additional protection to FYLF habitats from wet weather seasonal restrictions.	Most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on 220 native surfaced, stream crossings 163 crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	3rd most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on186 native surfaced, stream crossings 199 crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	2nd most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on214 native surfaced, stream crossings 170 crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	5th most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on 224 native surfaced, stream crossings 159 crossings available for motorized use. No additional protection to FYLF habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, crossings unauthorized to motorized use, while all the action alternatives include motorized route additions.

Table 3.03-143 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA route miles within FYLF HUC 7 watersheds, from existing motorized routes and from the proposed actions: prohibition of cross country travel, motorized route additions to the NFTS, and changes to the NFTS. See Chapter 3.02, Watershed Resources: Geology, Soil, Hydrology, for more detailed information and assumptions.

Table 3.03-143. Foothill Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Route Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres of FYLF RCA Cross Country Travel Prohibited	0	34,092	34,092	34,092	34,092	34,092	34,092
RCA Route Miles Prohibited to Cross Country Travel	0	68.1	71.2	69.1	57.0	65.8	69.9
RCA Miles Closed in Previous NEPA decisions, pending implementation	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Native Surfaced, Motorized Routes							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Existing NFTS RCA Miles	52.7	52.7	52.7	52.7	52.7	52.7	52.7
RCA Miles of Additions*	71.3	3.1	0	2.2	14.2	5.4	1.3
Closed by Previous NEPA decisions, pending implementation (positive)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Change in Class of Vehicles Resulting in Changed Maintenance Level, Changed from Smooth Surfaced to Native Surfaced Route	0	0.6	0	0	0.6	0.3	0
Net NFTS Native Surfaced, Motorized RCA Miles	**132.0**	**64.4**	**60.7**	**62.9**	**75.5**	**66.4**	**62.0**

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Wet Weather Seasonal Restrictions on all Native Surfaced Routes							
Trend of Effect	Negative	Negative	Negative	Beneficial	Beneficial	Beneficial	Negative
Proposed Wet Weather	No additional wet weather restrictions	No additional wet weather restrictions	No additional wet weather restrictions	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	No additional wet weather restrictions
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Cumulative adverse effects from continued motorized cross country travel on 34,092 RCA acres, including on 71.3 RCA miles of unauthorized routes . Motorized use continues on 132 RCA miles	6th most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on 76.1 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 64.4 RCA miles.	4th most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on 79.2 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 60.7 RCA miles.	Most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on 77.1 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 62.9 RCA miles. Additional wet weather restrictions apply.	3rd most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on 65.0 RCA miles of unauthorized routes. NFTS motorized use available on 75.5 RCA miles. Additional wet weather restrictions apply	2nd most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on 73.8 RCA miles of unauthorized routes. NFTS motorized use available on 66.4 RCA miles. Additional wet weather restrictions apply	5th most beneficial alternative. Motorized cross country travel prohibited on 34,092 RCA acres, including on 77.9 RCA miles of unauthorized routes. NFTS motorized use available on 62.0 RCA miles.

*Alternative 1 includes existing native surfaced, unauthorized routes, while all the action alternatives include motorized route additions.

Mountain Yellow-Legged Frog: Affected Environment

The mountain yellow-legged frog (MYLF) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). Mountain yellow-legged frogs occur in the Sierra Nevada from 4,500 feet to over 12,000 feet elevation (Jennings and Hayes 1994). 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. 2007).

Mountain yellow-legged frogs in the Sierra Nevada inhabit high mountain lakes, ponds, tarns, and streams, largely in areas that were glaciated (Zweifel 1955, In Lannoo 2005). Mountain yellow-legged frogs are seldom far from water, although they have been observed moving overland to disperse to other pond habitats. Typically, mountain yellow-legged 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). Vredenburg et al. (2004) found that *R. muscosa* (*sensu stricto*) tended to use stillwater habitats more frequently than *R. sierrae*, but it is unclear whether is difference is the result of stillwater habitat being more frequent within the formers geographic range or an actual phylogenetic difference in habitat selection behavior.

The Tahoe National Forest database has records for mountain yellow-legged frogs in 79 locations. Most of these observations were of individual frogs. Only 49 of these sightings are considered recent (Since 1980). Mountain yellow-legged frogs have been observed in both stream and pond habitats on the forest. The largest populations observed in recent surveys (1993-2002) were those containing 5 adults (Lyon Bog, Rattlesnake Creek, and Poorman Creek). The species appears to have disappeared from a significant number of historic locations within the Tahoe National Forest and is in very low abundance where it still persists.

Mountain Yellow-Legged Frog: Environmental Consequences

Indicators used to Measure Effects

Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to MYLF 7th field watersheds from motorized cross country travel.

NFTS Additions and Establishment of "Open Areas" (MYLF 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized route additions to the NFTS, and the miles of motorized route additions within Riparian Conservation Areas (RCAs) for MYLF 7th field watersheds. MYLF is not affected by the "Open Area" establishments, since no MYLF habitat occurs within or adjacent to proposed "Open Area" establishments at Greenhorn Creek or at Boca, Stampede, or Prosser reservoirs.

Site-specific Physical Impacts and Disturbance to known mountain yellow-legged frog locations: Proposed motorized route additions were evaluated to determine site-specific impacts to known mountain yellow-legged frog (MYLF) locations for each of the alternatives. Native surfaced routes that cross or intersect MYLF streams and ponds have the greatest potential to disturb MYLF, kill and crush MYLF egg masses and to alter stream banks and deliver sediment which can degrade MYLF habitat condition. In addition, proposed motorized route additions that are within RCAs or have the potential to deliver sediment to known MYLF locations were also evaluated by the alternatives.

Change in Class of Vehicle: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02, Watershed Resources: Geology, Soil, and Hydrology). If the route changes from smoothed surfaced to native surfaced (rough surfaced), the change in class of vehicle may result in increased sediment and erosion risk to MYLF habitat. The change in class of vehicle and associated maintenance downgrades is evaluated for their potential to affect selected 7th field watersheds that may have suitable habitat for the MYLF.

Wet Weather Seasonal Closures: Wet weather seasonal restrictions on native surfaced roads and routes are analyzed under "Effects Common to All Aquatic Species."

Reopened ML 1 Roads: Reopening ML 1 roads within any MYLF HUC7 watersheds has the potential to adversely impact MYLF habitats through habitat modification from increased sedimentation and changes in riparian habitat cover; therefore the reopening of ML 1 roads are analyzed for the alternatives.

Route Density within Riparian Conservation Areas (RCAs): route densities of native surfaced routes within RCAs were evaluated to compare the overall effects of all motorized routes (including existing routes and routes unauthorized to motorized public use) for the alternatives within each 7th field watershed occupied by mountain yellow-legged frog (MYLF). According to Chapter 3.02 (Watershed Resources: Geology, Soil, Hydrology), Level 2 roads and below have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes route density of all native surfaced motorized routes. Route density provides a relative index to measure the potential indirect effects to occupied habitat of MYLF from increased sedimentation from routes. Thresholds for route density have not been established, however, route density provides a relative way to compare the effects of the alternatives.

Stream Crossing Density within RCAs: The 7th field watersheds occupied by mountain yellow-legged frog were evaluated for the crossing density of native surfaced motorized routes within RCAs to compare direct and indirect effects of motorized routes for the alternatives. Route crossing density provides a way to measure the potential direct and indirect effects to MYLF and habitat. Direct effects include potential MYLF mortality as a result of use of motorized crossings of occupied MYLF streams. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Thresholds for motorized crossing route density have not been established, however, route crossing density provides a relative way to compare the effects of the alternatives.

Direct and Indirect Effects

Cross Country Travel. Under Alternative 1, no action, motorized cross country travel would continue on 22,717 Riparian Conservation Areas (RCAs) acres within MYLF HUC7 watersheds, where the potential for adversely affecting MYLF habitat could occur by increasing sedimentation and altering streamside vegetation. Under the action alternatives, the prohibition of cross country travel results in prohibiting motorized use on 22,717 RCA acres, including approximately 49 to 52 RCA miles and from 96 to 101 motorized crossings (Alternatives 5 and prohibit the least, Alternative 3 prohibits the most). Cross country travel prohibitions would likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit MYLF habitat.

NFTS Additions – Motorized Stream Crossings and RCA Miles

Number of Native Surfaced, Motorized Stream Crossing Additions within MYLF 7th Field Watersheds. The number of native surfaced, motorized stream crossings, proposed for addition to the NFTS, are assessed for the alternatives, and provides a useful way to compare potential changes in sediment delivery within MYLF HUC7 watersheds. Alternative 1 poses the greatest risk of increased sedimentation where 101 motorized stream crossings are associated with the continuance of cross country travel on existing unauthorized motorized routes. In decreasing order, Alternatives 5, 6, 2, 4, and 7 would result in the addition of 1 to 5 native surfaced, motorized route crossings. Alternative 3 does not add motorized route crossings to the NFTS, and therefore sedimentation or streamside vegetation would not be affected within any MYLF HUC7 watershed.

Table 3.03-144. Mountain Yellow-legged Frog 7th Field Watersheds - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions and Cross Country Prohibitions

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions to NFTS* (negative impact)	101	3	0	1	5	5	1
Closed by previous NEPA decisions, pending implementation	2	2	2	2	2	2	2
Motorized Stream Crossings that would be unauthorized to motorized use with the prohibition of cross country travel (positive impact	0	98	101	100	96	96	100

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing unauthorized routes, while all the action alternatives include motorized crossing additions.

RCA Miles of Proposed Additions to the NFTS within MYLF 7th Field Watersheds. The miles of proposed motorized route additions to the NFTS within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into MYLF habitats at the HUC7 level. Alternative 1 poses the greatest risk to increased sedimentation potential from 51.8 RCA miles of unauthorized motorized routes that would remain due to not prohibiting cross country travel. Similar to stream crossing numbers, Alternatives 2, 4, 5, 6, and 7 propose to add between 0.6 and 2.5

RCA miles (Alternatives 4 and 7add the least, Alternative 5 adds the most) of motorized routes to the NFTS. Alternative 3 does not add motorized routes to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any MYLF HUC7 watershed.

Table 3.03-145. RCA Miles of Proposed Route Additions and Cross Country Prohibitions within MYLF HUC7 Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized route additions within RCAs* (negative impact)	51.8	1.2	0	0.6	1.8	2.5	0.5
Routes closed by previous NEPA decisions, pending implementation (positive impact)	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Motorized routes within RCAs that would be prohibited to cross country travel (positive impact)	0	50.5	51.8	51.2	49.9	49.3	51.3

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing unauthorized routes, while all the action alternatives include motorized crossing additions.

Changes to the NFTS

Change in Class of Vehicles. For each of the alternatives, Table 3.03-146 displays the effects of proposed changes in class of vehicles and the associated changes in maintenance standards that have to potential to increase the risk of delivering sedimentation and erosion to MYLF HUC7 watersheds. Alternatives 2, 4, 5, 6, and 7 would result in changes to road maintenance levels potentially resulting in changes from smooth surfaced roads to rough surfaced roads. This change in road surface type has a higher potential to result in increased sedimentation to MYLF habitat affected by between 2 to 17 native surfaced, crossings and from approximately 1 to 5 miles of motorized routes.

Reopened ML 1 Roads. Under Alternatives 5 and 6, ML 1 Road SV-005 would be reopened within the Perazzo Canyon HUC7 watershed (Table 3.03-147). A MYLF site occurs within Perazzo Creek near the confluence to the Little Truckee River. Road SV-005 is located upstream of the known MYLF site and connects to two NFTS roads. SV-005 is nearest to Perazzo Creek about 1 mile south of the known MYLF site and is connected to an existing system road on the side opposite to the creek. The route is located on less than 5% slope and surveys indicate that some sediment has come off of the route, however, maintenance of existing waterbars would mitigate these effects. Therefore, there is a low likelihood that that reopening Road SV-005 would capture and deliver sediment to MYLF habitat in Perazzo Creek, and therefore effects to MYLF would likely be low to nonexistent.

The remaining alternatives would not affect MYLF habitat, since reopening ML 1 roads are not proposed within the RCAs of MYLF HUC7 watersheds.

Table 3.03-146. Mountain Yellow-Legged Frog – as a Result of the Change in Class of Vehicles as Measured by Native Surfaced, Motorized Crossings and Motorized Route Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced Crossings where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	15	0	2	15	13	2
RCA Motorized Route Miles where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	5.1	0	1.1	5.1	5.0	1.1

Site-specific Physical Impacts and Disturbance to Known Mountain Yellow-legged Frog Locations: On the Tahoe NF, MYLF has been documented from 25 7th field watersheds. Table 3.03-147 displays the MYLF 7th field watersheds (HUC7) where proposed motorized route additions are located and shows the relationship of proposed unauthorized routes with known MYLF locations. Potential site-specific adverse and beneficial impacts at the HUC7 scale are described.

Table 3.03-147. Direct and indirect impacts of proposed motorized route additions in relation to known mountain yellow-legged frog locations by 7th field watersheds

7th Field Watershed Name	Route ID/ Description for Action Alternatives	Reopened ML1 Road ID	Direct and Indirect Impacts	Beneficial Impacts
Alder Creek	No proposals.	No proposals.	No effect to one MYFL site.	All action alternatives prohibit cross country travel on 4 of 9 existing intermittent/perennial NFS crossings
Boca Reservoir	D_N72-1_a (Alt 6), N894-2-11 (Alt 5), TKN-M1,TKN-J2 (Alt 2,4,5,6,7); TKN-Q1 (Alt 2,5,6).	No proposals.	MYLF sighting east of Boca Res: TKN-M1 & TKN-Q1, and TKN-J2 not connected to MYLF location. Alt 5 proposal N894-2-11 comes off of system road not likely to affect MYLF habitat. D_N72-1_a, Alt 6 proposal is not connected to MYLF site over 1 mile to the south.	Proposed action alternatives prohibit cross country travel on up to 15 of 36 existing intermittent/perennial NFS crossings.
Canyon Creek-Sawmill Lake	YRS-003b (Alt 2,5,6).	No proposals.	No impact to MYLF site at south edge of HUC7, YRS-003b at top end of watershed > 3 miles from frog site and not connected.	Proposed action alternatives prohibit cross country travel on up to 3 of 4 existing intermittent/perennial NFS crossings.
Fordyce Lake	SV-004 (Alt 2,5,6) YRS-AF (Alt 2,4,5,6,7).	No proposals.	Multiple MYLF sites. SV-004 is 1 mile east of MYLF site not connected to sites and will not impact MYFL. YRS-AF is adjacent to MYFL site and has low potential to impact MYLF.	Proposed action alternatives prohibit cross country travel on up to 3 of 25 existing intermittent/perennial NFS crossings
Headwaters North Fork American River	No proposals.	No proposals.	No effects to one MYFL site at southernmost edge of watershed.	Proposed action alternatives prohibit cross country travel on 0 of 13 existing intermittent/perennial NFS crossings.
Headwaters North Yuba River	No proposals	No proposals.	No effects to one MYFL site at northern boundary of watershed.	Proposed action alternatives prohibit cross country travel on 6 of 26 existing intermittent/perennial NFS crossings.
Headwaters South Yuba River	TKN-J-4 (Alt 2,5,6,7)TKN-J5 (Alt 2,5,6,7).	No proposals.	TKN-J4 and TKN-J5 in northern part of HUC7 above So. Yuba Rr, MYLF site in southern part of HUC7 on opposite side of So. Yuba Rr. on private land. TKN-J 4 and TKN-J5 not connected.	Proposed action alternatives prohibit cross country travel on 1 of 22 existing intermittent/perennial NFS crossings.
Independence Creek	SV-P11 (Alt 2,5,6), D_350-10 (Alt 6).	No proposals.	Two MYLF sites. SV-P11 in same watershed, 1 ridge over, connection at bottom, route is in good condition, very little erosion and sediment off route, northern section has been ripped and decommissioned, south half very low use, effects to MYLF habitat not expected. Route D_350-10 has a low likelihood of delivering sediment to MYLF sites.	All action alternatives prohibit cross country travel on 4 of 19 existing intermittent/perennial NFS crossings.
Little Truckee River-Saddle Meadow	SV-P8 (Alt 2,5,6,7), D_S260 (Alt 6).	No proposals.	One MYLF site. SV-P8 is not connected to MYLF sites.	Proposed action alternatives prohibit cross country travel on 2 intermittent/perennial NFS crossings.
Lower Fordyce Creek	No proposals	No proposals.	No effect to MYLF site.	Proposed action alternatives prohibit cross country travel on 0 of 25 existing intermittent/perennial NFS crossings.
Lower Sagehen Creek	No proposals	No proposals.	No effect to MYLF site.	Proposed action alternatives prohibit cross country travel 1 of 14 existing intermittent/perennial NFS crossings.

7th Field Watershed Name	Route ID/ Description for Action Alternatives	Reopened ML1 Road ID	Direct and Indirect Impacts	Beneficial Impacts
Lower Salmon Creek	YRN-004 (Alt 2,5).	No proposals.	MYLF site near lakes, YRN-004, not connected to MYLF site and therefore no impacts to MYLF	All action alternatives prohibit cross country travel on 1 of 3 existing intermittent/perennial NFS crossings.
Middle Martis Creek	No proposals	No proposals.	No effect	Proposed action alternatives prohibit cross country travel on 0 of 35 existing intermittent/perennial NFS crossings.
Middle Truckee River-Lower Prosser Creek	TKN-M1 (Alt 2,4,5,6,7), TKN-PP (Alt 6).	No proposals.	TKN-M1 and TKN-PP not connected to MYLF site, not likely to affect MYLF.	All action alternatives prohibit cross country travel on 3 of 9 existing intermittent/perennial NFS crossings.
North Creek	No proposals.	No proposals.	2 MYLF sites not affected.	All action alternatives prohibit cross country travel on 3 of 9 existing intermittent/perennial NFS crossings.
North Yuba River-Haskell Creek	No proposals.	No proposals.	Two MYLF sites not affected.	Proposed action alternatives prohibit cross country travel on up to 6 of 17 existing intermittent/perennial NFS crossings.
North Yuba River-Howard Creek	No proposals.	No proposals.	No effects to two MYLF sites in upper watershed.	Proposed action alternatives prohibit cross country travel on up to 10 of 17 existing intermittent/perennial NFS crossings.
Perazzo Canyon	No proposals.	SV-005 (Alt 5, 6)	MYLF site in Perazzo Ck (near confluence to Little Truckee Rv) is downstream of SV-005,. MYLF not likely affected by SV-005 which connects to 2 NFTS roads.	All action alternatives prohibit cross country travel on 4 of 14 existing intermittent/perennial NFS crossings.
Prosser Creek	No proposals.	No proposals.	One MYLF site on Prosser Creek not affected.	Proposed action alternatives prohibit cross country travel on up to 4 of 16 existing intermittent/perennial NFS crossings.
Rattlesnake Creek	No proposals.	No proposals.	Multiple MYLF sites not affected.	Proposed action alternatives prohibit cross country travel on 5 of 9 existing intermittent/perennial NFS crossings.
South Yuba River-Lower Castle Creek	TKNJ-4	No proposals.	TKN-J4 on watershed boundary south of MYLF site with no connection and no impacts. Route is ~1 mile from MYLF site.	All action alternatives prohibit cross country travel on 5 of 8 existing intermittent/perennial NFS crossings.
Squaw Creek	No proposals.	No proposals.	No effects	Proposed action alternatives prohibit cross country travel on 0 of 20 existing intermittent/perennial NFS crossings.
Upper Cold Stream	D_5_b, D_89-55_a, D_89-55_c (Alt 6).	No proposals.	SVP-7e in headwaters no connection with MYLF along main channel and highway, no impacts expected.	Proposed action alternatives prohibit cross country travel on 10 of 10 existing intermittent/perennial NFS crossings.
Upper Five Lakes	No proposals.	No proposals.	No effects	Proposed action alternatives prohibit cross country travel on 1 of 10 existing intermittent/perennial NFS crossings.
Upper Sagehen Creek	No proposals.	No proposals.	No impacts to multiple MYLF sites.	All action alternatives prohibit cross country travel on 5 of 8 existing intermittent/perennial NFS crossings.

Route Density within Riparian Conservation Areas (RCAs): Route density within Riparian Conservation Areas (RCAs) for all native surfaced motorized routes within 7th field watersheds with known observations of mountain yellow-legged frogs was determined for the proposed alternatives. Alternative 1 poses the greatest risk of high route densities within Riparian Conservation Areas (RCAs) (Table 3.03-148, Figure 3.03-15). Under Alternative 1, 64% of the HUC7 watersheds with MYLF detections fall under the highest (32%) and moderately high (32%) categories for motorized route density (native surfaced routes). The action alternatives have decreasing RCA route densities compared to Alternative 1, ranging between 48% (Alternatives 2 and 5) and 36% (Alternatives 3, 4, and 7) of MYLF HUC7 watersheds that fall within the highest route densities category to moderately high route density category.

Table 3.03-148. Number 7th Field Watersheds (HUC7s) with Mountain Yellow-legged Frog Sites by RCA Route Density Category or Number (Percent) of HUC7s by Route Density Category (n=25)

Alternatives	**Highest** (%)	**Moderately High** (%)	**Moderately Low** (%)	**Lowest** (%)
Alt 1	8 (32%)	8 (32%)	6 (24%)	3 (12%)
Alt 2	8 (32%)	4 (16%)	7 (28%)	6 (24%)
Alt 3	6 (24%)	4 (16%)	7 (28%)	8 (32%)
Alt 4	6 (24%)	4 (16%)	7 (28%)	8 (32%)
Alt 5	8 (32%)	4 (16%)	7 (28%)	6 (24%)
Alt 6	6 (24%)	5 (20%)	7 (28%)	7 (28%)
Alt 7	6 (24%)	4 (16%)	7 (28%)	8 (32%)

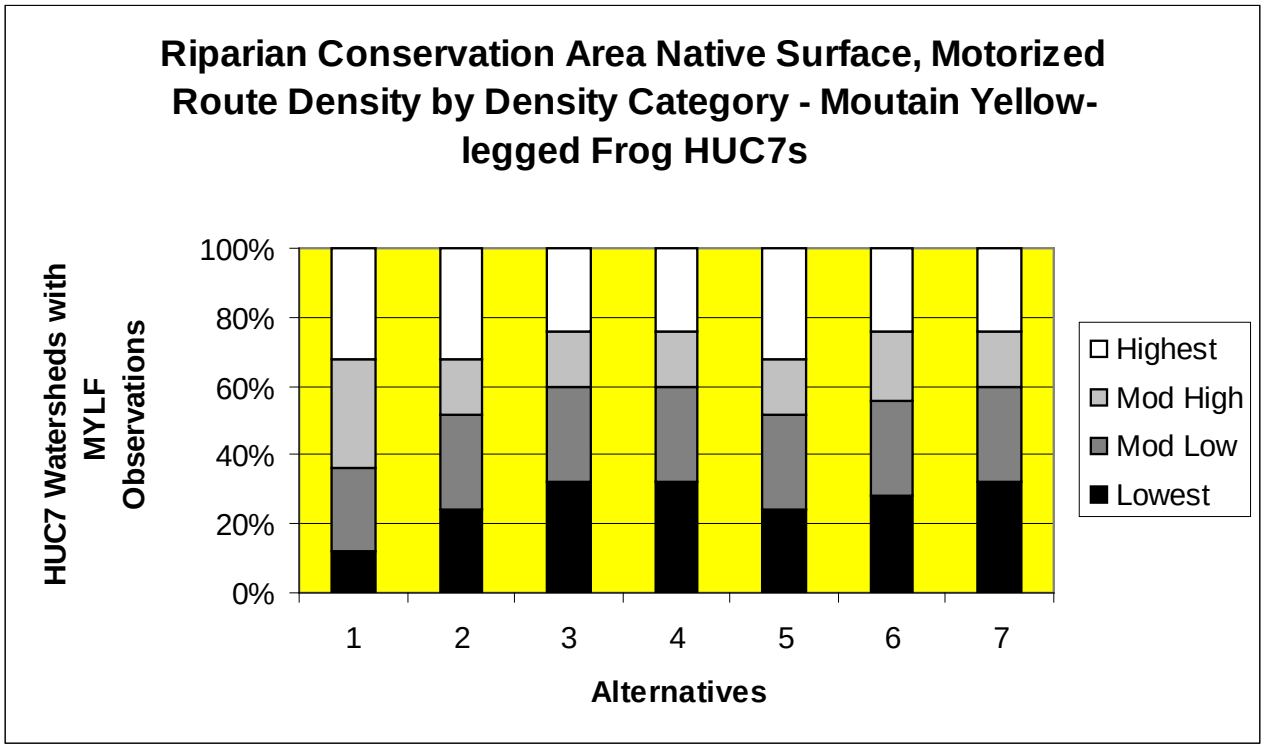

Figure 3.03-15. Number of 7th Field Watersheds within RCA Route Density Categories with Known Mountain Yellow-legged Frogs Locations

Stream Crossing Density within Riparian Conservation Areas (RCAs): RCA stream crossing density was assessed by route density categories of highest (10.4–20.4 crossings/sq. mile), moderately high (7.3-10.3 crossings/sq. mile), moderately low (4.2-7.6 crossings/sq. mi.), and lowest (0-4.1 crossing/sq. mi.) within 7th field watersheds (HUC7s) with known mountain yellow-legged frog observations (Table 3.03-149 and Figure 3.03-16). Alternative 1 poses the greatest direct impacts to mountain yellow-legged frogs (MYLF) from stream crossing densities where frogs may be disturbed and/or killed; and MYLF aquatic habitat conditions can be impacted from bank alteration and sediment input associated with motorized route crossings. Under Alternative 1, 40% of HUC7 watersheds with known MYLF detections are within the highest (24%) and moderately high (16%) route crossing density, and alternatively Alternative 1 has the least proportion of MYLF HUC7 watersheds with low crossing densities (20%). Alternatives 2 and 5 pose the next greatest risk to MYLF from stream crossings where 40% of MYLF HUC7 watersheds are within the highest (20%) and moderately high (20%) motorized crossing density categories. Alternative 6 has slightly lower route densities within both the highest and the moderately high crossing density categories compared to Alternatives 1, 2, and 5.

Alternatives 3, 4, and 7 have the lowest route densities of all the alternatives, and similarly reduces the potential direct and indirect effects of unauthorized motorized routes where only 8 % of HUC7 watersheds with route crossing densities within the highest category and the most HUC7 watersheds (44%) in the lowest crossing density category. Within all the action alternatives, unmanaged cross country

motorized travel would be prohibited, and over time as unauthorized routes are physically rehabilitated, MYLF and their habitat would benefit in the long term.

Table 3.03-149. Number (Percent) 7th Field Watersheds (HUC7s) with Mountain Yellow-legged Frog Sites by Native Surfaced, Motorized Crossing Density Category

Alternatives	Highest (%)	Moderately High (%)	Moderately Low (%)	Lowest (%)
Alt 1	6 (24%)	4 (16%)	10 (40%)	5 (20%)
Alt 2	5 (20%)	5 (20%)	7 (28%)	8 (32%)
Alt 3	2 (8%)	6 (24%)	6 (24%)	11 (44%)
Alt 4	2 (8%)	6 (24%)	6 (24%)	11 (44%)
Alt 5	5 (20%)	5 (20%)	7 (28%)	8 (32%)
Alt 6	4 (8%)	4 (8%)	9 (28%)	8 (32%)
Alt 7	2 (8%)	6 (24%)	6 (24%)	11 (44%)

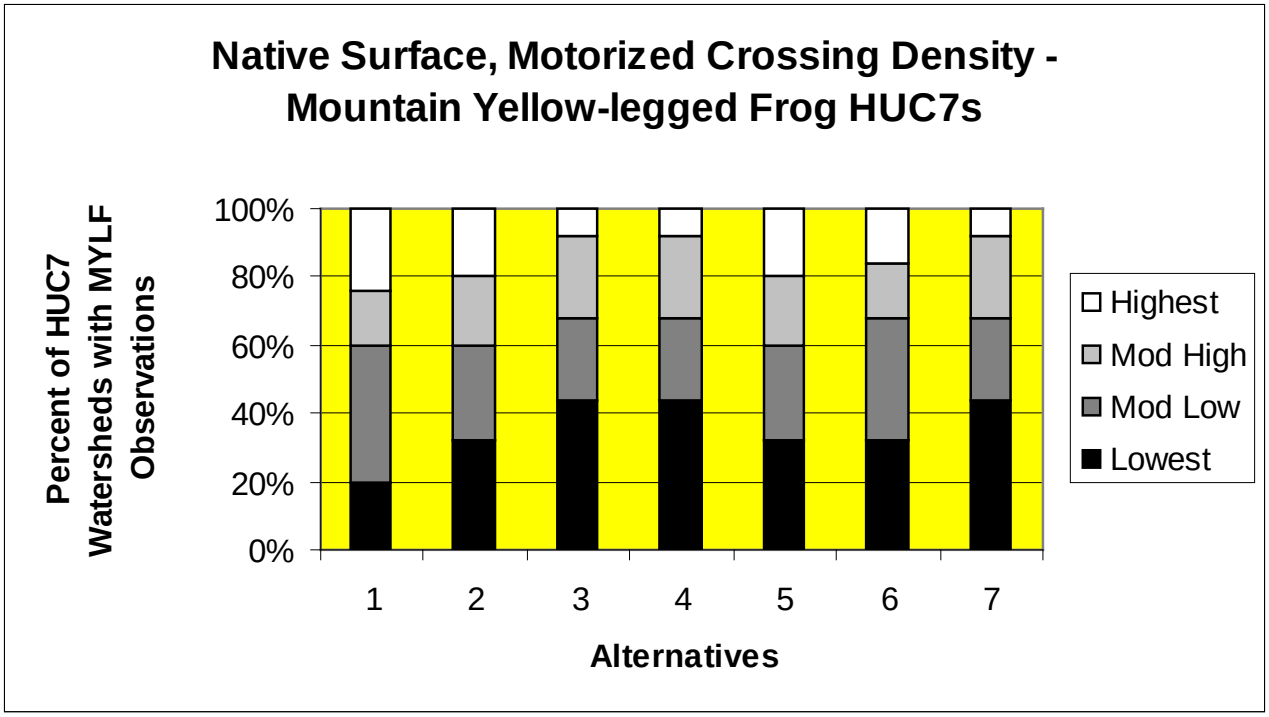

Figure 3.03-16. Number of 7th Field Watersheds by Native Surfaced, Motorized Crossing Density Category for Known Mountain Yellow-legged Frog Locations

Cumulative Effects

Cumulative Effects Boundary in Space and Time

The geographic boundary for assessing cumulative effects to the MYLF is suitable habitat on the Tahoe NF above 6,000 feet within high elevation ponds and slow moving portions of perennial and intermittent streams. This geographic boundary is sufficiently large to encompass historic and potential MYLF habitat on the Tahoe NF. Any larger boundary could dilute the effects of past, present, and future cumulative

impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred within the last 50 to 100 years. Reasonably foreseeable future impacts expand out to approximately 25 years into the future.

Cumulative Effects of Past, Present, and Reasonably Foreseeable Actions

Historically the mountain yellow-legged frog was extremely abundant within high elevation aquatic ecosystems of the Sierra Nevada Mountains (Grinnell and Storer 1924, Zweifel 1955, In Lannoo 2005). Beginning around the 1970s, the mountain-yellow frog has undergone dramatic population declines throughout the Sierra Nevada (Knapp and Matthews 2000, ranging between 50-90% declines of their historic localities (USFWS 2004).

Many past and current cumulative impacts have contributed to the decline in mountain yellow-legged frog numbers and distribution. The decline of the MYLF has largely been attributed to the introduction of salmonid fishes during the last century (Bradford et al. 1993, Knapp 1996).

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 (including motorized); and drought have all been identified as potential factors affecting the species and its habitat (USDA 2001).

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 MYLF habitat sites currently overlap with 5 active livestock grazing allotments (Canyon Creek, Devils Peak, Euer Valley, Independence, and Perazzo Meadows). Potential mountain yellow-legged frog habitat overlaps with an additional 29 allotments. Management direct including standards and guidelines for grazing should reduce potential grazing impacts from livestock grazing.

Introduced trout species within high mountain lakes has severely affected mountain yellow-legged frog population trends in the Sierra Nevada including the Tahoe NF. 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 MYLF will recover once introduced trout have been removed.

Historic vegetation management and fuels reduction projects have likely contributed to past and present cumulative effects, 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 Tahoe NF. 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, 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 Tahoe NF 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.

Under Alternative 1, cumulative effects from unauthorized routes would be greatest within HUC7 watersheds occupied by MYLF would have the highest RCA route densities and the highest route crossing densities. In addition, 24 of 25 (96%) of MYLF HUC7 watersheds would have cross country travel and continued route proliferation. Direct and indirect impacts of unauthorized motorized routes in Alternative 1 would result in considerable cumulative impacts to known MYLF sites where approximately 64% of HUC7 watersheds with MYLF observations have high to moderately high RCA route densities that may contribute to habitat degradation from off-site sedimentation. In addition, under Alternative 1, 64% of HUC7 watersheds with known MYLF detections are within the highest or moderately high route crossing density categories which have the potential to degrade stream condition by altering streambank vegetation and stream hydrology. Under Alternative 1, unauthorized route proliferation would likely continue and increase at an accelerated rate in the future, potentially increasing sediment delivery and alteration of streambank vegetation and hydrologic condition which may affect the abundance and distribution on the Tahoe NF. Already declining population trends of this species could be significantly affected by Alternative 1 in the long term.

Alternatives 2 and 5 also add to existing cumulative impacts to the MYLF, though impacts are considerably less than Alternative 1 as a result of the closure of a significant number of miles of motorized routes within RCAs and reduction in the number of route crossings. Proposed routes site-specifically has the potential to directly and indirectly degrade habitat condition within known mountain yellow-legged frog sites within 28% of all MYLF HUC7s (n=25). At the 7th field watershed scale, under Alternatives 2 and 5, 40% of MYLF HUC7 watersheds have route crossing densities within the highest (20%) and moderately high (20%) motorized crossing density categories.

Alternative 2 cumulatively affects 3 of 25 (12%) MYLF HUC7 sites. Alternatives 4, 6, and 7 affect MYLF habitat within 2 of 25 (8%) HUC7 watersheds from short routes accessing dispersed recreation sites. The potential for off-site sedimentation from these short route segments is expected to be relatively low. All action alternatives have decreasing RCA route densities compared to Alternative 1, ranging between 48% (Alternatives 2 and 5– most) and 36% (Alternative 3, 4, and 7– least) of MYLF HUC7 watersheds that fall within the highest route densities category to moderately high route density category.

For all the action alternatives, cross country motorized travel, including on routes unauthorized to motorized travel, would be prohibited. In addition, the majority these routes would benefit MYLF in the long-term once they are rehabilitated through obliteration or other means. Non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on routes that would be prohibited to cross country travel. In general, it is expected that impacts from non-motorized use would be less than motorized use. Over

time, it is expected that these unauthorized motorized routes would become revegetated and recover through active or passive means, and ultimately benefit MYLF in the future.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-150 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized route crossings within MYLF HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02, Watershed Resources: Geology, Soil, Hydrology, for more detailed information and assumptions.

Table 3.03-150. Mountain Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
RCA Acres Prohibited to Cross Country Travel	0	22,717	22,717	22,717	22,717	22,717	22,717
Stream Crossings Prohibited to Cross Country Travel	0	98	101	100	96	96	100
Native Surfaced, Motorized Stream Crossings							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Existing NFTS Crossings	93	93	93	93	93	93	93
Crossing Additions*	101	3	0	1	5	5	1
Change in Class of Vehicles from Smooth Surfaced to Native Surfaced Crossings	0	15	0	2	15	13	2
Closed crossings from previous NEPA decisions, pending implementation	2	2	2	2	2	2	2
Total Motorized Stream Crossings Prohibited to Motorized Use	2	85	103	100	83	85	100
Net Native Surfaced, Motorized Crossings	194	111	93	96	113	111	96
Wet Weather Seasonal Restrictions on all Native Surfaced Routes	None	None	None	Beneficial - Wet Weather Restrictions would be implemented	Beneficial - Wet Weather Restrictions would be implemented	Beneficial - Wet Weather Restrictions would be implemented	None
Establishment of Open Areas	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Amendments to Forest Plan	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Negative adverse cumulative effects from continued cross country travel. Motorized cross country travel prohibited 0 acres. Motorized use prohibited on 2 crossings from previous NEPA decisions. No additional protection to MYLF habitats from wet weather seasonal restrictions.	6th most beneficial alternative. Motorized cross country travel prohibited on 22,717 RCA acres, including on 85 native surfaced, stream crossings. No additional protection to MYLF habitats from wet weather seasonal restrictions.	4th most beneficial alternative. Motorized cross country travel prohibited on 22,717 RCA acres, including on 103 native surfaced, stream crossings. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Most beneficial alternative. Motorized cross country travel prohibited on 22,717 RCA acres, including on 100 native surfaced, stream crossings. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	3rd most beneficial alternative. Motorized cross country travel prohibited on 22,717 RCA acres, including on 83 native surfaced, stream crossings. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	2nd most beneficial alternative. Motorized country travel prohibited on 22,717 RCA acres, including on 85 native surfaced, stream crossings. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	5th most beneficial alternative. Motorized cross country travel prohibited on 22,717 RCA acres, including on 100 native surfaced, stream crossings. No additional protection to MYLF habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, crossings unauthorized to motorized use, while all the action alternatives include motorized route additions.

Table 3.03-151 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA route miles within MYLF HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02, Watershed Resources: Geology, Soil, Hydrology, for more detailed information and assumptions.

Table 3.03-151. Mountain Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Route Miles

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Cross Country Travel Prohibited	0	22,717	22,717	22,717	22,717	22,717	22,717
Native Surfaced, Motorized Routes							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Existing RCA Miles	45.9	45.9	45.9	45.9	45.9	45.9	45.9
RCA Miles of Native Surfaced, Motorized Route Additions*	51.8	1.2	0	0.6	1.8	2.5	0.5
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized route miles	0	5.1	0	1.1	5.1	5.0	1.1
Reopened ML 1 Roads	0	0	0	0	0	0	
Closed roads by previous NEPA, pending implementation (positive)	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Total RCA Route Miles Prohibited to Motorized Use (positive)	2.4	49.1	54.2	52.5	47.3	46.7	52.6
Net NFTS Native Surfaced, Motorized RCA Miles	97.9	52.2	47.1	47.6	52.8	53.4	47.5
Establishment of Open Areas	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Routes	None	None	None	Beneficial - Wet Weather Restrictions would be implemented	Beneficial - Wet Weather Restrictions would be implemented	Beneficial - Wet Weather Restrictions would be implemented	None
Amendments to Forest Plan	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect	No Effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Adverse cumulative impacts from cross country cross travel prohibition on 0 acres and on 2.4 miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.	6th most beneficial alternative. Motorized cross country travel prohibited on 22,717 RCA acres, including on 49.1 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.	4th most beneficial alternative. Motorized cross country travel prohibited on 22,717 RCA acres, including on 54.2 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Most beneficial alternative. Motorized cross country travel prohibited on 22,717 RCA acres, including on 52.5 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	2nd most beneficial alternative. Motorized cross country travel prohibited on 22,717 RCA acres, including on 47.3 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	3rd most beneficial alternative. Motorized cross country travel prohibited on 22,717 RCA acres, including on 46.7 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	5th most beneficial alternative. Motorized cross country travel prohibited on 22,717 RCA acres, including on 52.6 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing unauthorized routes, while all the action alternatives include motorized route additions.

Northwestern Pond Turtle: Affected Environment

The northwestern pond turtle (*Clemmys marmorata marmorata*) (NWPT) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). The northwestern pond turtle ranges approximately from the American River northward to the vicinity of Puget Sound with an elevational distribution from sea level to 6,000 feet (Stebbins 1972, In Lannoo 2005). Recent genetic studies support the traditional morphological subdivision of the western pond turtle into the northern subspecies, *Clemmys marmorata marmorata* (northwestern pond turtle), and the southern subspecies, *Clemmys marmorata pallida* (Gray 1995).

Habitat for the NWPT, historically, occurs in a variety of both permanent and intermittent aquatic habitats west of the Sierra-Cascade crest. This turtle is often restricted to areas near the banks or in quiet backwaters where the current is relatively slow and basking sites and refugia are available. Currently most populations exist in smaller streams, usually in montane areas. These streams may be either permanent or intermittent, but permanent streams support larger populations. Western pond turtles occur in a variety of water courses directly or indirectly modified by man, such as reservoirs, canals, excavated farm ponds, and mill ponds. This species is considered omnivorous. Aquatic plant material, beetles and aquatic invertebrates have been reported among their food (Stebbins 1972 and Nussbaum et al. 1983, In Lannoo 2005). Northwestern pond turtles have been observed at less than 20 locations within the Tahoe NF. Five of these locations are on NFS land and the remaining are on private land or on Bureau of Land Management administered lands. Tahoe NF reported sightings are from the Yuba River and American River drainages associated with pond habitat.

Risk factors to northwestern pond turtle from roads and trails are similar to frog species described above.

Northwestern Pond Turtle: Environmental Consequences

Indicators used to Measure Effects

Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to NWPT 7th field watersheds from motorized cross country travel.

NFTS Additions (NWPT 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized route additions to the NFTS, and the miles of motorized route additions within Riparian Conservation Areas (RCAs) for NWPT 7th field watersheds

Site-specific Physical Impacts and Disturbance to known northwestern pond turtle locations: Unauthorized motorized routes were evaluated to determine site-specific impacts to known northwestern pond turtle locations for each of the alternatives. Native surfaced routes that cross or intersect ponds occupied by NWPT have the greatest potential to disturb, crush and kill the pond turtle, and to alter stream banks and deliver sediment which can degrade pond turtle habitat condition. In addition, any

unauthorized motorized routes that are within RCAs or has the potential to delivery sediment to known NWPT locations were also evaluated for their potential to contribute to indirect effects by the alternatives.

Establishment of "Open Areas": Establishment of "Open Areas" would not affect the northwestern pond turtle, since none of the "Open Areas" would affect suitable pond turtle habitats. Therefore, no further analysis is warranted.

Change in Class of Vehicles: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02, Watershed Resources: Geology, Soil, and Hydrology). If the route changes from smoothed surfaced to native surfaced (rough surfaced), the change in class of vehicle may result in increased sediment and erosion risk to NWPT habitat. The change in class of vehicle and associated maintenance downgrades is evaluated for their potential to affect selected 7th field watersheds that may have suitable habitat for the NWPT.

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed under "Effects Common to All Aquatic Species.

Reopened ML 1 Roads: Reopened ML 1 roads within pond turtle habitats are analyzed for the alternatives.

RCA Motorized Route Density within Northwestern Pond Turtle 7th Field Watersheds: Route densities of native surfaced routes within RCAs were evaluated to compare the overall effects of all motorized routes (including existing and unauthorized) for the alternatives within each 7th field watershed occupied by the northwestern pond turtle. According to Chapter 3.02 (Watershed Resources: Geology, Soil, Hydrology), native surfaced roads have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes route density of all native surfaced motorized routes. Route density provides a relative index to measure the potential indirect effects to occupied habitat of the NWPT from increased sedimentation from routes. Thresholds for route density have not been established, however, route density provides a relative way to compare the effects of the alternatives.

Stream Crossing Density within RCAs: The 7th field watersheds occupied by northwestern pond turtle were evaluated for the crossing density of native surfaced motorized routes within RCAs to compare direct and indirect effects of motorized routes for the alternatives. Route crossing density provides a way to measure the potential direct and indirect effects to the northwestern pond turtle and habitat. Direct effects include potential pond turtle mortality as a result of use of motorized crossings of occupied pond turtle. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Thresholds for motorized crossing route density have not been established, however, route crossing density provides a relative way to compare the effects of the alternatives.

Direct and Indirect Effects

Cross Country Travel. Under Alternative 1, no action, motorized cross country travel would continue on 7,986 Riparian Conservation Areas (RCAs) acres within NWPT HUC7 watersheds, where the potential for adversely affecting NWPT habitat could occur by increasing sedimentation and altering streamside

vegetation (Table 3.03-152). Under the action alternatives, the prohibition of cross country travel results in prohibiting motorized use on 7,986 RCA acres, including on 10.4 to 16.3 RCA miles and from 31 to 47 native surfaced, motorized crossings (Alternative 5 prohibits the least, Alternative 3 prohibits the most). Cross country travel prohibitions would likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit NWPT habitat.

Table 3.03-152. Cross Country Travel on Native, Surfaced Routes within NWPT 7th Field Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number crossings prohibited to cross country travel	1	44	47	45	31	40	47
RCA miles where cross country travel prohibited	0.5	16.3	17.1	16.7	10.4	13.9	16.8
RCA acres where cross country travel prohibited	0	7,986	7,986	7,986	7,986	7,986	7,986

Change in Class of Vehicles *(Reopening ML 1 Road and Changed Maintenance Levels)*. Several ML 1 roads are proposed for reopening in the Cherokee Creek HUC7 watershed where there are known pond turtle locations. However, none of the ML1 roads proposed for reopening or changes to maintenance levels from smooth surfaced to native surfaced would affect NWPT habitat under any of the action alternatives.

NFTS Additions – Motorized Stream Crossings and RCA Miles

Number of Native Surfaced, Motorized Stream Crossing Additions within NWPT 7th Field Watersheds. The number of native surfaced, motorized stream crossings, proposed for addition to the NFTS, are assessed for the alternatives, and provides a useful way to compare potential changes in sediment delivery within NWPT HUC7 watersheds. Alternative 1 poses the greatest risk of increased sedimentation where 47 native surfaced, stream crossings are associated with the continuance of cross country travel on existing unauthorized routes (Table 3.03-153). This includes 1 crossing that was closed in a previous NEPA decision that is pending implementation.

All the action alternatives would reduce the number of crossings within NWPT HUC7 watersheds. In increasing order, Alternatives 4, 6, 2, and 5 would result in the addition of 2 to 16 native surfaced, motorized crossings. Alternatives 3 and 7 would not result in additional native surfaced, motorized stream crossings within any NWPT HUC7 watersheds, and therefore sedimentation or streamside vegetation would not be affected.

Table 3.03-153. Northwestern Pond Turtle 7th Field Watersheds - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions to NFTS (negative impact)	47	3	0	2	16	7	0

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing unauthorized routes, while all the action alternatives include motorized crossing additions.

RCA Miles of Proposed Motorized Route Additions within NWPT 7th Field Watersheds. The miles of proposed motorized route additions to the National Forest Transportation System (NFTS) within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into NWPT habitats at the HUC7 level. Alternative 1 poses the greatest risk to increased sedimentation potential from approximately 17 RCA miles of motorized unauthorized routes that would remain due to not prohibiting cross country travel (Table 3.03-154). Similar to stream crossing numbers, Alternatives 2, 4, 5, 6, and 7 propose to add between 0.2 and 6.6 RCA miles (Alternatives 4 and 7 add the least, Alternative 5 adds the most) of motorized routes to the NFTS. Alternative 3 does not add motorized routes to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any NWPT HUC7 watershed.

Table 3.03-154. Northwestern Pond Turtle - Miles of Proposed Route Additions within HUC7 Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized route additions within RCAs* (negative impact)	16.5	0.8	0	0.4	6.6	3.1	0.2

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing unauthorized routes, while all the action alternatives include motorized crossing additions.

Site-specific Physical Impacts and Disturbance to known Northwestern Pond Turtle locations: Within the boundaries of the Tahoe NF, the northwestern pond turtle is known from 5 locations on NFS lands and 13 locations on private and BLM administered lands. These pond turtle locations are known from nine 7th field watersheds within the boundary of the Tahoe NF. Proposed motorized route additions and reopening of ML 1 roads within nine 7th field watersheds that have northwestern pond turtle locations are shown in Table 3.03-155. Existing unauthorized routes under Alternative 1 could potentially affect the pond turtles and their habitats within the South Yuba River Pierce Meadow, Headwaters North Fork American River, and North Fork of North Fork American River-Blue Canyon watersheds. The action alternatives either do not propose motorized route additions or reopens any ML 1 roads that would directly or indirectly affect the pond turtle. Numerous private land motorized routes may contribute to direct and indirect impacts to the pond turtle.

Table 3.03-155. Description of motorized route additions for the action alternatives in relation to known northwestern pond turtle locations within 7th field watersheds

Watershed Name	Route ID/Description	Reopened ML1 Road ID	Direct and Indirect Impacts
Bullards Bar Reservoir-Bridger Creek	D_Y-125_a (Alt 2,4,5,6).	None	D_Y-125_a, not connected, no effect to pond turtle sites near Bullards Bar Res.
Cherokee Creek	YRN-008 (Alt 2,4,5,6); 491-3-1_p, 491-3-2_p (Alt 5,6); D_35_a,b, D_491-6_a,b (Alt 2,4,5,6); N39-6 (Alt 5).	0025-009, 0491-003 (Alt 2,4,5,6); 25-9-3_p, 25-9_p, 35-3_p, 35-4_p, 35-4-1_p, 39-9_p, 491-3_p (Alt 5,6) H39-12, N25-1-1, N25-3, N25-5, N25-6-1, N25-7, N25-9-1, N25-9-2, N35-1, N35-2, N35-3-1, N35-3-2, N35-6, N35-7, N39-4, N39-5, N39-5-1, N39-5-2, N39-7, N39-8-1, N491-1, N491-3-1, N55-2 (Alt 5).	YRN-008 and Cal Ida Network (numerous routes) not likely to impact turtle site, not connected D_35_a,b, D_491-6_a,b – would not affect pond turtle site.
Lower Oregon Creek	None	None	None
Lower Middle Yuba River	H18N49Y (Alt 5).	None	H18N49Y does not affect turtle sites
Middle Yuba River-Indian Creek	None	None	None
South Yuba River-Pierce Meadow	YRS-F1 short segments (Alt 2,4,5, 6,7); D_654-4-2_a, D_654-4_a, D_85-2-1-1_a (Alt 2,4,5,6); D_654-5 (Alt 5,6)	None	YRS-F1 – short route segments would not affect turtle habitat, not connected. D_654-4-2_a, D_654-4_a, D_85-2-1-1_a (Alt 2,4,5,6); D_654-5 (Alt 5,6) – short spurs t access dispersed recreation not connected to pond turtle site, no impacts. Alt 1 short segments not connected to turtle site.
Headwaters North Fork American River	Alt 1 existing unauthorized routes	None	Alt 1 unauthorized routes may impact turtles at one part of watershed,
North Fork of North Fork American River-Blue Canyon	Alt 1 existing unauthorized routes	None	Existing unauthorized routes may impact pond turtle site
Willow Creek	H293 (Alt 5), D_Y-122_a,b,c (Alt 2,4,5,6).	None	H293 located below pond turtle site, would not be impacted. D_Y-122_a,b,c – not connected would not affect pond turtle site.

RCA Motorized Route Density within Northwestern Pond Turtle 7th Field Watersheds: The northwestern pond turtle was identified to occur within nine 7th field watersheds on the Tahoe National Forest (Cherokee Creek, Willow Creek, Bullards Bar Reservoir-Bridger Creek, Lower Oregon Creek, Middle Yuba River-Indian Creek, Lower Middle Yuba River, Headwaters North Fork American River and North Fork of North Fork American River-Blue Canyon). For each of the alternatives, Table 3.03-156 and Figure 3.03-17 displays the number and percent of 7th field watersheds (HUC7s) with known locations of NWPT locations by RCA route density category of highest (8.9-27.3.mi/mi^2), moderately high (6.3-8.8 mi/mi^2), moderately low (14.3-6.2 mi/mi^2), and lowest (0.2-4.2 mi/mi^2). Alternative 1 poses the greatest direct and indirect effects to the NWPT where 2 of 9 (22%) pond turtle HUC7 watersheds are within the highest route density category, 3 of 9 (33%) are in moderately high; and 1 of 9 (11%) is in moderately low, and 3 of ((33%) are in lowest.

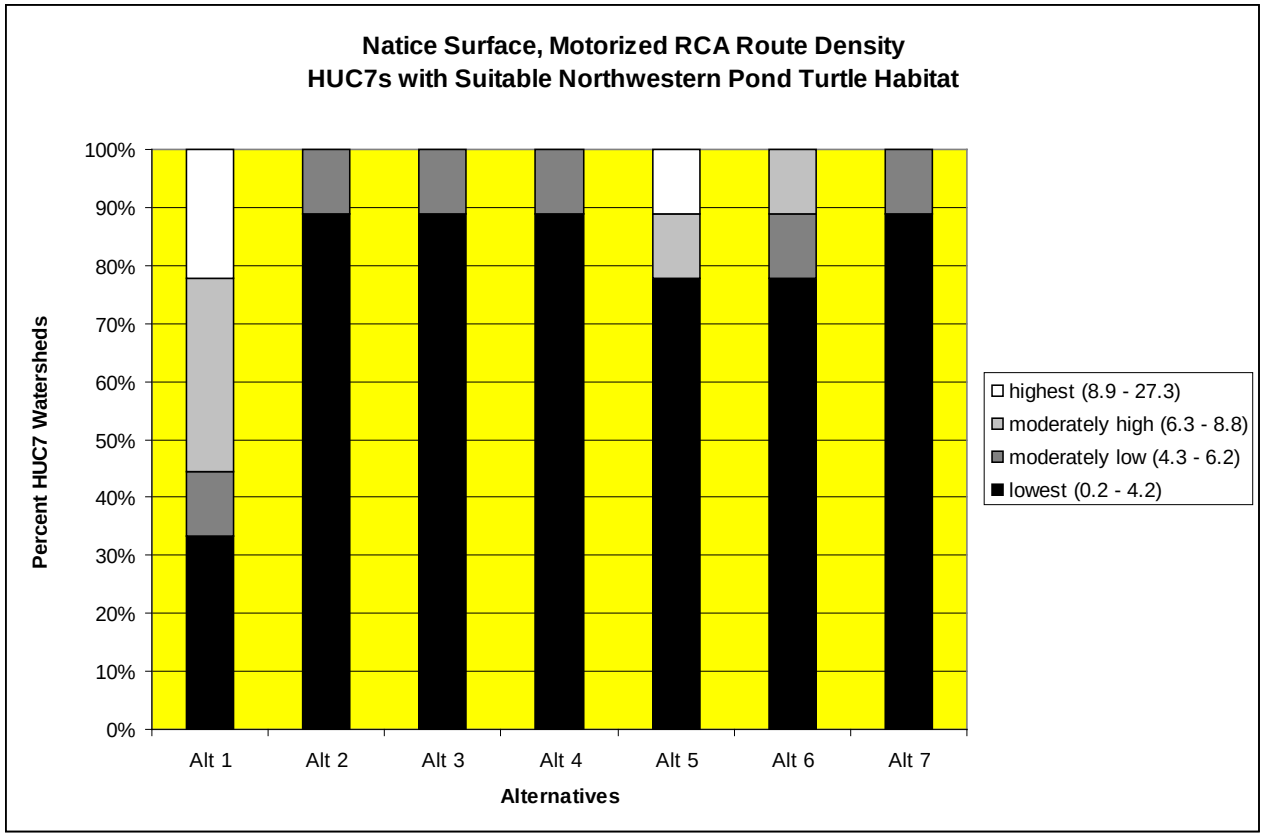

Figure 3.03-17. Number of Northwestern Pond Turtle 7th Field Watersheds by Motorized Native Surface RCA Route Density Category

All the action alternatives would reduce RCA route densities compared to Alternative 1. Under Alternative 5, 1 pond turtle HUC7 watersheds remains in the highest and moderately high route density categories, none are in moderately low, and 78% (7 of 9) HUC7s within the lowest RCA route density category. Alternative 6 would reduce route densities where 1 watershed would be in the moderately high

and moderately low route density categories, and the remaining 7 watersheds would be within the lowest category.

The remaining alternatives (Alternatives 2, 3, 4, and 7) improves RCA route densities similarly where between 1 (11%) watershed falls in the moderately low route density category and 8 pond turtle HUC7s (89%) fall within the lowest route density category.

Table 3.03-156. Number and Percent of 7th Field Watersheds (HUC7s) with Occupied Northwestern Pond Turtle Locations by Route Density Category

Alternatives	Highest (8.9 - 27.3 mi/mi^2)	Moderately High (6.3 - 8.8)mi/mi^2)	Moderately Low (4.3 - 6.2)mi/mi^2)	Lowest (0.2 - 4.2 mi/mi^2)
Alt 1	2	3	1	3
Alt 2	0	0	1	8
Alt 3	0	0	1	8
Alt 4	0	0	1	8
Alt 5	1	1	0	7
Alt 6	0	1	1	7
Alt 7	0	0	1	8

Motorized Route (native surface) Crossing Density within Northwestern Pond Turtle 7th Field Watersheds: For each of the alternatives, RCA stream crossing density was assessed by crossing density categories of highest (5.1-19.7 crossings/sq. mile), moderately high (3.1-5.0 crossings/sq. mile), moderately low (1.8-3.0 crossings/sq. mi.), and lowest (0-1.7 crossing/sq. mi.) within 7th field watersheds (HUC7s) with known northwestern pond turtles occurrences. Table 3.03-157 and Figure 3.03-18 displays the number of HUC7 watersheds with known northwestern pond turtle observations by crossing density categories listed above. Alternative 1 poses the greatest direct impacts to northwestern pond turtle from stream crossing densities (crossings/square mile) where pond turtles may be disturbed and/or killed; and pond turtle aquatic habitat conditions can be impacted from bank alteration and sediment input associated with motorized route crossings. Under Alternative 1, 22% (2 of 9) HUC7 watersheds with known pond turtle occurrences are within the highest crossing density category, 45% (4 of 9) in moderately high route crossing densities, and 11% (1 of 9) within moderately low, and 22% (2 of 9) within lowest categories. The remaining action alternatives reduce the number of stream crossings within Riparian Conservation Areas, and thus reduce the potential for direct and indirect impacts to the northwestern pond turtle. Alternative 5 would reduce crossing densities the least where 1 of 9 (11%) HUC7 remains in the highest stream crossing density category, 3 of 9 (33%) is within the moderately high category, 3 of 9 (33%) is within moderately low, and 2 of 9 (22%) HUC7s are within the lowest category. Compared to Alternative 5, Alternative 6 moves 1 HUC7 from the highest stream crossing density category to the moderately high category.

Alternatives 2 and 4 would further reduce stream crossing density where, none of the pond turtle HUC7 watersheds are in the highest category (5.1-19.7 crossings/mi^2), 3 are in the moderately high

category (3.1-5.0 crossings/mi^2), 4 are in the moderately low category (1.8-3.0 crossings/mi^2), and 2 are in the lowest category (0-1.7 crossings/mi^2).

Alternatives 3 and 7 would similarly reduce the most potential direct and indirect effects where HUC7 crossing density categories would be as follows: 0 of 9 HUC7s in the highest, 2 of 9 HUC7s (22%) in moderately high, 5 of 9 HUC7s (56%) in moderately low, and 2 of 9 HUC7s (22%) in lowest. Within all the action alternatives, unmanaged cross country motorized travel would be prohibited, and over time as routes unauthorized to motorized public use are physically revegetated and rehabilitated, the northwestern pond turtle and their habitat would benefit in the long term.

Table 3.03-157. Number of 7th Field Watersheds (HUC7s) with Occupied Northwestern Pond Turtle Locations by Stream Crossing Density Category of Native Surfaced Routes

Alternatives	Highest (5.1-19.7 crossings/mi^2)	Moderately High (3.1-5.0 crossings/mi^2)	Moderately Low (1.8-3.0 crossings/mi^2)	Lowest (0-1.7 crossings/mi^2)
Alt 1	2	4	1	2
Alt 2	0	3	4	2
Alt 3	0	2	5	2
Alt 4	0	3	4	2
Alt 5	1	3	3	2
Alt 6	0	4	3	2
Alt 7	0	2	5	2

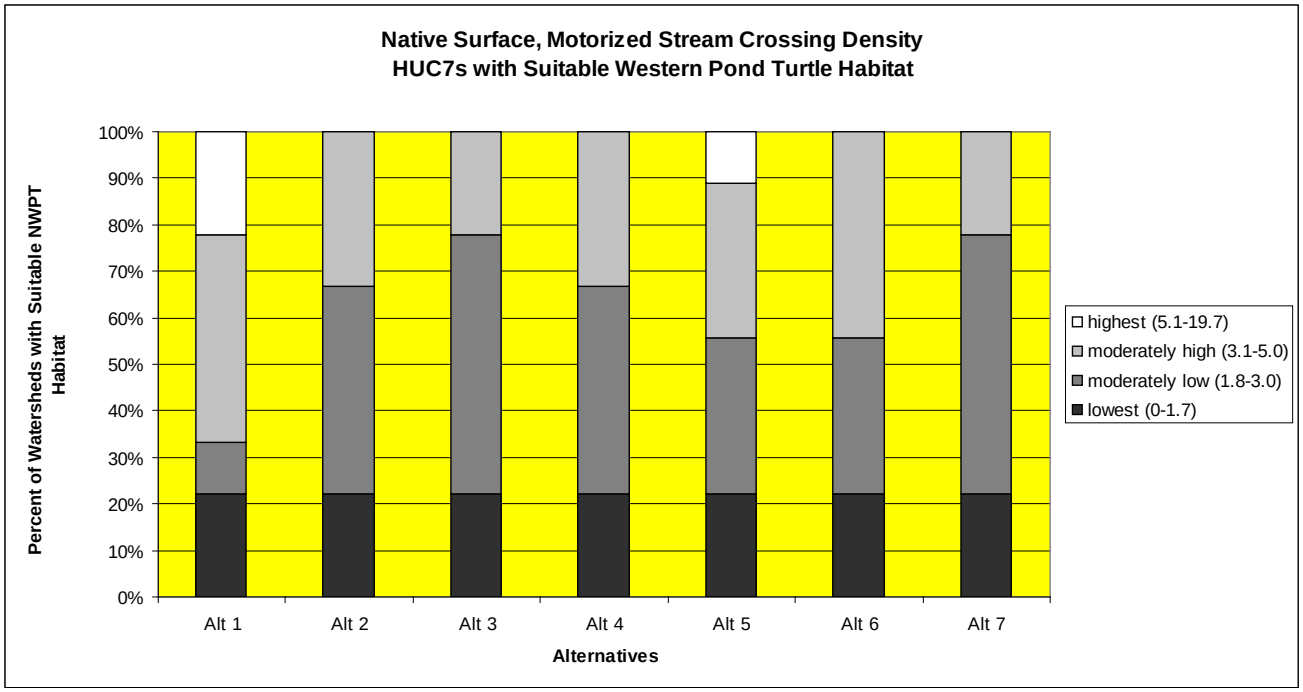

Figure 3.03-18. Northwestern Pond Turtle 7th Field Watersheds by Motorized Crossing

Cumulative Effects

The geographic boundary for assessing cumulative effects to the northwestern pond turtle is the westside of the Tahoe NF below 6,000 feet within lacustrine habitat (ponds and lakes), since this is within habitat that is considered suitable on the Tahoe NF. This geographic boundary is sufficiently large to encompass historic and potential pond turtle habitat on the Tahoe NF. Any larger boundary could dilute the effects of past, present, and future cumulative impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred within approximately the last 20 years. Reasonably foreseeable future impacts expand out to approximately 20 years into the future.

Current pond turtle habitat impacts from existing motorized routes has been documented at the Pierce wetland area within the South Yuba - Pierce 7th Field watershed on the Yuba River Ranger District where vehicles have altered and degraded pond turtle riparian vegetation, soils, and hydrology. This particular pond turtle location could be at risk from crushing and mortality and habitat degradation from continued motorized vehicle use off of routes.

Grazing has the potential to add to cumulative effects to the northwestern pond turtle. Known pond turtle locations occur within one active grazing allotment - Willow Creek. The recently closed Our House Allotment also has pond turtle occurrences where grazing impacts would no longer occur in the future. An additional 10 allotments has potential pond turtle habitat and could receive cumulative impacts from livestock grazing were turtles to be found there.

Alternative 1 would result in the greatest cumulative impacts to current existing cumulative impacts where HUC7 watersheds where pond turtles are located, and would have the have the greatest route densities and stream crossing densities compared to all the action alternatives. Beneficial impacts to pond turtle habitat would occur with all the action alternatives similarly from the reduction in RCA route density and stream crossing density. Alternative 5 would benefit the least and Alternative 3 would benefit the most. Direct and indirect beneficial effects of the action alternatives would prohibit cross country travel on 31 to 47 total crossings and on between 10 to 17 RCA miles within HUC7s

Non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on routes that would be prohibited to motorized use. In general, it is expected that impacts from non-motorized use would be less than motorized use. Over time, it is expected that these the prohibition of cross country travel, including on motorized routes unauthorized to motorized public use would become revegetated and recover through active or passive means, and ultimately benefit the northwestern pond turtle in the future.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-158 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized route crossings within NWPT HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02, Watershed Resources: Geology, Soil, Hydrology, for more detailed information and assumptions.

Table 3.03-158. Northwestern Pond Turtle 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Habitat Prohibited to Cross Country Travel	0	7,986	7,986	7,986	7,986	7,986	7,986
Crossings closed by previous NEPA decisions, pending implementation	1	1	1	1	1	1	1
Unauthorized Crossings Prohibited to Cross Country Travel	0	43	46	44	30	39	46
Total Crossings Prohibited to Cross Country Travel	**1**	**44**	**47**	**45**	**31**	**40**	**47**
Motorized Stream Crossings							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Existing NFTS Native Surfaced, Motorized Stream Crossings	14	14	14	14	14	14	14
Native Surfaced, Motorized Crossing Additions*	46	3	0	2	16	7	0
Change in Class of Vehicles from Smooth Surfaced to Native Surfaced Crossings	0	0	0	0	0	0	0
Native Surfaced Crossings from Reopened ML 1 Roads	0	0	0	0	0	0	0

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Native Surfaced, Motorized Crossings*	**60**	**17**	**14**	**16**	**30**	**21**	**14**
Wet Weather Seasonal Restrictions on all Native Surfaced Routes	None	None	None	Beneficial - Wet Weather Restrictions would be implemented.	Beneficial - Wet Weather Restrictions would be implemented.	Beneficial - Wet Weather Restrictions would be implemented.	None
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Cumulative adverse effects from continued motorized cross country travel on 7,986 RCA acres, including on 46 native surfaced, stream crossings. Motorized use continues on 60 native surfaced, crossings No additional protection to NWPT habitats from wet weather seasonal restrictions.	4th most beneficial alternative. Motorized cross country travel prohibited on 7,986 RCA acres, including on 44 native surfaced, stream crossings. 17 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.	3rd most beneficial alternative, shared with Alternative 7. Motorized cross country travel prohibited on 7,986 RCA acres, including on 47 native surfaced, stream crossings 14 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Most beneficial alternative. Motorized cross country travel prohibited on 7,986 RCA acres, including on 45 native surfaced, stream crossings 16 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Least beneficial alternative due to number of native surfaced crossings added. Motorized cross country travel prohibited on 7,986 RCA acres, including on 31 native surfaced, stream crossings 30 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	2nd most beneficial alternative. Motorized cross country travel prohibited on 7,986 RCA acres, including on 40 native surfaced, stream crossings 21 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	3rd most beneficial alternative, shared with Alternative 3. Motorized cross country travel prohibited on 7,986 RCA acres, including on 47 native surfaced, stream crossings 14 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, unauthorized routes, while all the action alternatives include motorized route additions.

Table 3.03-159 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA route miles within NWPT HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02, Watershed Resources: Geology, Soil, Hydrology, for more detailed information and assumptions.

Table 3.03-159. Northwestern Pond Turtle 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Route Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Habitat Prohibited to Cross Country Travel	0	7,986	7,986	7,986	7,986	7,986	7,986
RCA miles closed by previous NEPA decisions, pending implementation	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Unauthorized RCA Miles Prohibited to Cross Country Travel	0	15.8	16.6	16.2	9.9	13.4	16.3
Total RCA Miles Prohibited to Cross Country Travel	**0.5**	**16.3**	**17.1**	**16.7**	**10.4**	**13.9**	**16.8**
RCA Miles of Native Surfaced, Motorized Routes							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Existing RCA Miles	5.3	5.3	5.3	5.3	5.3	5.3	5.3
RCA Miles of Route Additions*	16.5	0.8	0	0.4	6.6	3.1	0.2
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized Route miles	0	0	0	0	0	0	0
Net NFTS Native Surfaced, Motorized RCA Miles*	**21.8**	**6.2**	**5.3**	**5.7**	**11.9**	**8.4**	**5.5**
Wet Weather Seasonal Restrictions on all Native Surfaced Routes	None	None	None	Beneficial -	Beneficial - Wet Weather Restrictions would be implemented	Beneficial - Wet Weather Restrictions would be implemented	None

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Cumulative adverse effects from continued motorized cross country travel on 7,986 RCA acres, including on 16.5 RCA miles of unauthorized routes . Motorized use continues on 21.8 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions.	4th most beneficial alternative. Motorized cross country travel prohibited on 7,986 RCA acres, including on 16.3 RCA miles of unauthorized routes. NFTS motorized use available on 6.2 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions.	3rd most beneficial alternative, shared with Alternative 7. Motorized cross country travel prohibited on 7,986 RCA acres, including on 17.1 RCA miles of unauthorized routes. NFTS motorized use available on 5.3 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Most beneficial alternative. Motorized cross country travel prohibited on 7,986 RCA acres, including on 16.7 RCA miles of unauthorized routes. NFTS motorized use available on 5.7 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Least beneficial alternative due to number of native surfaced crossings added. Motorized cross country travel prohibited on 7,986 RCA acres, including on 10.4 RCA miles of unauthorized routes . NFTS motorized use available on 11.9 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	2nd most beneficial alternative. Motorized cross country travel prohibited on 7,986 RCA acres, including on 13.9 RCA miles of unauthorized routes. NFTS motorized use available on 8.4 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	3rd most beneficial alternative, shared with Alternative 3. Motorized cross country travel prohibited on 7,986 RCA acres, including on 16.8 RCA miles of unauthorized routes. NFTS motorized use available on 5.5 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, unauthorized routes, while all the action alternatives include motorized route additions.

Sensitive Aquatic Mollusks

This section will also address two Sensitive aquatic mollusk species currently designated as Sensitive by the Regional Forester, the Great Basin ramshorn snail and the California floater.

Great Basin Ramshorn Snail: Affected Environment

The Great Basin ramshorn snail (GBRS) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). The Great Basin ramshorn snail occurs in a highly restrictive distribution but is locally abundant. Historically, the Great Basin ramshorn snail occurred within the lakes and larger, slow streams in and around the northern Great Basin. In California the snail was known to occur in six local drainages in which the species probably survives in four of these drainages.

The Great Basin ramshorn snail occurs in larger lakes and slow rivers including larger spring sources and spring-fed creeks. These snails characteristically burrow in soft mud and may be invisible even when abundant (Taylor 1981). The Great Basin ramshorn snail can occur with *Pisidium ultramontanum*, *Lanx klamathensis*, or several other endemic mollusks (Frest and Johannes 1993). It also occurs with *Juga acutifilosa* and *Fluminicola seminalis*. Habitat requirements include cold highly oxygenated water, muddy substrate, and slow stream flow. Springs are preferred, but the snail will use river margins. Soft sediments are preferred. Threats to snails have been attributed to water diversions and water pollution. Mitigations for fish species, such as adding spawning gravels, may harm this species by smothering soft mud habitats.

Historically, the GBRS has been observed in the Truckee River directly downstream of Lake Tahoe, on the Lake Tahoe Basin Management Unit. Currently, this snail has not been sighted or surveyed for on the Tahoe National Forest. Suitable habitat occurs within slow segments of the Truckee and Little Truckee Rivers and their tributaries.

Road and trail-associated risks to this species are similar to those described for fish and frogs described above and include habitat alteration, changes in water flow regime, changes in water quality and loss of hosts for development.

Great Basin Ramshorn Snail: Environmental Consequences

Indicators used to Measure Effects

Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to twelve GBRS 7th field watersheds from motorized cross country travel.

Additions to the NFTS (GBRS 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized route additions to the NFTS, and the miles of motorized route additions within Riparian Conservation Areas (RCAs) for GBRS 7th field watersheds

Establishment of Open Areas: The establishments of "Open Areas" at Boca, Stampede, and Prosser reservoirs were evaluated under the section "Effects Common to All Aquatic Species." The Greenhorn

"Open Area" is not within the geographic range of the GBRS, and therefore, no further analysis is warranted.

Change in Class of Vehicles (Changed Maintenance Standards): Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02, Watershed Resources: Geology, Soil, and Hydrology). If the route changes from smoothed surfaced to native surfaced (rough surfaced), the change in class of vehicle may result in increased sediment and erosion risk to GBRS habitat. The change in class of vehicle and associated maintenance downgrades is evaluated for their potential to affect selected 7th field watersheds that may have suitable habitat for the GBRS.

Wet Weather Seasonal Closures: Wet weather seasonal closures were evaluated under "Effects Common to All Aquatic Species."

Reopened ML 1 Roads. Reopening of ML 1 roads are analyzed for their potential effects to GBRS for the alternatives.

Route Density within Riparian Conservation Areas (RCAs) and Stream Crossing Density within RCAs: The GBRS shares the same twelve 7th field watersheds as the tui chub (Alder Creek, Prosser Creek, Prosser Creek Reservoir, Middle Truckee River-Lower Prosser Creek, Little Truckee River-Saddle Meadow, Lower Sagehen Creek, Lower Davies, Hoke Valley, Stampede Reservoir, Little Truckee River Canyon, Russel Valley, and Boca Reservoir). Refer to the Lahontan Lake Tui Chub section for analysis of native surfaced route densities within RCAs and stream crossing density.

Direct and Indirect Effects

The Great Basin ramshorn snail has not been sighted or surveyed for on the Tahoe National Forest. Suitable habitat occurs within slow flowing segments of the Truckee and Little Truckee Rivers and associated tributaries. Direct effects to the species from the action alternatives are not likely since confirmation of the species presence has not been confirmed. The nearest known occurrence of the GBRS is within the Truckee River downstream of Lake Tahoe on the Lake Tahoe Basin Management Unit. The alternatives will be evaluated for their potential indirect impacts to potential habitat for this species. Potential habitat for this species occurs within twelve 7th Field watersheds on the eastside of the Tahoe NF (Alder Creek, Prosser Creek, Prosser Creek Reservoir, Middle Truckee River-Lower Prosser Creek, Little Truckee River-Saddle Meadow, Lower Sagehen Creek, Lower Davies, Hoke Valley, Stampede Reservoir, Little Truckee River Canyon, Russel Valley, and Boca Reservoir).

Cross Country Travel. Table 3.03-160 shows that under Alternative 1, no action, motorized cross country travel would continue on 12,359 Riparian Conservation Areas (RCAs) acres within GBRS HUC7 watersheds, where the potential for adversely affecting GBRS habitat could occur by increasing sedimentation and altering streamside vegetation. Under the action alternatives, the prohibition of cross country travel results in prohibiting motorized use on 12,359 RCA acres, including 22.7 to 26.7 RCA miles and from 28 to 35 native surfaced, motorized crossings (Alternative 5 prohibits the least, Alternative 3 prohibits the most). Cross country travel prohibitions would likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit GBRS habitat.

Table 3.03-160. Cross Country Travel within Twelve GBRS 7th Field Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres cross country prohibited	0	12,359	12,359	12,359	12,359	12,359	12,359
Crossings prohibited to cross country travel	0	31	35	34	30	28	32
RCA miles prohibited to cross country travel	0.6	24.7	26.7	26.2	22.7	23.5	25.9

Additions to the NFTS – Stream Crossings and RCA Miles

Number of Native Surfaced, Motorized Stream Crossing Additions within Twelve GBRS 7th Field Watersheds. The number of native surfaced, motorized stream crossings, proposed for addition to the NFTS, are assessed for the alternatives, and provides a useful way to compare potential changes in sediment delivery within GBRS HUC7 watersheds. Alternative 1 poses the greatest risk of increased sedimentation where 35 native surfaced, stream crossings are associated with the continuance of cross country travel on existing unauthorized motorized routes (Table 3.03-161). In increasing order, Alternatives 4, 2, 7, 6, and 5 would result in the addition of 1 to 7 native surfaced, motorized route crossings. Alternative 3 does not result in additional native surfaced, motorized stream crossings within the twelve GBRS HUC7 watersheds, and therefore sedimentation or streamside vegetation would not be affected.

Table 3.03-161. Great Basin Ramshorn Snail HUC7 Watersheds - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions to the NFTS

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions to NFTS (negative impact)	35	2	0	1	5	7	3

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing unauthorized routes, while all the action alternatives include motorized crossing additions.

RCA Miles of Proposed Additions to the NFTS within GBRS 7th Field Watersheds. The miles of proposed motorized route additions to the NFTS within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into GBRS habitats at the HUC7 level. Alternative 1 poses the greatest risk to increased sedimentation potential from 26 RCA miles of motorized routes unauthorized for motorized use that would remain due to not prohibiting cross country travel (Table 3.03-162). Similar to stream crossing numbers, Alternatives 2, 4, 5, 6, and 7 propose to add between 0.5 and 3.2 RCA miles (Alternative 4 adds the least, Alternative 5 adds the most) of motorized routes. Alternative 3 does not add motorized routes to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any GBRS HUC7 watershed.

Table 3.03-162. Miles of Proposed Motorized Route Additions within twelve GBRS HUC7 Watersheds

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized route additions within RCAs (negative impact)	26.1	2.0	0	0.5	4.0	3.2	0.9

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing unauthorized routes, while all the action alternatives include motorized crossing additions.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-163 displays the effects of proposed changes in class of vehicles and the associated maintenance downgrades that have to potential to increase the risk of delivering sedimentation and erosion to GBRS HUC7 watersheds. Alternatives 2, 5, and 6 result in changed road maintenance resulting in changes from smooth surfaced roads to rough surfaced roads. This change in road surface type has a higher potential to result in increased sedimentation to GBRS habitat on 7 stream crossings and 2.3 miles of native surfaced, motorized routes.

Table 3.03-163. Great Basin Ramshorn Snail (12 HUC7s) –Change in Class of Vehicles as Measured by changes Native Surfaced, Motorized Crossings and Motorized Route Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced Crossings where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	7	0	0	7	7	0
RCA Motorized Route Miles where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	2.3	0	0	2.3	2.3	0

Reopened ML 1 Roads. No ML 1 roads are proposed within RCAs of GBRS habitats, and therefore would not affect GBRS or habitat under any of the alternatives.

Cumulative Effects

Cumulative Effects Boundary in Space and Time

The geographic boundary for assessing cumulative effects to the Great Basin ramshorn snail on the Tahoe NF within the twelve watersheds that may potentially indirectly impact suitable habitat for the species. Suitable habitat for this species occurs within slow flowing segments of the Truckee and Little Truckee Rivers and associated tributaries on the eastside of the Forest. This cumulative effects boundary is sufficiently large to assess all past, present, and future cumulative effects to suitable habitat for the ramshorn snail. Any larger boundary could dilute the effects of past, present, and future cumulative impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred within the last 50 to 100 years. Reasonably foreseeable future impacts expand out to approximately 25 years into the future.

Cumulative Effects of Past, Present, and Reasonably Foreseeable Actions

Historically, the Great Basin ramshorn snail has been observed in the Truckee River directly downstream of Lake Tahoe, on the Lake Tahoe Basin Management Unit. The current knowledge of the species

distribution within the Great Basin is limited in scope. Potential past cumulative effects to this species includes habitat degradations from water diversions, reduced water quality, urbanization, livestock grazing, recreational activities, and others. Relatively little is known about the life history of this species to adequately and effectively address cumulative effects to this species without a lot of speculation. Therefore, there is a great deal of uncertainty surrounding the past cumulative effects to this species from these activities.

Under Alternative 1, cumulative effects from unauthorized motorized routes would be greatest where HUC7 watersheds with potential ramshorn snail habitat would have the highest RCA route densities and the highest route crossing densities. The indirect impacts of potential sediment delivery from existing motorized routes unauthorized to motorized public use in Alternative 1 would add considerable cumulative impacts to potential ramshorn snail habitat where 83% (10 of 12) HUC7 watersheds route densities within the highest route density category. Alternative 1 would have the highest stream crossing densities compared to all the action alternatives. The remaining alternatives improve both route density within Riparian Conservation Areas and stream crossing densities with Alternative 5 reducing the least and Alternatives 3, 4, and 7 reducing the most.

For all the action alternatives, future unmanaged cross country motorized travel would be prohibited. In addition, prohibition of cross country travel, including on the majority of existing routes unauthorized to motorized public use, would likely benefit suitable ramshorn snail habitat in the long-term once these routes are rehabilitated through obliteration or other means. Non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on these routes that would be prohibited to motorized use. In general, it is expected that impacts from non-motorized use would be less than motorized use. Over time, it is expected that these routes would become revegetated and recover through active or passive means, and ultimately benefit habitat for the Great Basin ramshorn snail in the future.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-164 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized route crossings within Great Basin ramshorn snail HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02, Watershed Resources: Geology, Soil, Hydrology, for more detailed information and assumptions.

Table 3.03-164. Great Basin Ramshorn Snail 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Acres Cross Country Travel Prohibited	0	12,359	12,359	12,359	12,359	12,359	12,359
Crossings Prohibited to Cross Country Travel	0	31	35	34	30	28	32
RCA Miles Prohibited to Cross Country Travel	0.6	24.7	26.7	26.2	22.7	23.5	25.9
Native Surfaced, Motorized Routes							
Trend of Effect	Negative	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial	Beneficial
Existing Stream Crossings	82	82	82	82	82	82	82
Native Surfaced, Motorized Crossing Additions*	35	2	0	1	5	7	3
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	7	0	0	7	7	0
Net Native Surfaced, Motorized Crossings	**117**	**91**	**82**	**83**	**94**	**96**	**85**
Wet Weather Seasonal Restrictions on all Native Surfaced Routes	None	None	None	Beneficial - Wet Weather Restrictions would be implemented	Beneficial - Wet Weather Restrictions would be implemented	Beneficial - Wet Weather Restrictions would be implemented	None

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Most negative alternative. Motorized cross country travel continues on 12,359 RCA acres, including on 35 native surfaced, stream crossings. 117 NFTS total crossings would receive motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.	6th most beneficial alternative. Motorized cross country travel prohibited on 12,359 RCA acres, including on 31 native surfaced, stream crossings. 91 NFTS crossings available for motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.	4th most beneficial alternative. Motorized cross country travel prohibited on 12,359 RCA acres, including on 35 native surfaced, stream crossings. 82 NFTS crossings available for motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Most beneficial alternative. Motorized cross country travel prohibited on 12,359 RCA acres, including on 34 native surfaced, stream crossings. 83 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	2nd most beneficial alternative. Motorized cross country travel prohibited on 12,359 RCA acres, including on 30 native surfaced, stream crossings. 94 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	3rd most beneficial alternative. Motorized cross country travel prohibited on 12,359 RCA acres, including on 28 native surfaced, stream crossings. 96 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	5th most beneficial alternative. Motorized cross country travel prohibited on 12,359 RCA acres, including on 32 native surfaced, stream crossings. 85 NFTS crossings available for motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, crossings unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

Table 3.03-165 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA route miles within GBRS HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02, Watershed Resources: Geology, Soil, Hydrology, for more detailed information and assumptions.

Table 3.03-165. Great Basin Ramshorn Snail 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Route Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Cross Country Travel Prohibited	0	9,770	12,359	12,359	12,359	12,115	12,359
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0.6	24.7	26.7	26.2	22.8	23.5	25.9
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	31.3	31.3	31.3	31.3	31.3	31.3	31.3
RCA Miles of Native Surfaced, Motorized Route Additions*	26.1	2.0	0	0.5	4.0	3.2	0.9
Establishment of Open Areas	Cross country travel continued around Boca, Stampede, Prosser and Greenhorn	2,589	0	0	0	244	0
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized miles	0	2.3	0	0	2.3	2.3	0
Net NFTS Native Surfaced, Motorized RCA Miles	**58**	**35.6**	**31.3**	**31.8**	**37.6**	**36.8**	**32.2**
Wet Weather Seasonal Restrictions on all Native Surfaced Routes	None	None	None	Beneficial - Wet Weather Restrictions would be implemented	Beneficial - Wet Weather Restrictions would be implemented	Beneficial - Wet Weather Restrictions would be implemented	None

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Most negative alternative – adverse cumulative impacts. Motorized cross country travel continues on 12,359 RCA acres, including on 26 RCA miles of unauthorized routes. No additional protection to GBRS habitats from wet weather seasonal restrictions.	6th most beneficial alternative. Motorized cross country travel prohibited on 9,770 RCA acres. NFTS motorized use available on 35.6 RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions.	4th most beneficial alternative. Motorized cross country travel prohibited on 12,359 RCA acres. NFTS motorized use available on 31.3 RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Most beneficial alternative. Motorized cross country travel prohibited on 12,359 RCA acres NFTS motorized use available on 31.8 RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	2nd most beneficial alternative. Motorized cross country travel prohibited on 12,359 RCA acres. NFTS motorized use available on 37.6 RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	3rd most beneficial alternative. Motorized cross country travel prohibited on 12,115 RCA acres. NFTS motorized use available on 36.8 RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	5th most beneficial alternative. Motorized cross country travel prohibited on 12,359 RCA acres. NFTS motorized use available on 32.2 RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing unauthorized routes, while all the action alternatives include motorized route additions.

California Floater: Affected Environment and Environmental Consequences

The California floater (*Anodonta californiensis*) is listed as a Sensitive Species in Region 5 and designated as a "species of special concern" by the State of California. The California floater occurs in lakes and slow rivers (Taylor 1981), generally, on soft substrates (mud-sand), in fairly large streams and lakes, in relatively slow currents (Frest and Johannes 1995).

The current known distributions in California are the Lassen, Modoc, and Shasta-Trinity National Forests. This species still survives in Fall and Pit Rivers, Shasta Co. The California floater has been reported to occur adjacent to the Tahoe NF, but no occurrences have been documented on NFS lands within the boundary of the Tahoe NF. Donner Lake is reported as the locality of an unconfirmed historic sighting in a mollusk database created by Drs. Jayne Brim-Box and Jeff Kershner (pers. communication). The species has been reported to occur at the following sites in Nevada: 1)Truckee River, 2) Humboldt River, Humboldt Basin, Elko, Co. in 1979, 3) Thousand Springs Valley northeast of Wells, Elko Co., Lake Bonneville Basin in 1989 (Nevada Natural Heritage Database).

Howard and Cuffey (2003) found that the California floater was almost exclusively found in pools with no riffles and very few in runs in the south Fork of the Eel River in Oregon.

Road and trail-associated risks to the California floater are similar to those described for other aquatic species described above, and include changes in sedimentation delivery, habitat alteration, changes in water flow regime, changes in water quality and loss of hosts for development.

Direct, Indirect and Cumulative Effects

The California floater has not been confirmed to occur on the Tahoe NF, therefore the alternatives would not directly or indirectly affect the California Floater. Historically, the California floater was reported from Donner Lake within private lands and near Lake Tahoe within the Truckee River. Potentially suitable habitat for the floater on the Tahoe NF includes the Truckee River and streams tributary to it. Direct, indirect and cumulative effects to potentially suitable habitat of the floater would be similar to those addressed for the Great Basin ramshorn snail. See Environmental Consequences for ramshorn snail in the previous section.

Compliance with Forest Plan and Other Direction

The Tahoe LRMP, as amended by the SNFPA 2004, provides management direction for riparian and aquatic dependent resources. The following management standards and guidelines apply to the TNF Travel Management Project for aquatic species and were considered for the analysis of the alternatives.

1. *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) 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 (Management Standard & Guideline 92).*

In the sections above, the alternatives for the Tahoe NF Motorized Travel Management Project were analyzed for consistency with the LRMP riparian conservation objectives (See RCO analysis). Management design standards and mitigation measures were developed to minimize the risk of increasing sediment to aquatic systems and to minimize impacts to habitat for aquatic and riparian dependent species. All proposed action alternatives reduce or minimizes adverse effects to aquatic systems, particularly through the prohibition of cross country travel within close proximity or adjacent to aquatic ecosystems.

2. *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 (RCO#2, Management Standard & Guideline 100).*

   Under the action alternatives, native surfaced, motorized route and area additions and their associated stream crossings were evaluated for their hydrologic condition. Corrective actions and mitigation measures were developed when it was deemed necessary. See Appendix A (Site Specific Road, Trail and Open Area Information), Watershed Resources: Geology, Soil, Hydrology (Chapter 3.02), and Appendix I (Riparian Conservation Objectives).

3. *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 (RCO#2, Management Standard & Guideline 101).*

   Proposed stream crossings additions were inventoried and evaluated for their condition. Appropriate mitigation measures were developed (See Appendix A, Site Specific Road, Trail and Open Area Information).

4. *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 (RCO#2, Standard and Guideline 102).*

   Proposed route additions to the NFTS were inventoried and assessed for their condition. Conditions were described and mitigations measures were developed as appropriate.

5. *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 (RCO#3, Management Standard and Guideline 116).*

For the Tahoe NF Travel Management Project, each proposed route addition was evaluated for their potential to degrade water quality or habitat for aquatic and riparian-dependent species. Proposed route additions were evaluated for their proximity to aquatic habitats and their potential to affect aquatic systems, including water quality, soil condition, hydrologic connectivity, and riparian vegetation.

Summary of Effects Analysis across All Alternatives

The following tables provide a relative ranking of effects by Terrestrial Species and Aquatic and Riparian Species. Please refer to the alternative analyses for more detailed descriptions of effects. The score of 7 = least impact for biological resource; score of 1 = most impact for biological resource.

Table 3.03-166. Comparison of Effects to Terrestrial Species

Indicators – Terrestrial Species	Rankings of Alternatives for Each Indicator						
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Density of motorized routes at the watershed level.	1	4	7	6	2	3	5
Acres open to motorized use and Miles of unauthorized routes within terrestrial species habitat.	1	2	7	6	3	4	5
Miles of motorized routes at forest-wide scale and within the habitat for each species group.	1	4	7	6	2	3	5
Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added route or area.	1	4	7	6	2	3	5
The proportion of a species (or species group's) habitat that is affected by motorized routes.	1	4	7	6	2	3	5
Average for Terrestrial Species	**1**	**3.6**	**7**	**6**	**2.2**	**3.2**	**5**

Table 3.03-167. Comparison of Effects to Aquatic and Riparian Species

Indicators – Aquatic and Riparian Species	Rankings of Alternatives for Each Indicator						
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of unauthorized routes within or adjacent to TES aquatic/riparian species habitat.	1	3	7	6	2	4	5
Density of high risk motor vehicle routes as a measure of habitat effectiveness at the 7th field watershed level.	1	3	7	6	2	4	5
Miles of motor vehicle routes and acres of areas at forest-wide scale and within the habitat for each species.	1	3	7	6	2	4	5
The proportion of a species habitat that is affected by motor vehicle routes	1	3	7	6	2	4	5
Number hydrologically sensitive areas within 300 ft. (RCA width) of an added route or area.	1	4	7	6	2	3	5
Average for Aquatic and Riparian Species	**1**	**3.2**	**7**	**6**	**2**	**3.8**	**5**

Chapter 3.04

Fire Fuels Management

3.04. Fire Fuels Management

This section focuses on analyses of the alternatives presented in this EIS and how they could affect current fire and fuels management on the Tahoe National Forest (TNF).

Affected Environment

Fire Management

Understanding past and present roles of fire in shaping TNF ecosystems is critical for managing fire. Fire, once a pervasive force in structuring and rejuvenating TNF ecosystems, is now intensively managed. Fire has been an important ecosystem process in the Sierra Nevada for thousands of years. Before the area was settled in the 1850s, fires were generally frequent throughout much of the range (Sierra Nevada Ecosystem Project 1996).

Because fire was so prevalent in the centuries before extensive Euro-American settlement (pre-settlement), many common plants exhibit specific fire-adapted traits such as thick bark and fire-simulated flowering, sprouting, seed release and/or germination (Chang 1996). In addition, fire affected the dynamics of biomass accumulation and nutrient cycling, and generated vegetation mosaics at a variety of spatial scales (Chang 1996). Because fire influenced the dynamics of nearly all ecological processes, reduction of the influence of fire through the 20th century fire suppression efforts in these ecosystem has had widespread (though not yet completely understood) effects.

Current management strategies and those of the immediate past have contributed to Forest conditions that encourage high-severity fires. The policy of excluding all wildfires has been successful in generally eliminating fires of low to moderate severity as a significant ecological process. However, current technology is not capable of eliminating the high-severity fires. Thus, the fires that affect significant portions of the landscape, which once varied considerably in severity, are now almost exclusively high-severity, large, stand-replacing fires.

Changes in Fuels

The dramatic reduction in area burned in the 20th century, combined with the effects of forest management practices and generally warmer-moister climatic conditions (Graumlich 1993; Stein 1996), has almost certainly led to substantial increases in the quantity and changes in arrangement of live and dead fuels. While data from early 20th century are not available to test this assertion rigorously, it is based on comparisons with early conditions inferred from numerous historical accounts, documented fire histories, and structures of uncut stands (Kilgore and Sando 1975; Parsons and DeBenedetti 1979; Bonnickson and Stone 1982; van Wagtendonk 1985; Biswell 1989; Weatherspoon and others 1992; Chang 1996; Skinner and Chang 1996; Weatherspoon and Skinner 1996).

Live and dead fuels have increased along with the development of denser conifer forests. These increases in stand density were concentrated mainly in small and medium size classes of shade-tolerant and fire sensitive species. Lacking fire, the natural thinning that has occurred has been due to competition (primarily water and light), diseases, and insects. The result has been a large increase in the amount and continuity of live forest fuels near the forest floor that provide a link between the surface fuels and upper

canopy layers. The lack of fire has allowed dead fuels to accumulate in excess of their presettlement levels.

Twentieth Century Fire Regimes in Perspective

The TNF has recorded wildfires since establishment of the Forest Reserves in the early 1900s. The TNF has also compiled detailed information from fire reports for the period between 1976 and the present. Conclusions about recent fire regimes come from these two information sources as well as technical papers that have analyzed these data.

Twentieth century fire regimes in the TNF are very different from pre-European contact fire regimes. Intervals between present-day fires are longer, allowing more time for fuels and vegetation to accumulate between fires. As a result, fires have more fuel to burn and become more severe. Consequently, fires today kill more of the vegetation, and are difficult and dangerous to control.

Table 3.04-1 displays how the number and size of fires on the TNF have changed over time. Most fires in the Sierra Nevada are suppressed at a very small size. Less than one percent of the fires that started on TNF system lands in the last thirty years exceeded 100 acres. Fire fighting capability and efficiency has steadily improved through the century as fire suppression technologies have improved and expenditures for fire management have increased. The total number of fires started has declined by more than 50 percent. However the total number of acres burned has increased by more the four fold. In addition, the number of fires in every size category has increased. From 1992 to 2006 there were four fires greater than 5,000 acres compared to only one during the previous 15 years.

Table 3.04-1. TNF Acres burned in by size of fire

Years	1977-1991	1992-2008
Total Fires	**2,263**	**1,248**
Total Acres Burned	**19,828**	**110,661**
Fires greater than 50 acres	12	15
Fires greater than 100 acres	11	15
Fires greater than 1,000 acres	5	10
Fires greater than 5,000 acres	1	6

Trends in Fire Causes and Sizes and Fire Suppression Capability

Human-caused fires have been declining slowly but steadily over the century, likely as a result of increased fire suppression efficiency and improved public education (McKelvey and Busse 1996). However all of the fires greater than 5,000 acres in the last 15 years were human caused. The number of lightning-caused fires has remained relatively constant over the century; however, over the last two decades the sizes of lightning-caused fires have increased.

The availability of Forest Service firefighting resources and equipment has remained steady or declined over the past decade (Husari and McKelvey 1996). A similar trend has occurred in State firefighting agencies in Nevada and California. Additional resources are available through local fire departments, but these agencies are primarily dedicated to protecting lives and property in the immediate

vicinity of their jurisdictions. Human populations are projected to increase in the Sierra Nevada over the next half century (Duane 1996). Refer to Chapter 3.11 for more information on population growth. This will result in greater demands on local fire departments to provide fire protection to homes and communities during periods of high fire danger. In the future, additional firefighting resources may not be available to attack multiple lightning fires, especially during their initial stages.

Relationships between Climate and Fire Sizes and Causes

Based on 2,000-year tree ring records from giant sequoia groves, Swetnam (1993) concluded that fire activity has consistently decreased when rainfall has increased. The period from 1937 through 1986, has been the third wettest half-century in the past 1,000 or more years; it has been the fourth wettest half-century in the last 4,000 years (Stine 1996, Graumlich 1993). These wet conditions may have contributed to the success of fire suppression in limiting fire size.

Based on available records for the 20th century, McKelvey and Busse (1994) concluded that not all hot, dry years were extreme fire years; however, nearly all of the extreme fire years occurred during hot, dry periods. The greatest acreage burned coincides with critically dry years (as defined by the California Department of Water Resources) in the San Joaquin and Sacramento River Valleys. One-third of the years between 1901 and 1969, were ranked as dry or critically dry in at least one of the river valleys. Almost one-half of the years between 1970 and 1998 were ranked as dry or critically dry. Extreme fire years occurred during the critically dry years; these years reflect the correlation between lightning-caused fires, drought years, episodic events, and acres burned.

Wildland Urban Intermix Zone

The wildland urban intermix zone (WUI) is an area where human habitation is mixed with areas of flammable wildland vegetation. It extends out from the edge of developed private land into Federal, private, and State jurisdictions. There are currently 3,282.6 miles of roads useable by fire suppression equipment in the WUI. The WUI is comprised of two zones: the defense zone and the threat zone.

- The defense zone is the buffer in closest proximity to communities, areas with higher densities of residences, commercial buildings, and/or administrative sites with facilities. Defense zones generally extend roughly ¼ mile out from these areas.
- Threat zones generally extend approximately 1¼ miles out from the defense zone boundary; however, actual extents of threat zones are based on fire history, local fuel conditions, weather, topography, existing and proposed fuel treatments, and natural barriers to fire.

Environmental Consequences

Weather, topography, and fuels influence the behavior of fires. Motor vehicle access into an area can lead to an increased risk of a wildfire being started by humans. Wildfires can be started by the vehicles themselves; i.e. sparks from exhaust or hot pieces of metal such as exhaust pipes coming into contact with vegetation. In addition human activities in the back country such as camping and hunting can also lead to an increased risk of wildfires starting. Motor vehicle use provides access to larger areas for these activities and hence a larger area for potential risk of human caused fires.

Road access into an area is also a benefit for fire suppression. Road access allows for a more rapid initial attack by suppression forces increasing the chance that a wildfire may be stopped at a smaller size. In addition to quicker access, roads can also allow heavier equipment such as fire engines and bull dozers to reach the fire and thus stop the fires at a smaller size. Changes in fuels alter fire behavior and also change how fires affect ecosystem components and processes.

Measures or Factors Used to Assess Environmental Consequences

The alternatives can be compared in terms of; 1) how they increase the risk of a wildfire being started by humans based the level of access by motorized vehicles and the 2) amount of roads accessible allowing for a more rapid initial attack by suppression forces with heavier equipment such as fire engines and bull dozers.

Risk of Human Caused Wildfire

Although the amount of human caused fires has been decreasing over time, motor vehicle access into an area can lead to an increased risk of a wildfire being started by humans. Wildfires can be started by the vehicles themselves; i.e. sparks from exhaust or hot pieces of metal such as exhaust pipes coming into contact with vegetation. In addition human activities in the back country such as camping and hunting can also lead to an increased risk of wildfires starting. Motor vehicle use provides access to larger areas for these activities and hence a larger area for potential risk of human caused fires. To assess the changes in potential risk the density of open routes accessible by the public was used a potential indicator. Table 3.04-2 displays the categories used to assess this risk.

Table 3.04-2. Risk Assessment Categories Used For Human Caused Fire

Density of Roads and Trails Open for Motor Vehicles by Watershed	Degree of Potential Risk
0 Miles/Square Mile	Lowest Risk
0-2 Miles/Square Mile	Lower Risk
2-4 Miles/Square Mile	Moderate Risk
4-6 Miles/Square Mile	Higher Risk
6 Plus Miles/Square Mile	Highest Risk

Table 3.04-3 displays the level risk of human caused wildfire by alternative. The greatest level of risk is associated with Alternative 1, the No Action Alternative. All of the action alternatives reduce the level of risk. Of the action alternatives, the least reduction in risk is associated with Alternative 5. Alternatives 2, 3, 4, 6 and 7 all have similar reductions in risk of human caused wildfire.

Table 3.04-3. Changes in Risk of Human Caused Wildfire by Alternative

Risk of Human Caused Wildfire		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Route Density (Percent of Forest Total)	**Lowest Risk** (0 Miles/Square Mile)	.6%	.6%	.6%	.6%	.6%	.6%	.6%
	Lower Risk (0-2 Miles/Square Mile)	17.2%	26.6%	27.7%	26.6%	25.0%	27.2%	26.6%
	Moderate Risk (2-4 Miles/Square Mile)	44.0%	57.7%	56.6%	57.7%	58.2%	57.0%	57.7%
	Higher Risk (4-6 Miles/Square Mile)	31.4%	11.5%	11.9%	11.5%	12.6%	11.5%	11.5%
	Highest Risk (>6 Miles/Square Mile)	6.9%	3.5%	3.1%	3.5%	3.6%	3.5%	3.5%

Access by Suppression Forces

Road access into an area is also a benefit for fire suppression. Road access allows for a more rapid initial attack by suppression forces increasing the chance that a wildfire may be stopped at a smaller size. In addition to quicker access, roads can also allow heavier equipment such as fire engines and bull dozers to reach the fire and thus stop the fires at a smaller size.

Access by these vehicles is particularly important in the wildland urban intermix zone (WUI). The wildland urban intermix zone is an area where human habitation is mixed with areas of flammable wildland vegetation. It extends out from the edge of developed private land into Federal, private, and State jurisdictions.

Table 3.04-4 displays the miles of roads useable by heavier equipment such as fire engines and bull dozers to reach the fire and thus stop the fires at a smaller size within the wildland urban intermix zone (WUI) as well as within the total forest.

Table 3.04-4. Access for fire suppression equipment by alternative

Access for Fire Suppression Equipment		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Roads useable by fire suppression equipment (miles)	**Wildland urban intermix zone** (WUI)	3,282.6	2501.1	2499.2	2500.3	2523.2	2503.8	2499.2
	Forest Total	**6,450.6**	**4,757.3**	**4,752.3**	**4,756.0**	**4,836.7**	**4,768.1**	**4,753.3**

The greatest level of access is associated with Alternative 1, the No Action Alternative. All of the action alternatives reduce the level of access and all similar reductions in access to allow heavier equipment such as fire engines and bull dozers to reach the fire and thus stop the fires at a smaller size.

Summary of Effects Analysis across All Alternatives

The following table summarizes the effects analysis for fire and fuels by ranking each alternative regarding how well it provides for each of the indicators. The following rankings were used: A score of 7 indicates the alternative has the least impact for fire and fuels related to the indicator. A score of 1 indicates the alternative has the greatest adverse impact to fire and fuels. This information is to be used to fill out the alternatives summary at the end of Chapter 2 of the EIS.

Table 3.04-5. Comparison of Effects to Fire and Fuels

Indicator	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Changes in Risk of Human Caused Wildfire by Alternative	7	5	1	3	6	2	4
Access for Fire Suppression Equipment by Alternative	1	4	7	5	2	3	6
Average	**4**	**4.5**	**4**	**4**	**4**	**2.5**	**5**

Chapter 3.05

Cultural Resources

3.05. Cultural Resources

Introduction

The Congress in 1966 declared as National policy that the Federal government will "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 historic properties and avoiding unnecessary damage to them. Many historic properties are fragile and once damaged or destroyed cannot be repaired or replaced. Section 106 of the NHPA compels Federal agencies to take into account the effect of its undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (36 CFR 60) (Historic Properties). The Travel Management rule requires that the effects on cultural resources be considered with the objective of minimizing damage when designating roads, trails, and areas for motor vehicle use on National Forest lands (36 CFR 212.55(a), 212.55(b)(1)).

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

The Forest Service is directed to identify, evaluate, treat, protect, and manage historic properties by several laws. However, the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.) (NHPA) provides comprehensive direction to federal agencies about their historic preservation responsibilities. Executive Order 11593, entitled *Protection and Enhancement of the Cultural Environment*, also includes direction about the identification and consideration of historic properties in Federal land management decisions.

The NHPA of 1966 extends the policy of 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 (ACHP) and State Historic Preservation Officers (SHPO). NHPA Section 106 directs all Federal agencies to take into account effects of their undertakings (actions, financial support, and authorizations) on properties included in or eligible for the National Register. The Advisory Council on Historic Preservation's regulations at 36 CFR 800 implements NHPA Section 106. NHPA Section 110 sets inventory, nomination, protection, and preservation responsibilities for Federally-owned historic properties.

The Forest Service's policy for compliance with Section 106 of the NHPA in travel management, with respect to route designation for motor vehicle use, was issued in 2005: *USDA Forest Service Policy for Section 106 of the NHPA Compliance in Travel Management: Designated Routes for Motor Vehicle Use* (2005). This policy was developed in consultation with the ACHP. It outlines minimal requirements for considering possible effects to historic properties that may be associated with designating routes and areas as part of a national forest's transportation system. This policy statement recognizes the use of programmatic agreements for compliance with Section 106 of the NHPA.

Section 106 of the NHPA and the ACHPs implementing regulations, *Protection of Historic Properties* (36 CFR Part 800), require that federal agencies take into account the effect of their undertakings on historic properties, and that agencies provide the ACHP with an opportunity to comment on those undertakings. Programmatic agreements (36 CFR 800.14(b)) provide alternative procedures for complying with 36 CFR 800. Region 5 has such an agreement: *Programmatic Agreement among the U.S.D.A. Forest Service, Pacific Southwest Region, U.S.D.A. Forest Service, Intermountain Region's Humboldt-Toiyabe National Forest, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Designating Motor Vehicle Routes and Managing Motorized Recreation on the National Forests in California* (2006) (Motorized Recreation PA). This agreement defines the Area of Potential Effects (APE) (36 CFR 800.4(a)(1)) and includes a strategy outlining the requirements for cultural resource inventory, evaluation of historic properties, and effect determinations; it also includes protection and resource management measures (protection 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 Federally owned properties that meet the NRHP criteria to the National Register of Historic Places, 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.

Tahoe National Forest cultural resource management direction and standard and guidelines (S&Gs) are located in the Tahoe National Forest Land Resource and Management Plan (1990: V-18). They are:

- **Cultural Resource Inventories**: Preliminary examination overview and/or R-5 Supplement survey of areas to identify the presence or absence of archaeological, historical, or other cultural resource properties. Includes preparation and approval of reports. Unit of work is the number of survey acres examined.
- **Cultural Resource Evaluation**: A set of properties will be evaluated by a qualified cultural resource specialist to determine the significance of cultural and historical values. Includes evaluation of proposed actions on cultural resources and appropriate consultation and preparation of EA/EIS reports. Includes nomination and/or determination of eligibility of properties for the NRHP. Using best professional judgment, the specialist will apply NRHP significance criteria as well as the criteria developed in the cultural resources overview.
- **Cultural Resources Protection**: Activities and costs related to protection of cultural resources properties. Includes physical protection, public contact, signing, or other activities associated with protection of properties. Where specific management plans are absent, Class 1 properties and frequently vandalized properties will be considered for inclusion within patrol routes. Includes review, processing, and administration of cultural resource use permits. Unit is properties. Treat all properties as significant until evaluated.
- **Cultural Resource Enhancement**: Includes analysis and intensive research of cultural resource properties to provide qualitative and quantitative background data in order to prepare them for

public interpretation or scientific or ethnic use. Improvement of the properties with interpretive services (IS) and facilities for public use should be reported under IS or other developed recreation sites.

Effects Analysis Methodology

Assumptions Specific to Cultural Resources

- Unauthorized, user-created routes and areas have already affected cultural resources within route/area prisms.
- Historic railroad grades and roads being used as authorized routes were built for the purposes of travel and continued use of them will cause no effect.
- 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.
- 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).
- 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 historic properties for the purposes of this undertaking, unless they already have been determined ineligible in consultation with the SHPO or through other agreed on procedures (36 CFR 60.4; 36 CFR 800).
- 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.
- 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.
- Wheeled over snow use has no measurable potential impact to cultural resources.

Data Sources

- Site-specific cultural resource inventories. The Forest conducted cultural resources field surveys for this undertaking throughout 2007–09. 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.
- Existing information from cultural resource records, historic archives, maps, and GIS spatial layers was also used.

Cultural Resources Indicators

- Degree to which the integrity of historic property values are diminished.
- Number of cultural resources within unauthorized routes at risk from ongoing use.
- 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 and establishing "Open Areas"***

   Short-term timeframe: 1 year
   Long-term timeframe: 20 years
   Spatial boundary: Location of historic property.
   Indicator(s): Degree to which the integrity of historic property values are diminished, related to: location, design, setting, materials, workmanship, feeling, or association.
   Methodology: Use existing data from cultural resource site atlas, historic archives, maps, site record files, and GIS spatial layers, and information obtained from archaeological inventories of unauthorized routes, to identify cultural resources in the APE that may have direct or indirect effects.
   Rationale: Motorized Recreation PA.

3. ***Direct and indirect effects of changes to the existing NFTS including identifying seasons of use and vehicle class and reopening Maintenance Level 1 roads.***

   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, reopening a Maintenance Level 1 road that was previously closed due to conflicts with cultural resources is considered an undertaking.

   Short-term timeframe: 1 year
   Long-term timeframe: 20 years
   Spatial boundary: Location of historic property.
   Indicator(s): Degree to which the integrity of historic property values are diminished, related to: location, design, setting, materials, workmanship, feeling, or association.

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

Rationale: Motorized Recreation PA.

4. ***Direct and indirect effects of Amendments to the Forest Plan***

Amending the Forest Plan to remove the November 1 to May 1 seasonal closure in the Sugar Pine area (Management Area 84 Humbug Sailor) on key winter deer range to improve motorized recreation opportunities is not considered an undertaking subject to NHPA Section 106 compliance (USDA Forest Service Policy for Section 106 of the NHPA Compliance in Travel Management: Designated Routes for Motor Vehicle Use (2005)). Motorized vehicles can already use NFTS roads. Changing the season of use will have no direct, indirect, or cumulative effect on cultural resources.

Short-term timeframe: 1 year

Long-term timeframe: 20 years

Spatial boundary: Location of historic property.

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

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

Rationale: Motorized Recreation PA.

5. ***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.

Prior to the 1974 Forest and Rangeland Renewable Resources Planning Act (RPA), effects to cultural 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 cultural 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 ineligible for inclusion.

All projects listed in the Reasonably Foreseeable Projects and Cumulative Effects (Appendix H) 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) or successor agreement(s).

Cultural Resources: 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 North-Central Sierra Nevada, are key topics in this region's anthropological, archaeological, and historical research.

With over 3,000-recorded sites on Tahoe National Forest System land, the Forest contains a variety of prehistoric and historic archaeological sites, buildings, features and objects (Table 3.05-1). Research of cultural resources discovered within the Tahoe National Forest (TNF) indicate that people have been using the Forest for over 8,000 years with intensification occurring within the last 5,000-4,000 years. By 5,000 years ago on the Westside of the Forest, permanent villages were established at elevations generally below 3,500 feet (snow line). On the Eastside of the Forest, winter villages were located in the lower elevation valleys where Reno and Carson City, Nevada, are located. Prior to the crossing of the Sierra Nevada by emigrant parties, an extensive trail system was established by Native people for travel and trade. Many of these trails became major travel routes into California during the historic era. Two Native American ethnographic groups, the Nisenan Maidu and the Washoe, have direct ties to Tahoe National Forest System land. To date, no traditional cultural properties (TCP) or sites of religious or cultural importance have been identified within the TNF.

Table 3.05-1. Cultural Resource Sites within the Tahoe National Forest

Type of Site	# Sites
Documented Sites	3,228
National Register Listed Properties (included in the figure given above)	7

Sites representing prehistoric and ethnographic land use include seasonal villages, temporary camps, toolstone quarries, bedrock mortar milling locations, and petroglyphs. People today favor many of the areas preferred by Native people. Resource extraction, grazing, residential development, and recreation are common modern activities throughout the Forest.

During the late 1830s and 1840s, trappers and explorers began venturing into California. With the discovery of gold in Coloma in 1848 came a massive emigration of gold seekers and settlers into the area now encompassed by the TNF. This event had a devastating effect on the local Native American Maidu groups through the impacts of displacement, disease, Native food resources elimination, and death. Numerous trails and routes were established across the TNF including various branches associated with the Overland Emigrant Trail, the Placer County Emigrant Trail, and the Henness Pass Road. These early roads accessed different mining communities. Local toll roads and turnpikes, like the Michigan to Last Chance Trail, the Enterprise and the Pacific Turnpikes, the Skillman Flat Toll Road, the Galloway Ridge Road and the Sierra Turnpike, were constructed to link settlements and transport supplies. The completion of the Central Pacific Railroad across the North-Central Sierra Nevada, and the TNF, established this route as one of the major transportation corridors into California. Four of California's original 64 State Highways, including the Victory and Lincoln Highways, are within the TNF (State Highways 25, 36, 38 and 37) as is part of the Tahoe to Ukiah Highway (State Route 20). The Victory and Lincoln Highways followed the corridor of the Central Pacific Railroad. This corridor eventually became Highway 40 and Interstate 80. These routes have played an important part in changing the environment as the access to the Forest allowed for early (i.e., beginning with the 1849 Gold Rush) and extensive development.

Historic mining is only located on the Westside of the Forest. Due to the deeply incised nature of the terrain, many of the sites are located in the rugged terrain of the Yuba, Bear, and American Rivers and their associated tributaries. This area of California was one of the richest producing gold areas in the State. Consequently, hundreds of mines and roads to access the mines were established in the 1850s.

Logging occurred throughout the entire Forest and an extensive network of logging road and railroad grades were built to supply lumber and various wood products to support other industries (mining, construction, fuel for steam power, and shipping containers). On the Eastside of the Forest, with its open Eastside Pine habitat and terrain, logging, ranching, and ice production were primary industries. Beginning in the 1890s, railroad based logging extended from the Central Pacific Railroad to the farthest reaches of the Forest on the Eastside and eventually linked into the Feather River Canyon railroad line on the north end of Sierra Valley. Many of these railroad grades provide the footprint for many roads on the Eastside. On the Westside of the forest, large scale commercial logging companies focused on relatively easy to log terrain that bordered the Central Pacific Railroad. In the rugged mountainous mining areas of

Downieville and Foresthill, local mills supplied more local needs and markets. Logging has continued until recent years as a dominant industry in the TNF.

Historic cultural resources reflect particularly the cultural and economic products of the rapid pace of technological achievement in the last two centuries. These more recent resources often reflect industrial and technological advances in resource extraction, landscape use, and, later, management by the Forest Service and other State and local agencies.

Sites representing historic land use include cabins, roads and trails, bridges, lumber or mining mill complexes, town sites, ditches, homesteads, sheep camps, arbor glyphs (tree carvings), railroad grades, trestles, mining shafts and adits, ground sluicing areas and tailings, Forest Service administrative buildings and compounds, along with logging, mining, grazing, and recreation landscapes. Nearly all of the historic sites found in the TNF date from ca. 1846 to the present. Historic sites provide many opportunities for interpretation and public appreciation.

Existing Conditions

Field surveys were conducted to identify cultural resources in the APE that may be affected by the undertaking (i.e., to determine the resources at risk). New sites located were recorded. Existing sites were monitored to obtain current condition information. Cultural resources specialists conducted field surveys during the field seasons of 2007-2009. Existing archaeological, historic, and ethnographic literature in the Forest's Heritage Program files, Infra database and GIS were reviewed. A cultural resources report summarizes the data collected for this proposed undertaking (Tahoe National Forest Cultural Resource Report TNF02051/R2007051700062). The report includes a survey summary and site condition assessment of the sites associated with routes or areas being considered for addition to the NFTS and provides the background information for this chapter.

The primary objectives of this project from its inception in 2007 were to identify cultural resources in the APE that may be affected by the undertaking (i.e., resources at risk) and collect information on their condition. Surveys consisted of pedestrian transects conducted according to methods and standards mandated in the Motorized Recreation PA. The Forest has calculated a maximum of 88 miles of unauthorized routes (13 miles of roads from Alternative 6 and 75 miles of motorized trails from Alternative 5) and 93 miles of Maintenance Level 1 (ML 1) roads (from Alternative 5): the unauthorized routes are being analyzed as potential additions to the NFTS while the ML 1 roads are being considered for re-opening (Table 3.05-2).

Table 3.05-2. Cultural Resource Survey Miles and Acres within APE*

Item	Miles	Acres
Unauthorized Routes Previously Surveyed (roads and trails)	55	-
Unauthorized Routes Surveyed for this project (roads and trails)	33	-
ML 1 Roads Previously Surveyed	93	
"Open Areas" Surveyed	-	400
Total	**181**	**400**

***Note**: Figures have been rounded.

The existing condition of cultural resources in the APE, the resources at risk, provides baseline information in assessing the potential effect of adding routes to the NFTS. The first step was determining the total number of cultural resources within the APE: 149 cultural resource sites have been identified within the APE. Of this total number, 133 are considered resources at risk. Resources at risk are those cultural resource sites that are either unevaluated or eligible. Table 3.05-3 includes all cultural resources sites regardless of NRHP status where any segment of an unauthorized route transects the boundary of a site despite scale or impact or is within 30 meters of a route. There are routes associated with multiple sites (e.g. Route D_14 and Site 05175500105). Sites such as this were not double counted in the final number; they are identified in Table 3.05-3 with an asterisk (*) and in Table 3.05-4.

The NRHP status of all sites is also reported in Table 3.05-3. All cultural resources sites that have not been evaluated for the inclusion in the NRHP are noted as unevaluated. Several sites within the APE have been evaluated for inclusion in the NRHP. There are 17 sites within the APE that are ineligible for inclusion in the NRHP. These sites are not retained in the remaining tables in this chapter. Four (4) sites have been determined to be eligible with one of these listed on the NRHP (FS Site 05175700004); see Table 3.05-5 for a summary.

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 effect to cultural resources. The results of field survey and archival review 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). Examples of effects identified are summarized in Table 3.05-6.

The project’s effect on the integrity of the 133 unevaluated/eligible at risk cultural resource sites was assessed. Available data and monitoring observations were used 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 3.05-3. Summary of Cultural Resources within the APE

Route ID	Site Number	Site Type	NRHP Status
25-9_p	05175300469	Prehistoric	Unevaluated
491-3_1	05175300337	Multicomponent	Unevaluated
491-3_2	05175300216	Historic	Unevaluated
ARM-5	05175400124	Prehistoric	**Ineligible**
Boca Reservoir “Open Area”	05175700175	Prehistoric	**Ineligible**
Boca Reservoir “Open Area”	05175700241	Historic	**Ineligible**
Boca Reservoir “Open Area”	05175700303	Prehistoric	Unevaluated
Boca Reservoir “Open Area”	05175700305	Prehistoric	Unevaluated
Boca Reservoir “Open Area”	05175700307	Prehistoric	Unevaluated
Boca Reservoir “Open Area”	05175700240/CA-NEV-81*	Prehistoric	Unevaluated
Boca Reservoir “Open Area”	CA-NEV-26	Multicomponent	Unevaluated
Boca Reservoir “Open Area”	05175700747	Prehistoric	Unevaluated
Boca Reservoir “Open Area”	05175700749	Prehistoric	Unevaluated
Boca Reservoir “Open Area”	05175700750	Prehistoric	Unevaluated
Boca Reservoir “Open Area”	05175700775	Prehistoric	Unevaluated
Boca Reservoir “Open Area”	05175700776	Prehistoric	Unevaluated
Boca Reservoir “Open Area”	05175700777	Prehistoric	Unevaluated
H11E10	05175300696	Historic	Unevaluated
H301-6	05175300176*	Historic	Unevaluated
H301-6	05175300188*	Multicomponent	Unevaluated
H3-4-4	05175700148*	Prehistoric	Unevaluated
H54-9	05175600283	Historic	Unevaluated
H54-9	05175600341	Multicomponent	Unevaluated
H54-9	05175600317	Prehistoric	Unevaluated
H88-44	05175400215	Prehistoric	Unevaluated
H889-28	05175700088	Prehistoric	Unevaluated
H889-3-18-5	05175700563*	Prehistoric	Unevaluated
H889-8	05175700395*	Multicomponent	Unevaluated
H889-8	05175700401	Prehistoric	Unevaluated
H894-5-1	05175700240/CA-NEV-81*	Prehistoric	Unevaluated
N25-1-1	05175300347	Prehistoric	Unevaluated
N25-1-1	05175300348	Prehistoric	Unevaluated
N25-2	05175300454	Prehistoric	Unevaluated
N25-6-1	05175300356	Prehistoric	Unevaluated
N25-7	05175300034	Prehistoric	Unevaluated
N261-8-15-2	05175700563*	Prehistoric	Unevaluated
N27-3	05175300514	Historic	Unevaluated
N27-5	05175300446	Prehistoric	Unevaluated
N39-5	05175300217	Historic	Unevaluated
N43-6-2	05175400368	Historic	Unevaluated
N860-20-1	05175600426	Prehistoric	Unevaluated

Route ID	Site Number	Site Type	NRHP Status
N860-20-1	05175700540*	Prehistoric	Unevaluated
N886-14-10	05175700577	Historic	Unevaluated
N886-1-5	05175700009	Multicomponent	Unevaluated
N886-1-5	05175700409	Multicomponent	Unevaluated
N886-18-10	05175700447	Prehistoric	Unevaluated
N886-18-10	05175700529	Prehistoric	Unevaluated
N889-3-30-10	05175700304	Prehistoric	Unevaluated
N890-14-5	05175700511	Prehistoric	Unevaluated
N96-34-2-6	05175400325	Prehistoric	Unevaluated
Prosser Reservoir “Open Area”	05175700460	Prehistoric	**Ineligible**
Prosser Reservoir “Open Area”	05175700609	Multicomponent	Unevaluated
Prosser Reservoir “Open Area”	05175700608/CA-NEV-64	Prehistoric	Unevaluated
Prosser Reservoir “Open Area”	05175700753	Prehistoric	Unevaluated
Prosser Reservoir “Open Area”	05175700754	Prehistoric	Unevaluated
Prosser Reservoir “Open Area”	05175700755	Prehistoric	Unevaluated
Prosser Reservoir “Open Area”	05175700756*	Prehistoric	Unevaluated
Prosser Reservoir “Open Area”	05175700757	Prehistoric	Unevaluated
Prosser Reservoir “Open Area”	05175700758	Prehistoric	Unevaluated
Prosser Reservoir “Open Area”	05175700759	Prehistoric	Unevaluated
Prosser Reservoir “Open Area”	05175700760	Prehistoric	Unevaluated
Prosser Reservoir “Open Area”	05175700761	Prehistoric	Unevaluated
Prosser Reservoir “Open Area”	05175700762	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	05175700535	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	05175700540*	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	05175700004/SIE-S44	Prehistoric	**Eligible** and listed on the National Register of Historic Places
Stampede Reservoir “Open Area”	05175700763	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	05175700764	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	05175700765	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	05175700766	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	05175700767	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	05175700768	Historic	Unevaluated
Stampede Reservoir “Open Area”	05175700769	Historic	Unevaluated
Stampede Reservoir “Open Area”	05175700770	Historic	Unevaluated
Stampede Reservoir “Open Area”	DWR-S-1	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	SIE-11	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	SIE-12	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	SIE-13	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	SIE-14	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	SIE-15	Prehistoric	Unevaluated
Stampede Reservoir “Open Area”	SIE-16	Prehistoric	Unevaluated

Route ID	Site Number	Site Type	NRHP Status
Stampede Reservoir "Open Area"	SIE-17	Prehistoric	Unevaluated
Stampede Reservoir "Open Area"	SIE-28	Prehistoric	**Ineligible**
D_25_d	05175300004	Historic	**Eligible**
D_11E03_b	05175300016*	Multicomponent	Unevaluated
D_11E03_c	05175300016*	Multicomponent	Unevaluated
D_11E03_d	05175300016*	Multicomponent	Unevaluated
D_721-2_a	05175300074	Prehistoric	Unevaluated
D_12E66_c	05175300156*	Multicomponent	Unevaluated
D_12E66_d	05175300156*	Multicomponent	Unevaluated
D_S-301_a	05175300176*	Historic	Unevaluated
D_S-301_a	05175300188*	Multicomponent	Unevaluated
D_11E10_a	05175300386*	Historic	Unevaluated
D_12E66_a	05175300404*	Prehistoric	Unevaluated
D_12E66_a	05175300561*	Prehistoric	Unevaluated
D_12E67_d	05175300404*	Prehistoric	Unevaluated
D_12E67_d	05175300561*	Prehistoric	Unevaluated
D_S295_a	05175300436*	Historic	Unevaluated
D_S295_b	05175300436*	Historic	Unevaluated
D_12E68_a	05175300455	Historic	Unevaluated
D_S300_a	05175300595*	Historic	Unevaluated
D_S300_b	05175300595*	Historic	Unevaluated
D_738-4_a	05175300883	Historic	Unevaluated
D_12E66_b	05175300892	Prehistoric	Unevaluated
D_6149-31	05175400008	Historic	Unevaluated
D_P88_d	05175400176	Historic	**Eligible**
D_P88_b	05175400312	Historic	Unevaluated
D_14_b	05175500105*	Prehistoric	Unevaluated
D_14_c	05175500105*	Prehistoric	Unevaluated
D_14_h	05175500105*	Prehistoric	Unevaluated
D_14_j	05175500105*	Prehistoric	Unevaluated
D_14-4	05175500105*	Prehistoric	Unevaluated
D_18-19_a	05175500344	Prehistoric	Unevaluated
D_738-4_f	05175500363*	Multicomponent	Unevaluated
D_738-4_g	05175500363*	Multicomponent	Unevaluated
D_738-4_e	05175500364	Multicomponent	Unevaluated
D_SIE-855_a	05175600016	Prehistoric	**Ineligible**
D_5_b	05175600018	Historic	Unevaluated
D_16TH19-1	05175600119	Historic	Unevaluated
D_7-10	05175600164	Historic	Unevaluated
D_860-42	05175600202	Historic	Unevaluated
D_SIE-0560_c	05175600249	Historic	**Ineligible**
D_S450	05175600338	Prehistoric	Unevaluated

Route ID	Site Number	Site Type	NRHP Status
D_5_a	05175600394	Historic	Unevaluated
D_860-25	05175600421	Prehistoric	Unevaluated
D_SV-M1	05175600431	Multicomponent	Unevaluated
D_560-20_b	05175600442	Historic	**Eligible**
D_860-40	05175600449	Historic	**Ineligible**
D_03-4_a	05175700148*	Prehistoric	Unevaluated
D_270-8_b	05175700358*	Multicomponent	Unevaluated
D_270-8_c	05175700358*	Multicomponent	Unevaluated
D_886-10_a	05175700379*	Prehistoric	Unevaluated
D_886-18_a	05175700379*	Prehistoric	Unevaluated
D_886-18_b	05175700379*	Prehistoric	Unevaluated
D_S860_a	05175700620	Multicomponent	Unevaluated
D_787-19	05175700756*	Prehistoric	Unevaluated
D_450-101_a	05175700779	Historic	Unevaluated
D_72_d	05175700125	Historic	**Ineligible**
D_860-5_b	05175700354*	Prehistoric	**Ineligible**
D_860-5_h	05175700097/05175700101*	Prehistoric	**Ineligible**
D_860-5_i	05175700096*	Historic	Unevaluated
D_N886_18C	05175700778	Prehistoric	Unevaluated
D_NEV-3013_b	05175700264	Historic	**Ineligible**
SV-P14	05175600571	Prehistoric	Unevaluated
SV-P5	05175600574	Historic	**Ineligible**
TKN-J11	05175700096*	Historic	Unevaluated
TKN-J11	05175700097/05175700101*	Prehistoric	**Ineligible**
TKN-J11	05175700354*	Prehistoric	**Ineligible**
TKN-J13	05175700286	Multicomponent	Unevaluated
TKN-J13	05175700287	Prehistoric	Unevaluated
TKN-J6	05175700374	Prehistoric	Unevaluated
TKN-J9	05175700508	Historic	**Ineligible**
TKN-M2	05175700395*	Multicomponent	Unevaluated
TKN-M2	05175700397	Prehistoric	Unevaluated
TKN-M2	05175700734	Prehistoric	Unevaluated
TKN-Q1	05175700087	Prehistoric	Unevaluated
TKN-Q1	05175700554	Prehistoric	**Ineligible**
TKN-PP	05175700774	Prehistoric	Unevaluated
TKS-11	05175700735	Prehistoric	Unevaluated
TKS-11	05175700736	Prehistoric	Unevaluated
TKS-M9	05175700450	Historic	**Ineligible**
YRN-004	05175300676	Historic	Unevaluated
YRN-007	05175300426	Prehistoric	Unevaluated
YRN-008	05175300369	Historic	Unevaluated
YRN-1	05175300881	Historic	Unevaluated

Route ID	Site Number	Site Type	NRHP Status
YRN-2	05175300499	Historic	Unevaluated
YRN-2	05175300545	Historic	Unevaluated
YRN-2	05175300546	Historic	Unevaluated
YRN-4	05175300386*	Historic	Unevaluated
YRN-509	05175300198	Historic	Unevaluated
YRN-509	05175300205	Historic	Unevaluated
YRN-7	05175300674	Historic	Unevaluated
YRN-M2	05175300671	Historic	Unevaluated
YRN-M2	05175300675	Historic	Unevaluated
YRN-M2	05175300890	Historic	Unevaluated
YRS-F1	05175300888	Historic	**Ineligible**
YRS-SF5	05175500272	Historic	Unevaluated
Unauthorized routes not included in any alternative	749 additional sites		

Note: Under site type, prehistoric indicates Native American sites; historic designates sites that date from 1846 until 50 years ago, and multicomponent refers to a location that contains artifacts and/or features from both time periods; * indicates a site listed multiple times but only counted once.

Table 3.05-4. Cultural Resource Sites Associated with Multiple Routes within the APE by Alternative

Route ID	Site Number	Alt 1	Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
D_11E03_b	05175300016	X	X		X	X	
D_11E03_c	05175300016	X	X		X	X	
D_11E03_d	05175300016	X	X		X	X	
D_12E66_c	05175300156	X	X	X	X	X	
D_12E66_d	05175300156	X	X	X	X	X	
D_S-301_a	05175300176	X	X	X	X	X	
H301-6	05175300176	X			X		
D_S-301_a	05175300188	X	X	X	X	X	
H301-6	05175300188	X			X		
D_11E10_a	05175300386	X	X		X	X	
YRN-4	05175300386	X	X		X	X	X
D_12E66_a	05175300404	X	X		X	X	
D_12E67_d	05175300404	X	X		X	X	
D_S295_a	05175300436	X	X	X	X	X	
D_S295_b	05175300436	X	X	X	X	X	
D_12E66_a	05175300561	X	X		X	X	
D_12E67_d	05175300561	X	X		X	X	
D_S300_a	05175300595	X	X	X	X	X	
D_S300_b	05175300595	X	X	X	X	X	
D_14_b	05175500105	X	X	X	X	X	
D_14_c	05175500105	X				X	
D_14_h	05175500105	X				X	
D_14_j	05175500105	X	X	X	X	X	

Route ID	Site Number	Alt 1	Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
D_14-4	05175500105	X				X	
D_738-4_f	05175500363	X			X	X	
D_738-4_g	05175500363	X			X	X	
D_860-5_i	05175700096	X				X	
TKN-J11	05175700096	X	X		X	X	
D_03-4_a	05175700148	X	X	X	X	X	
H3-4-4	05175700148	X			X		
Boca Reservoir "Open Area"	05175700240/CA-NEV-81	X	X				
H894-5-1	05175700240/CA-NEV-81	X			X		
D_270-8_b	05175700358	X				X	
D_270-8_c	05175700358	X				X	
D_886-10_a	05175700379	X	X		X	X	
D_886-18_a	05175700379	X	X		X	X	
D_886-18_b	05175700379	X	X		X	X	
H889-8	05175700395	X			X		
TKN-M2	05175700395	X	X		X	X	
N860-20-1	05175700540	X			X		
Stampede Reservoir "Open Area"	05175700540	X	X				
H889-3-18-5	05175700563	X			X		
N261-8-15-2	05175700563	X			X		
D_787-19	05175700756	X				X	
Prosser Reservoir "Open Area"	05175700756	X	X				

Note: Sites that have been determined ineligible were not included in this table. Alternative 3 was not listed on this table because no additions or changes to the NFTS would occur.

Table 3.05-5. Summary of Cultural Resource Sites within the APE

Unevaluated	Eligible	Ineligible	Total Number of Sites in APE	Total Number of Unevaluated and Eligible Sites in the APE
129	4	16	149	133

Table 3.05-6. Examples of Site Effects Documented at Cultural Resource Sites at Risk

Direct/Minor Effects	Direct/Moderate Effects
§ Driving off-established routes onto cultural sites. § Motorized vehicle camping-related activities (e.g., digging fire pits) within boundaries of cultural sites. § Illicit digging activities (looting).	§ Routes traverse cultural resource sites causing displacement of artifacts. § Routes with improper drainage causing erosion. § In open areas, multiple vehicular tracks crisscrossing sites.

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: none/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. Routes in varying degrees have transected most sites in the APE. In some cases, effects to cultural resources were negligible (i.e., none) and no mitigation measures are required. However, monitoring was recommended in these situations or when effects were difficult to determine (i.e., camping at a very large quarry site).

Working definitions for the four severity categories are provided in Table 3.05-7. A severity rating of "minor" indicates that some relatively minor disturbance has been noted within the boundaries of the 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 or lessened by employing the simplest of protection measures. In most cases, this would consist of installing barriers to keep vehicles on the route or within motorized vehicle based dispersed camping to a confined location.

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. 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. Any major severity effects from proposed routes identified during this analysis were addressed through the Section 106 process (i.e., evaluation of Site 05175300888) or the route was eliminated from consideration. No major severity effects to cultural resources exist under any of the action alternatives.

Table 3.05-7. Severity of Effects Definitions

Severity of Effects	Working Definition	Explanatory Notes
None/Negligible	Cultural resources are adjacent to routes but are not transected by a route or the route transects a portion of the site. 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. Monitoring is recommended.
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. 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

Severity of Effects	Working Definition	Explanatory Notes
		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.

Table 3.05-8 provides a summary of the effects to cultural resources at risk based on an analysis of effects to site integrity (i.e., degree to which the integrity of historic property values are diminished). The data categorize current forest-wide severity of effects if no action is taken to avoid adverse effects.

Table 3.05-8. At-Risk Sites Summarized According to Type and Severity of Effect based on Alternative 1

Unknown	None	Direct/Minor	Direct/Moderate	Major	Total
8	11	80	34	None	133

Cultural Resources: Environmental Consequences

Considerations for all alternatives

This section discloses the environmental effects of each of the alternatives on cultural resources on the Forest. This analysis is focused on the effects of five management actions: (1) the prohibition of cross country motorized travel, (2) additions of currently unauthorized routes to the National Forest Transportation System (NFTS), (3) establishment of motorized "Open Areas," (4) changes to the existing NFTS, and (5) Amendments to the Forest Plan. These 5 management actions have indicators that are used in determining effects for the proposed actions. The indicators were previously listed in the Cultural Resources Indicators section under the Effects Analysis Methodology.

Direct and indirect effects common to all alternatives

To minimize redundancy, cross country travel, additions to the NFTS, establishment of "Open Areas," changes to the NFTS, and amendments to the Forest Plan are addressed corporately in the following section for all seven of the alternatives.

Cross Country Travel: For all of the action alternatives, the prohibition of motor vehicle use off designated transportation systems and areas would have a beneficial effect on cultural resources throughout the Forest in the short and long terms. It would curtail on-going potential for adverse effects and reduce the threat to cultural and historic properties that would occur if use were to continue on all unauthorized roads and trails. It would also help eliminate potential effects resulting from the creation of any new routes and trails if cross-country motorized vehicle use was not prohibited. Under this prohibition, most, if not all, future permitted or other authorized motorized vehicle travel off designated NFTS roads would be subject to NHPA Section 106 compliance and potential effects to cultural and historic properties can be identified at that time. Under Alternative 1, cross country travel would continue, except for areas previously prohibited to motorized use.

Additions to the NFTS: This is addressed individually under each alternative discussion, except for Alternatives 1 and 3, which do not add any routes to the NFTS.

Establishment of Motorized "Open Areas": This is addressed individually under Alternatives 2 and 6, the only alternatives to establish "Open Areas." The establishment of "Open Areas" would not affect cultural resources in Alternatives 1, 3, 4, 5, and 7 as no "Open Areas" are proposed.

Changes to the existing NFTS: Proposed changes to the existing NFTS are minimal. A modification proposed to existing system routes is a change in permitted vehicle class. For purposes of this cultural resource assessment, it is assumed that there is no measurable difference in the magnitude of effects to cultural resources between full-size four-wheel drive vehicles, passenger vehicles, specialized off-highway vehicles, and single-track motorcycle trails. Based on the current data available, there is no measurable difference in the scale of potential damage to cultural resources, regardless of vehicle size or type.

Change in season of use has no effect on cultural resources and will not be addressed under each alternative.

The changes to the NFTS resulting from reopening Maintenance Level 1 (ML 1) roads will be addressed under Alternatives 4, 5, 6, and 7 since those are the only alternatives that add ML 1 roads to the NFTS.

Amendments to the Forest Plan: There is no effect to cultural resources from amending the Forest Plan; therefore, this will not be addressed under each alternative.

Effects of Mitigation Measures on Cultural Resources: As described in Chapter 2 (The Alternatives) and Appendix A (Site Specific Road, Trail and Open Area Information), mitigation measures have been proposed to eliminate or lessen direct, indirect, and cumulative effects on forest resources. Some mitigation may consist of ground-disturbing activities with the potential to adversely affect cultural resources. In this section, all proposed mitigation measures are reviewed and those with the potential to affect cultural resources are identified and analyzed.

Certain mitigation measures have little or no potential to affect cultural resources because they do not involve ground or surface disturbance. Mitigations that do not pose a threat include: monitoring, seasonal closures, installation of single-post signs, and installation of non-intrusive barriers to control traffic flow. Weed removal mitigations also pose no threat to cultural resources. The mitigation measures listed in this paragraph have little or no potential to affect cultural resources and are therefore exempt from further analysis.

Site specific effects: Table 3.05-9 shows the site specific motorized effects on at risk cultural resource sites by alternative. Sites that have been determined ineligible have been removed from this table and the specific alternative tables. The protection 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. If monitoring demonstrates that protection 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 approach is an option in the Motorized Recreation PA. Table 3.05-10 summarizes motorized effects on at-risk cultural resources by alternative.

Table 3.05-9. Site Specific Motorized Effects on Cultural Resources at Risk by Alternative

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 1	Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
25-9_p	05175300469	Displacement	Direct/minor	Monitor	X			X	X	
491-3_1	05175300337	None	None	Monitor	X			X	X	
491-3_2	05175300216	Displacement	Direct/minor	Monitor	X					
Boca Reservoir "Open Area"	05175700303	Displacement	Direct/minor	Install barriers to keep users on system route	X	X				
Boca Reservoir "Open Area"	05175700305	Displacement	Direct/minor	Install barriers to keep users on system route	X	X				
Boca Reservoir "Open Area"	05175700307	Displacement	Direct/minor	Install barriers to keep users on system route	X	X				
Boca Reservoir "Open Area"	05175700240/CA-NEV-81*	Displacement	Direct/minor	Install barriers to keep users on system routes	X	X				
Boca Reservoir "Open Area"	CA-NEV-26	Displacement	Direct/moderate	Site is below high water in closed BOR area. Demarcate closed area.	X	X				
Boca Reservoir "Open Area"	05175700747	Displacement	Direct/moderate	Install barriers	X	X				
Boca Reservoir "Open Area"	05175700749	Displacement	Direct/moderate	Install barriers	X	X				
Boca Reservoir "Open Area"	05175700750	Displacement	Direct/moderate	Install barriers	X	X				
Boca Reservoir "Open Area"	05175700775	Displacement	Direct/moderate	Install barriers	X	X				
Boca Reservoir "Open Area"	05175700776	Displacement	Direct/moderate	Install barriers	X	X				
Boca Reservoir "Open Area"	05175700777	Displacement	Direct/moderate	Install barriers	X	X				
H11E10	05175300696	Displacement	Direct/minor	Monitor	X			X		
H301-6	05175300176*	Displacement	Direct/minor	Monitor	X			X		
H301-6	05175300188*	Displacement	Direct/minor	Monitor	X			X		
H3-4-4	05175700148*	Displacement	Direct/minor	Monitor	X			X		
H54-9	05175600283	Displacement	Direct/minor	Monitor	X			X		
H54-9	05175600341	Displacement	Direct/minor	Monitor	X			X		
H54-9	05175600317	Displacement	Direct/minor	Monitor	X			X		

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 1	Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
H88-44	05175400215	Displacement	Direct/minor	Monitor	X			X		
H889-28	05175700088	Displacement	Direct/minor	Monitor	X			X		
H889-3-18-5	05175700563*	Displacement	Direct/minor	Monitor	X			X		
H889-8	05175700395*	Displacement	Direct/minor	Monitor	X			X		
H889-8	05175700401	Displacement	Direct/minor	Monitor	X			X		
H894-5-1	05175700240/CA-NEV-81*	Displacement	Direct/minor	Monitor	X			X		
N25-1-1	05175300347	Displacement	Direct/minor	Monitor	X			X		
N25-1-1	05175300348	Displacement	Direct/minor	Monitor	X			X		
N25-2	05175300454	Displacement	Direct/minor	Monitor	X			X		
N25-6-1	05175300356	Displacement	Direct/minor	Monitor	X			X		
N25-7	05175300034	Displacement	Direct/minor	Monitor	X			X		
N261-8-15-2	05175700563*	Displacement	Direct/minor	Monitor	X			X		
N27-3	05175300514	Displacement	Direct/minor	Monitor	X			X		
N27-5	05175300446	Displacement	Direct/minor	Monitor	X			X		
N39-5	05175300217	Displacement/looting	Direct/minor	Monitor	X			X		
N43-6-2	05175400368	Displacement	Direct/minor	Monitor	X			X		
N860-20-1	05175600426	Displacement	Direct/minor	Monitor	X			X		
N860-20-1	05175700540*	Displacement	Direct/minor	Monitor	X			X		
N886-14-10	05175700577	Displacement	Direct/minor	Monitor	X			X		
N886-1-5	05175700009	Displacement	Direct/minor	Monitor	X			X		
N886-1-5	05175700409	Displacement	Direct/minor	Monitor	X			X		
N886-18-10	05175700447	Displacement	Direct/minor	Monitor	X			X		
N886-18-10	05175700529	Displacement	Direct/minor	Monitor	X			X		
N889-3-30-10	05175700304	Displacement	Direct/minor	Monitor	X			X		
N890-14-5	05175700511	Displacement	Direct/minor	Monitor	X			X		
N96-34-2-6	05175400325	Displacement	Direct/minor	Monitor	X			X		
Prosser Reservoir “Open Area”	05175700609	Displacement/shoreline erosion/high level of motorized use	Direct/moderate	Install barriers	X	X				

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 1	Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
Prosser Reservoir "Open Area"	05175700608/CA-NEV-64	Displacement/shoreline erosion/ high level of motorized use	Direct/moderate	Install barriers	X	X				
Prosser Reservoir "Open Area"	05175700753	Displacement/ high level of motorized use	Direct/moderate	Install barriers	X	X				
Prosser Reservoir "Open Area"	05175700754	Displacement/ high level of motorized use	Direct/moderate	Install barriers	X	X				
Prosser Reservoir "Open Area"	05175700755	Displacement/ high level of motorized use	Direct/moderate	Install barriers	X	X				
Prosser Reservoir "Open Area"	05175700756*	Displacement	Direct/minor	Install barriers	X	X				
Prosser Reservoir "Open Area"	05175700757	Displacement/ high level of motorized use	Direct/moderate	Install barriers	X	X				
Prosser Reservoir "Open Area"	05175700758	Displacement/ high level of motorized use	Direct/moderate	Install barriers	X	X				
Prosser Reservoir "Open Area"	05175700759	Displacement/ high level of motorized use	Direct/moderate	Install barriers	X	X				
Prosser Reservoir "Open Area"	05175700760	Displacement/ high level of motorized use	Direct/moderate	Install barriers	X	X				
Prosser Reservoir "Open Area"	05175700761	Displacement/ high level of motorized use	Direct/moderate	Install barriers	X	X				
Prosser Reservoir "Open Area"	05175700762	Displacement/high level of motorized use	Direct/moderate	Install barriers	X	X				
Stampede Reservoir "Open Area"	05175700535	Displacement	Direct/moderate	Install barriers to keep users on route	X	X				
Stampede Reservoir "Open Area"	05175700540*	Displacement	Direct/moderate	Install barriers to keep users on route	X	X				
Stampede Reservoir "Open Area"	05175700004/SIE-S44	Displacement/shoreline erosion	Direct/minor	Install barriers	X	X				
Stampede Reservoir "Open Area"	05175700763	Displacement	Direct/moderate	Install barriers	X	X				
Stampede Reservoir "Open Area"	05175700764	Displacement	Direct/moderate	Install barriers	X	X				
Stampede Reservoir "Open Area"	05175700765	Displacement	Direct/moderate	Install barriers	X	X				

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 1	Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
Stampede Reservoir "Open Area"	05175700766	Displacement	Direct/moderate	Install barriers	X	X				
Stampede Reservoir "Open Area"	05175700767	Displacement	Direct/moderate	Install barriers	X	X				
Stampede Reservoir "Open Area"	05175700768	Displacement	Direct/moderate	Install barriers	X	X				
Stampede Reservoir "Open Area"	05175700769	Displacement	Direct/moderate	Install barriers	X	X				
Stampede Reservoir "Open Area"	05175700770	Displacement	Direct/moderate	Install barriers	X	X				
Stampede Reservoir "Open Area"	DWR-S-1	Unknown-below waterline	Unknown	N/A	X	X				
Stampede Reservoir "Open Area"	SIE-11	Unknown-below waterline	Unknown	N/A	X	X				
Stampede Reservoir "Open Area"	SIE-12	Unknown-below waterline	Unknown	N/A	X	X				
Stampede Reservoir "Open Area"	SIE-13	Unknown-below waterline	Unknown	N/A	X	X				
Stampede Reservoir "Open Area"	SIE-14	Unknown-below waterline	Unknown	N/A	X	X				
Stampede Reservoir "Open Area"	SIE-15	Unknown-below waterline	Unknown	N/A	X	X				
Stampede Reservoir "Open Area"	SIE-16	Unknown-below waterline	Unknown	N/A	X	X				
Stampede Reservoir "Open Area"	SIE-17	Unknown-below waterline	Unknown	N/A	X	X				
D_25_d	05175300004	Displacement	Direct/minor	Monitor	X	X	X	X	X	
D_11E03_b	05175300016*	Displacement/Camping	Direct/minor	Monitor	X	X		X	X	
D_11E03_c	05175300016*	Displacement/Camping	Direct/minor	Monitor	X	X		X	X	
D_11E03_d	05175300016*	Displacement/Camping	Direct/minor	Monitor	X	X		X	X	
D_721-2_a	05175300074	Displacement/Camping	Direct/minor	Monitor	X	X	X	X	X	
D_12E66_c	05175300156*	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_12E66_d	05175300156*	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_S-301_a	05175300176*	Camping	Direct/minor	Monitor	X	X	X	X	X	

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 1	Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
D_S-301_a	05175300188*	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_11E10_a	05175300386*	None	None	Monitor	X	X		X	X	
D_12E66_a	05175300404*	Camping	Direct/minor	Monitor	X	X		X	X	
D_12E66_a	05175300561*	Camping	Direct/minor	Monitor	X	X		X	X	
D_12E67_d	05175300404*	Camping	Direct/minor	Monitor	X	X		X	X	
D_12E67_d	05175300561*	Camping	Direct/minor	Monitor	X	X		X	X	
D_S295_a	05175300436*	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_S295_b	05175300436*	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_12E68_a	05175300455	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_S300_a	05175300595*	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_S300_b	05175300595*	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_738-4_a	05175300883	Camping	Direct/minor	Monitor	X	X		X	X	
D_12E66_b	05175300892	Camping	Direct/minor	Monitor	X	X		X	X	
D_6149-31	05175400008	Camping/looting	Direct/minor	Monitor	X				X	
D_P88_d	05175400176	None	None	Monitor	X				X	
D_P88_b	05175400312	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_14_b	05175500105*	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_14_c	05175500105*	Camping	Direct/minor	Monitor	X				X	
D_14_h	05175500105*	Camping	Direct/minor	Monitor	X				X	
D_14_j	05175500105*	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_14-4	05175500105*	Camping	Direct/minor	Monitor	X				X	
D_18-19_a	05175500344	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_738-4_f	05175500363*	Camping	Direct/minor	Monitor	X			X	X	
D_738-4_g	05175500363*	Camping	Direct/minor	Monitor	X			X	X	
D_738-4_e	05175500364	Camping	Direct/minor	Monitor	X			X	X	
D_5_b	05175600018	Camping	Direct/minor	Monitor	X				X	
D_16TH19-1	05175600119	Camping	Direct/minor	Monitor	X				X	
D_7-10	05175600164	Camping	Direct/minor	Monitor	X				X	
D_860-42	05175600202	Camping	Direct/minor	Monitor	X				X	
D_S450	05175600338	Camping	Direct/minor	Monitor	X				X	

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 1	Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
D_5_a	05175600394	Camping	Direct/minor	Monitor	X				X	
D_860-25	05175600421	Camping	Direct/minor	Monitor	X				X	
D_SV-M1	05175600431	Camping	Direct/minor	Monitor	X				X	
D_560-20_b	05175600442	Camping	Direct/minor	Monitor	X				X	
D_03-4_a	05175700148*	Camping	Direct/minor	Monitor	X	X	X	X	X	
D_270-8_b	05175700358*	Camping	Direct/minor	Monitor	X				X	
D_270-8_c	05175700358*	Camping	Direct/minor	Monitor	X				X	
D_886-10_a	05175700379*	Camping	Direct/minor	Monitor	X	X		X	X	
D_886-18_a	05175700379*	Camping	Direct/minor	Monitor	X	X		X	X	
D_886-18_b	05175700379*	Camping	Direct/minor	Monitor	X	X		X	X	
D_S860_a	05175700620	Camping	Direct/minor	Monitor	X				X	
D_787-19	05175700756*	Camping	Direct/minor	Monitor	X				X	
D_450-101_a	05175700779	Camping	Direct/minor	Monitor	X	X		X	X	
D_860-5_i	05175700096*	Camping	None	None	X				X	
D_N886_18C	05175700778	Camping	Direct/minor	Monitor	X				X	
SV-P14	05175600571	Displacement	Direct/minor	Install barriers to keep users on route	X	X	X	X	X	X
TKN-J11	05175700096*	Camping	None	None	X	X		X	X	
TKN-J13	05175700286	Displacement/shoreline erosion	Direct/moderate	Install barriers	X	X	X	X	X	X
TKN-J13	05175700287	Displacement/shoreline erosion	Direct/moderate	Install barriers	X	X	X	X	X	X
TKN-J6	05175700374	Displacement/camping	Direct/minor	Recreation mitigation (barriers)	X	X		X	X	X
TKN-M2	05175700395*	Displacement	Direct/minor	Install barriers to keep users on route	X	X		X	X	
TKN-M2	05175700397	Displacement	Direct/minor	Install barriers to keep users on route	X	X		X	X	
TKN-M2	05175700734	Erosion/Displacement	Direct/moderate	Install barriers to keep users on route-	X	X		X	X	
TKN-Q1	05175700087	Displacement	Direct/minor	Monitor	X	X		X	X	
TKN-PP	05175700774	Displacement	Direct/minor	Monitor	X				X	

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 1	Alt 2	Alt 4	Alt 5	Alt 6	Alt 7
TKS-11	05175700735	None	None	None	X	X		X	X	X
TKS-11	05175700736	None	None	Monitor	X	X		X	X	X
YRN-004	05175300676	Displacement	Direct/minor	Monitor	X	X		X		
YRN-007	05175300426	None	None	Monitor	X	X		X		
YRN-008	05175300369	Displacement /rutting	Direct/moderate	Install barriers to keep users on route and to designate camping areas.	X	X		X	X	
YRN-1	05175300881	None	None	Monitor	X	X		X	X	X
YRN-2	05175300499	Erosion	Direct/moderate	Monitor-	X	X		X	X	X
YRN-2	05175300545	Displacement	Direct/minor	Install barriers to keep users on route	X	X		X	X	X
YRN-2	05175300546	None	None	Monitor	X	X		X	X	X
YRN-4	05175300386*	None	None	Monitor	X	X		X	X	X
YRN-509	05175300198	Displacement	Direct/minor	Install barriers to prohibit use on spur road off main route	X			X	X	
YRN-509	05175300205	Displacement	Direct/minor	Install barriers to prohibit use on spur road off main route	X			X	X	
YRN-7	05175300674	Erosion	Direct/moderate	Monitor-.	X	X		X		X
YRN-M2	05175300671	Erosion	Direct/moderate	Monitor-	X	X		X		
YRN-M2	05175300675	Displacement	Direct/minor	Monitor	X	X		X		
YRN-M2	05175300890	None	None	Monitor	X	X		X		
YRS-SF5	05175500272	None	None	Monitor	X	X	X	X	X	X
Unauthorized routes not included in any alternative	749 additional sites									

Note: Sites that have been determined ineligible were not included in this table. Alternative 3 was not listed on this table because no additions or changes to the NFTS would occur;

* indicates a site listed multiple times but only counted once.

Table 3.05-10. Summary Comparison of Effect, Type, and Severity on At Risk Cultural Resources

Effect	Type/Severity	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Displacement/erosion/rutting	Direct/Moderate	34	34	0	2	7	5	4
Displacement/camping/looting	Direct/Minor	80	34	0	13	60	45	3
None or Unknown	None	19	17	0	1	10	9	6
	Total	**133**	**85**	**0**	**16**	**77**	**59**	**13**
Cross Country Travel		Continues	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited

Alternative 1: No Action

The No Action Alternative provides a baseline for comparing the other alternatives. Under the No Action Alternative, no changes would be made to the NFTS and there would be no prohibition of cross country travel. Current management plans would continue to guide project area management. The Travel Management Rule would not be implemented, and no motor vehicle use map (MVUM) would be published. Motor vehicle travel by the public would not be limited to designated routes. Unauthorized routes would continue to proliferate and would have no status or authorization as NFTS facilities.

Direct and Indirect Effects

General effects of the No Action Alternative on cultural resources have been addressed in the Environmental Consequences section (above). One hundred thirty-three (133) cultural resource sites have been identified as resources at risk within the APE. They are vulnerable to effects if no action is taken to manage motorized use. An additional 749 sites are located near, or are transected by, unauthorized routes not addressed under any alternative in this analysis; these sites are also resources at risk. To quantify potential cumulative effects, one can calculate the average number of previously identified cultural resource sites per acre that would be susceptible to new routes created in the future without a prohibition. Within the TNF, 3,228 cultural resources sites have been identified. Site density averages .004 cultural resource sites for every acre. Excluding the 133 cultural resource sites that have already been identified (Table 3.05-5) within the APE, upwards of 3,095 additional cultural resource sites could be susceptible to an adverse effect if no management actions were implemented (this number includes the 749 sites associated with unauthorized routes not addressed under any alternative in this analysis).

Under Alternative 1, cross country travel would not be prohibited. There would be no management of any known unauthorized motorized routes. An unknown number of additional routes not being proposed in this project would continue to be used. Of the 133 cultural resource sites located within this alternative (refer to Table 3.05-4), 34 sites have moderate effects and 80 have minor effects that would continue and likely increase. The type and severity of effects for the remaining 19 is “none” or unknown (unknown was used for sites that were under water). Since cross country travel could occur anywhere on the forest, an unidentified number of cultural resources could be affected including the 749 sites located near or transected by unauthorized routes not addressed under any alternative in this analysis. This alternative does not propose any mitigation for these potential effects. Alternative 1 would have unmitigated adverse effects on upwards of 882 cultural resource sites (133 sites within the APE and 749 sites associated with

unauthorized routes not addressed under any alternative in this analysis); it would not meet the requirements of Section 106 of the NHPA.

Table 3.05-11. Summary of Effects to Cultural Resources at Risk: Alternative 1

Route ID	Site Number	Effect	Type/Severity	Alt 1
25-9_p	05175300469	Displacement	Direct/minor	X
491-3_1	05175300337	None	None	X
491-3_2	05175300216	Displacement	Direct/minor	X
Boca Reservoir “Open Area”	05175700303	Displacement	Direct/minor	X
Boca Reservoir “Open Area”	05175700305	Displacement	Direct/minor	X
Boca Reservoir “Open Area”	05175700307	Displacement	Direct/minor	X
Boca Reservoir “Open Area”	05175700240/CA-NEV-81*	Displacement	Direct/minor	X
Boca Reservoir “Open Area”	CA-NEV-26	Displacement	Direct/moderate	X
Boca Reservoir “Open Area”	05175700747	Displacement	Direct/moderate	X
Boca Reservoir “Open Area”	05175700749	Displacement	Direct/moderate	X
Boca Reservoir “Open Area”	05175700750	Displacement	Direct/moderate	X
Boca Reservoir “Open Area”	05175700775	Displacement	Direct/moderate	X
Boca Reservoir “Open Area”	05175700776	Displacement	Direct/moderate	X
Boca Reservoir “Open Area”	05175700777	Displacement	Direct/moderate	X
H11E10	05175300696	Displacement	Direct/minor	X
H301-6	05175300176*	Displacement	Direct/minor	X
H301-6	05175300188*	Displacement	Direct/minor	X
H3-4-4	05175700148*	Displacement	Direct/minor	X
H54-9	05175600283	Displacement	Direct/minor	X
H54-9	05175600341	Displacement	Direct/minor	X
H54-9	05175600317	Displacement	Direct/minor	X
H88-44	05175400215	Displacement	Direct/minor	X
H889-28	05175700088	Displacement	Direct/minor	X
H889-3-18-5	05175700563*	Displacement	Direct/minor	X
H889-8	05175700395*	Displacement	Direct/minor	X
H889-8	05175700401	Displacement	Direct/minor	X
H894-5-1	05175700240/CA-NEV-81*	Displacement	Direct/minor	X
N25-1-1	05175300347	Displacement	Direct/minor	X
N25-1-1	05175300348	Displacement	Direct/minor	X
N25-2	05175300454	Displacement	Direct/minor	X
N25-6-1	05175300356	Displacement	Direct/minor	X
N25-7	05175300034	Displacement	Direct/minor	X
N261-8-15-2	05175700563*	Displacement	Direct/minor	X
N27-3	05175300514	Displacement	Direct/minor	X
N27-5	05175300446	Displacement	Direct/minor	X
N39-5	05175300217	Displacement/ looting	Direct/minor	X
N43-6-2	05175400368	Displacement	Direct/minor	X

Route ID	Site Number	Effect	Type/Severity	Alt 1
N860-20-1	05175600426	Displacement	Direct/minor	X
N860-20-1	05175700540*	Displacement	Direct/minor	X
N886-14-10	05175700577	Displacement	Direct/minor	X
N886-1-5	05175700009	Displacement	Direct/minor	X
N886-1-5	05175700409	Displacement	Direct/minor	X
N886-18-10	05175700447	Displacement	Direct/minor	X
N886-18-10	05175700529	Displacement	Direct/minor	X
N889-3-30-10	05175700304	Displacement	Direct/minor	X
N890-14-5	05175700511	Displacement	Direct/minor	X
N96-34-2-6	05175400325	Displacement	Direct/minor	X
Prosser Reservoir “Open Area”	05175700609	Displacement/shoreline erosion	Direct/moderate	X
Prosser Reservoir “Open Area”	05175700608/CA-NEV-64	Displacement/shoreline erosion	Direct/moderate	X
Prosser Reservoir “Open Area”	05175700753	Displacement	Direct/moderate	X
Prosser Reservoir “Open Area”	05175700754	Displacement	Direct/moderate	X
Prosser Reservoir “Open Area”	05175700755	Displacement	Direct/moderate	X
Prosser Reservoir “Open Area”	05175700756*	Displacement	Direct/minor	X
Prosser Reservoir “Open Area”	05175700757	Displacement	Direct/moderate	X
Prosser Reservoir “Open Area”	05175700758	Displacement	Direct/moderate	X
Prosser Reservoir “Open Area”	05175700759	Displacement	Direct/moderate	X
Prosser Reservoir “Open Area”	05175700760	Displacement	Direct/moderate	X
Prosser Reservoir “Open Area”	05175700761	Displacement	Direct/moderate	X
Prosser Reservoir “Open Area”	05175700762	Displacement	Direct/moderate	X
Stampede Reservoir “Open Area”	05175700535	Displacement	Direct/moderate	X
Stampede Reservoir “Open Area”	05175700540*	Displacement	Direct/moderate	X
Stampede Reservoir “Open Area”	05175700004/SIE-S44	Displacement/shoreline erosion/looting	Direct/minor	X
Stampede Reservoir “Open Area”	05175700763	Displacement	Direct/moderate	X
Stampede Reservoir “Open Area”	05175700764	Displacement	Direct/moderate	X
Stampede Reservoir “Open Area”	05175700765	Displacement	Direct/moderate	X
Stampede Reservoir “Open Area”	05175700766	Displacement	Direct/moderate	X
Stampede Reservoir “Open Area”	05175700767	Displacement	Direct/moderate	X
Stampede Reservoir “Open Area”	05175700768	Displacement	Direct/moderate	X
Stampede Reservoir “Open Area”	05175700769	Displacement	Direct/moderate	X
Stampede Reservoir “Open Area”	05175700770	Displacement	Direct/moderate	X
Stampede Reservoir “Open Area”	DWR-S-1	Unknown-below waterline	Unknown	X
Stampede Reservoir “Open Area”	SIE-11	Unknown-below waterline	Unknown	X
Stampede Reservoir “Open Area”	SIE-12	Unknown-below waterline	Unknown	X
Stampede Reservoir “Open Area”	SIE-13	Unknown-below waterline	Unknown	X

Route ID	Site Number	Effect	Type/Severity	Alt 1
Stampede Reservoir “Open Area”	SIE-14	Unknown-below waterline	Unknown	X
Stampede Reservoir “Open Area”	SIE-15	Unknown-below waterline	Unknown	X
Stampede Reservoir “Open Area”	SIE-16	Unknown-below waterline	Unknown	X
Stampede Reservoir “Open Area”	SIE-17	Unknown-below waterline	Unknown	X
D_25_d	05175300004	Displacement	Direct/minor	X
D_11E03_b	05175300016*	Displacement/Camping	Direct/minor	X
D_11E03_c	05175300016*	Displacement/Camping	Direct/minor	X
D_11E03_d	05175300016*	Displacement/Camping	Direct/minor	X
D_721-2_a	05175300074	Displacement/Camping	Direct/minor	X
D_12E66_c	05175300156*	Camping	Direct/minor	X
D_12E66_d	05175300156*	Camping	Direct/minor	X
D_S-301_a	05175300176*	Camping	Direct/minor	X
D_S-301_a	05175300188*	Camping	Direct/minor	X
D_11E10_a	05175300386*	None	None	X
D_12E66_a	05175300404*	Camping	Direct/minor	X
D_12E66_a	05175300561*	Camping	Direct/minor	X
D_12E67_d	05175300404*	Camping	Direct/minor	X
D_12E67_d	05175300561*	Camping	Direct/minor	X
D_S295_a	05175300436*	Camping	Direct/minor	X
D_S295_b	05175300436*	Camping	Direct/minor	X
D_12E68_a	05175300455	Camping	Direct/minor	X
D_S300_a	05175300595*	Camping	Direct/minor	X
D_S300_b	05175300595*	Camping	Direct/minor	X
D_738-4_a	05175300883	Camping	Direct/minor	X
D_12E66_b	05175300892	Camping	Direct/minor	X
D_6149-31	05175400008	Camping/looting	Direct/minor	X
D_P88_d	05175400176	None	None	X
D_P88_b	05175400312	Camping	Direct/minor	X
D_14_b	05175500105*	Camping	Direct/minor	X
D_14_c	05175500105*	Camping	Direct/minor	X
D_14_h	05175500105*	Camping	Direct/minor	X
D_14_j	05175500105*	Camping	Direct/minor	X
D_14-4	05175500105*	Camping	Direct/minor	X
D_18-19_a	05175500344	Camping	Direct/minor	X
D_738-4_f	05175500363*	Camping	Direct/minor	X
D_738-4_g	05175500363*	Camping	Direct/minor	X
D_738-4_e	05175500364	Camping	Direct/minor	X
D_5_b	05175600018	Camping	Direct/minor	X
D_16TH19-1	05175600119	Camping	Direct/minor	X

Route ID	Site Number	Effect	Type/Severity	Alt 1
D_7-10	05175600164	Camping	Direct/minor	X
D_860-42	05175600202	Camping	Direct/minor	X
D_S450	05175600338	Camping	Direct/minor	X
D_5_a	05175600394	Camping	Direct/minor	X
D_860-25	05175600421	Camping	Direct/minor	X
D_SV-M1	05175600431	Camping	Direct/minor	X
D_560-20_b	05175600442	Camping	Direct/minor	X
D_03-4_a	05175700148*	Camping	Direct/minor	X
D_270-8_b	05175700358*	Camping	Direct/minor	X
D_270-8_c	05175700358*	Camping	Direct/minor	X
D_886-10_a	05175700379*	Camping	Direct/minor	X
D_886-18_a	05175700379*	Camping	Direct/minor	X
D_886-18_b	05175700379*	Camping	Direct/minor	X
D_S860_a	05175700620	Camping	Direct/minor	X
D_787-19	05175700756*	Camping	Direct/minor	X
D_450-101_a	05175700779	Camping	Direct/minor	X
D_860-5_i	05175700096	Camping	None	X
D_N886_18C	05175700778	Camping	Direct/minor	X
SV-P14	05175600571	Displacement	Direct/minor	X
TKN-J11	05175700096	Camping	None	X
TKN-J13	05175700286	Displacement/shoreline erosion	Direct/moderate	X
TKN-J13	05175700287	Displacement/shoreline erosion	Direct/moderate	X
TKN-J6	05175700374	Displacement/camping	Direct/minor	X
TKN-M2	05175700395*	Displacement	Direct/minor	X
TKN-M2	05175700397	Displacement	Direct/minor	X
TKN-M2	05175700734	Erosion/ Displacement	Direct/moderate	X
TKN-Q1	05175700087	Displacement	Direct/minor	X
TKN-PP	05175700774	Displacement	Direct/minor	X
TKS-11	05175700735	None	None	X
TKS-11	05175700736	None	None	X
YRN-004	05175300676	Erosion	Direct/moderate	X
YRN-007	05175300426	None	None	X
YRN-008	05175300369	Displacement/rutting	Direct/moderate	X
YRN-1	05175300881	None	None	X
YRN-2	05175300499	Erosion	Direct/moderate	X
YRN-2	05175300545	Displacement	Direct/minor	X
YRN-2	05175300546	None	None	X
YRN-4	05175300386*	None	None	X
YRN-509	05175300198	Displacement	Direct/minor	X
YRN-509	05175300205	Displacement	Direct/minor	X

Route ID	Site Number	Effect	Type/Severity	Alt 1
YRN-7	05175300674	Erosion	Direct/moderate	X
YRN-M2	05175300671	Erosion	Direct/moderate	X
YRN-M2	05175300675	Displacement	Direct/minor	X
YRN-M2	05175300890	None	None	X
YRS-SF5	05175500272	None	None	X

Note: * indicates a site listed multiple times, but only counted once.

Alternative 2: Increased Motorized Recreation and Access Opportunities

Alternative 2 responds to public scoping of insufficient public motorized opportunities and motorized access for dispersed recreation in the proposed action. This alternative is based on the Proposed Action (Alternative 7), with additional routes and mixed use to provide more access and motorized recreation opportunities.

Direct and Indirect Effects

Under Alternative 2, cross country travel would be prohibited and a total of 59.6 miles of unauthorized motorized routes (5 miles of road and 54.6 miles of trails) would be added to the NFTS. Additionally, four motorized "Open Areas" would be established for a total of 2,649 acres (Greenhorn, Boca Reservoir, Prosser Reservoir, and Stampede Reservoir). There are a total 85 sites within the APE for this alternative (8 sites are associated with multiple routes; they are noted in Table 3.05-12 with an *).

Additions to the NFTS: Twenty-seven (27) sites outside of the proposed "Open Areas" at three reservoirs in this alternative were noted as having direct/minor effects. Seven (7) sites outside of the reservoirs have a rating of direct/moderate. The type and severity of effects for the remaining 9 sites is "none". Sites determined ineligible for the NRHP were removed from the table (Table 3.05-12). Protection measures include installing barriers to keep users on system routes. At 6 sites, mitigations (i.e., barriers) from recreation, watershed, and botany would facilitate protecting the sites. Monitoring is recommended to determine if additional protection measures would be needed in the future (such as at Site 05175300004 where interpretive signage or developing an interpretive trail may be appropriate). At many of the sites where camping occurs for example, it was difficult to identify effects caused by motorized vehicles. Monitoring at these locations will be used to assess site condition over time.

Establish Motorized "Open Areas": Alternative 2 establishes motorized use "Open Areas" below the high water line at Boca, Prosser, and Stampede Reservoirs. Limited surveys were conducted at Boca, Prosser, and Stampede at the high use areas and shoreline access points (off of existing NFTS routes). Approximately 300 acres were surveyed. There are no cultural resources within the proposed Greenhorn "Open Area."

Boca dam was constructed in 1937 and there was no archaeological survey completed prior to construction. Both Prosser and Stampede Reservoirs were surveyed ca. 1957 by the Bureau of Reclamation (BOR). At Prosser, constructed in 1962, two prehistoric sites were excavated, NEV-11 and NEV-67. At Stampede, constructed in 1970, two prehistoric sites were excavated, SIE-28 and SIE-S44.

SIE-S44 was subsequently listed on the National Register of Historic Places. As the survey and cultural resource site recording at Prosser and Stampede was done by 1957 standards, historic sites were not recorded. Site locations were placed on 15 minute quadrangle maps making cross correlations with current observations extremely difficult. For example, the precise location of NEV-11 and NEV-67 on-the-ground has not been ascertained with confidence. This is due to multiple factors including 1957 mapping scales, vegetation changes (i.e., no vegetation now below the high water line increasing visibility) and other factors. Motorized use below the high water line has been allowed since the reservoirs were established. Subsequently, there is high motorized use at both Boca and Prosser, but the use is higher at Prosser due to its close proximity to the Town of Truckee and several subdivisions constructed adjacent to the reservoir.

Motorized access to shoreline below the high water line at these reservoirs has direct/minor effects to 7 sites and direct/moderate effects to 27 cultural sites (one is a NRHP listed site). The type and severity of effects for the remaining 8 sites is unknown (they were under water at Stampede Reservoir). The more severe effects to these sites are not always associated with motorized vehicles. The non-motorized impacts are most often associated with shoreline erosion (wave action, deflation). There is also documented artifact collecting (looting) that has occurred at the NRHP listed site that was a legal action a few years ago from nearby private property residents. The shoreline erosion is having moderate effects on these sites. Other than Alternatives 2 and 6, the other action alternatives do not establish these reservoirs as motorized “Open Areas,” but the effects resulting from shoreline erosion will continue. A mitigation measure includes installing barriers to keep users on system routes or to keep users off of the cultural resource sites; this may be difficult to implement at Boca, Prosser, and Stampede Reservoirs due to the flat open terrain. Monitoring will be used to assess the effectiveness of installing barriers.

Table 3.05-12. Summary of Effects to Cultural Resources at Risk: Alternative 2

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 2
Boca Reservoir “Open Area”	05175700303	Displacement	Direct/minor	Install barriers to keep users on system route	X
Boca Reservoir “Open Area”	05175700305	Displacement	Direct/minor	Install barriers to keep users on system route	X
Boca Reservoir “Open Area”	05175700307	Displacement	Direct/minor	Install barriers to keep users on system route	X
Boca Reservoir “Open Area”	05175700240/CA-NEV-81*	Displacement	Direct/minor	Install barriers to keep users on system routes	X
Boca Reservoir “Open Area”	CA-NEV-26	Displacement	Direct/moderate	Site is below high water in closed BOR area. Demarcate closed area.	X
Boca Reservoir “Open Area”	05175700747	Displacement	Direct/moderate	Install barriers	X
Boca Reservoir “Open Area”	05175700749	Displacement	Direct/moderate	Install barriers	X

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 2
Boca Reservoir "Open Area"	05175700750	Displacement	Direct/moderate	Install barriers	X
Boca Reservoir "Open Area"	05175700775	Displacement	Direct/moderate	Install barriers	X
Boca Reservoir "Open Area"	05175700776	Displacement	Direct/moderate	Install barriers	X
Boca Reservoir "Open Area"	05175700777	Displacement	Direct/moderate	Install barriers	X
Prosser Reservoir "Open Area"	05175700609	Displacement/ shoreline erosion	Direct/moderate	Install barriers	X
Prosser Reservoir "Open Area"	05175700608/CA-NEV-64	Displacement/ shoreline erosion	Direct/moderate	Install barriers	X
Prosser Reservoir "Open Area"	05175700753	Displacement	Direct/moderate	Install barriers	X
Prosser Reservoir "Open Area"	05175700754	Displacement	Direct/moderate	Install barriers	X
Prosser Reservoir "Open Area"	05175700755	Displacement	Direct/moderate	Install barriers	X
Prosser Reservoir "Open Area"	05175700756	Displacement	Direct/minor	Install barriers	X
Prosser Reservoir "Open Area"	05175700757	Displacement	Direct/moderate	Install barriers	X
Prosser Reservoir "Open Area"	05175700758	Displacement	Direct/moderate	Install barriers	X
Prosser Reservoir "Open Area"	05175700759	Displacement	Direct/moderate	Install barriers	X
Prosser Reservoir "Open Area"	05175700760	Displacement	Direct/moderate	Install barriers	X
Prosser Reservoir "Open Area"	05175700761	Displacement	Direct/moderate	Install barriers	X
Prosser Reservoir "Open Area"	05175700762	Displacement	Direct/moderate	Install barriers	X
Stampede Reservoir "Open Area"	05175700535	Displacement	Direct/moderate	Install barriers to keep users on route	X
Stampede Reservoir "Open Area"	05175700540	Displacement	Direct/moderate	Install barriers to keep users on route	X
Stampede Reservoir "Open Area"	05175700004/SIE-S44	Displacement/ shoreline erosion/looting	Direct/minor	Install barriers	X
Stampede Reservoir "Open Area"	05175700763	Displacement	Direct/moderate	Install barriers	X
Stampede Reservoir "Open Area"	05175700764	Displacement	Direct/moderate	Install barriers	X
Stampede Reservoir "Open Area"	05175700765	Displacement	Direct/moderate	Install barriers	X
Stampede Reservoir "Open Area"	05175700766	Displacement	Direct/moderate	Install barriers	X

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 2
Stampede Reservoir "Open Area"	05175700767	Displacement	Direct/moderate	Install barriers	X
Stampede Reservoir "Open Area"	05175700768	Displacement	Direct/moderate	Install barriers	X
Stampede Reservoir "Open Area"	05175700769	Displacement	Direct/moderate	Install barriers	X
Stampede Reservoir "Open Area"	05175700770	Displacement	Direct/moderate	Install barriers	X
Stampede Reservoir "Open Area"	DWR-S-1	Unknown-below waterline	Unknown	N/A	X
Stampede Reservoir "Open Area"	SIE-11	Unknown-below waterline	Unknown	N/A	X
Stampede Reservoir "Open Area"	SIE-12	Unknown-below waterline	Unknown	N/A	X
Stampede Reservoir "Open Area"	SIE-13	Unknown-below waterline	Unknown	N/A	X
Stampede Reservoir "Open Area"	SIE-14	Unknown-below waterline	Unknown	N/A	X
Stampede Reservoir "Open Area"	SIE-15	Unknown-below waterline	Unknown	N/A	X
Stampede Reservoir "Open Area"	SIE-16	Unknown-below waterline	Unknown	N/A	X
Stampede Reservoir "Open Area"	SIE-17	Unknown-below waterline	Unknown	N/A	X
D_25_d	05175300004	Displacement	Direct/minor	Monitor	X
D_11E03_b	05175300016*	Displacement/ Camping	Direct/minor	Monitor	X
D_11E03_c	05175300016*	Displacement/ Camping	Direct/minor	Monitor	X
D_11E03_d	05175300016*	Displacement/ Camping	Direct/minor	Monitor	X
D_721-2_a	05175300074	Displacement/ Camping	Direct/minor	Monitor	X
D_12E66_c	05175300156*	Camping	Direct/minor	Monitor	X
D_12E66_d	05175300156*	Camping	Direct/minor	Monitor	X
D_S-301_a	05175300176	Camping	Direct/minor	Monitor	X
D_S-301_a	05175300188	Camping	Direct/minor	Monitor	X
D_11E10_a	05175300386	None	None	Monitor	X
D_12E66_a	05175300404*	Camping	Direct/minor	Monitor	X
D_12E66_a	05175300561*	Camping	Direct/minor	Monitor	X
D_12E67_d	05175300404*	Camping	Direct/minor	Monitor	X
D_12E67_d	05175300561*	Camping	Direct/minor	Monitor	X
D_S295_a	05175300436*	Camping	Direct/minor	Monitor	X
D_S295_b	05175300436*	Camping	Direct/minor	Monitor	X
D_12E68_a	05175300455	Camping	Direct/minor	Monitor	X
D_S300_a	05175300595*	Camping	Direct/minor	Monitor	X
D_S300_b	05175300595*	Camping	Direct/minor	Monitor	X

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 2
D_738-4_a	05175300883	Camping	Direct/minor	Monitor	X
D_12E66_b	05175300892	Camping	Direct/minor	Monitor	X
D_P88_b	05175400312	Camping	Direct/minor	Monitor	X
D_14_b	05175500105*	Camping	Direct/minor	Monitor	X
D_14_j	05175500105*	Camping	Direct/minor	Monitor	X
D_18-19_a	05175500344	Camping	Direct/minor	Monitor	X
D_03-4_a	05175700148	Camping	Direct/minor	Monitor	X
D_886-10_a	05175700379*	Camping	Direct/minor	Monitor	X
D_886-18_a	05175700379*	Camping	Direct/minor	Monitor	X
D_886-18_b	05175700379*	Camping	Direct/minor	Monitor	X
D_450-101_a	05175700779	Camping	Direct/minor	Monitor	X
SV-P14	05175600571	Displacement	Direct/minor	Install barriers to keep users on route	X
TKN-J11	05175700096	Camping	None	None	X
TKN-J13	05175700286	Displacement/ shoreline erosion	Direct/moderate	Install barriers	X
TKN-J13	05175700287	Displacement/ shoreline erosion	Direct/moderate	Install barriers	X
TKN-J6	05175700374	Displacement/ camping	Direct/minor	Recreation mitigation protects site.	X
TKN-M2	05175700395	Displacement	Direct/minor	Install barriers to keep users on route	X
TKN-M2	05175700397	Displacement	Direct/minor	Install barriers to keep users on route	X
TKN-M2	05175700734	Erosion/ Displacement	Direct/moderate	Install barriers to keep users on route- Watershed and botany mitigations will help protect site.	X
TKN-Q1	05175700087	Displacement	Direct/minor	Monitor	X
TKS-11	05175700735	None	None	None	X
TKS-11	05175700736	None	None	Monitor	X
YRN-004	05175300676	Displacement	Direct/minor	Monitor	X
YRN-007	05175300426	None	None	Monitor	X
YRN-008	05175300369	Displacement/ rutting	Direct/moderate	Install barriers to keep users on route and to designated camping areas.	X
YRN-1	05175300881	None	None	Monitor	X
YRN-2	05175300499	Erosion	Direct/moderate	Monitor-.	X
YRN-2	05175300545	Displacement	Direct/minor	Install barriers to keep users on route	X
YRN-2	05175300546	None	None	Monitor	X
YRN-4	05175300386	None	None	Monitor	X
YRN-7	05175300674	Erosion	Direct/moderate	Monitor-	X

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 2
YRN-M2	05175300671	Erosion	Direct/moderate	Monitor	X
YRN-M2	05175300675	Displacement	Direct/minor	Monitor	X
YRN-M2	05175300890	None	None	Monitor	X
YRS-SF5	05175500272	None	None	Monitor	X

Note: * indicates a site associated with multiple routes once but only counted once.

Alternative 3: Cross Country Travel Prohibition Only – No Changes to the Existing National Forest Transportation System

Alternative 3 would prohibit cross country travel and proposes no new additions to the NFTS. This alternative also provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS. None of the unauthorized roads, trails, or areas would be added to the NFTS. Alternative 3 responds to the issues of transportation system management costs, potential adverse effects of motorized roads and trails on the characteristics of Inventoried Roadless Areas, quiet recreation and potential adverse impacts associated with motorized roads and trails on water, soils, sensitive plants, wildlife, and cultural resources.

Direct and Indirect Effects

Under Alternative 3, 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 directly or indirectly affected. There would be beneficial effects to cultural resources under this alternative. There are a minimum of 882 cultural resources sites identified associated with unauthorized routes. These sites are at risk from ongoing use. Based on the effects identified during monitoring for this undertaking, these effects would not continue under this alternative.

To quantify potential cumulative effects, one can calculate the average number of previously identified cultural resource sites per acre that would be at risk. Within the TNF, 3,228 cultural resources sites have been identified. Site density averages .004 cultural resource sites for every acre. Excluding the 133 cultural resource sites identified (Table 3.05-5) within the APE, upwards of 3,095 additional cultural resource sites would not be susceptible to an adverse effect because cross country travel would prohibited, and no unauthorized motorized routes would be added to the existing NFTS and no “Open Areas” would be established.

Alternative 4: Increased Resource Protection

Alternative 4 responds to issues of cost, maintenance, wilderness, Inventoried Roadless Areas, quiet use, and natural resource impacts by prohibiting cross country travel and adding fewer routes to the NFTS than the Proposed Action. Alternative 4 is based on the Proposed Action contained in the Notice of Intent as modified by an alternative submitted by an environmental group coalition during scoping.

Direct and Indirect Effects

Under Alternative 4, cross country travel is prohibited and a total of 26.3 miles of unauthorized motorized routes (3.7 miles of road and 22.6 miles of trail) would be added to the Forest transportation system. There are 16 sites within the APE for this alternative (4 sites are associated with multiple routes; they are noted in Table 3.05-13 with an *).

Additions to the NFTS: Two (2) routes have direct effect/moderate severity ratings to two sites located on a proposed route along the shoreline of Stampede Reservoir. They are also subjected to shoreline erosion. Barriers would be installed to keep motorized users on the designated route. Thirteen (13) sites have direct/minor effects. Monitoring at these sites is prescribed as many of the effects were negligible and difficult to determine (i.e., camping at an extremely large basalt quarry area). The type and severity of effects for the remaining 1 site is “none”. Sites determined ineligible were removed from Table 3.05-13.

Reopening Maintenance Level 1 roads: There are no cultural resources associated with the proposed opening of the Maintenance Level 1 road.

Table 3.05-13. Summary of Effects to Cultural Resources at Risk: Alternative 4

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 4
D_25_d	05175300004	Displacement	Direct/minor	Monitor-	X
D_721-2_a	05175300074	Displacement/Camping	Direct/minor	Monitor	X
D_12E66_c	05175300156*	Camping	Direct/minor	Monitor	X
D_12E66_d	05175300156*	Camping	Direct/minor	Monitor	X
D_S-301_a	05175300176	Camping	Direct/minor	Monitor	X
D_S-301_a	05175300188	Camping	Direct/minor	Monitor	X
D_S295_a	05175300436*	Camping	Direct/minor	Monitor	X
D_S295_b	05175300436*	Camping	Direct/minor	Monitor	X
D_12E68_a	05175300455	Camping	Direct/minor	Monitor	X
D_S300_a	05175300595*	Camping	Direct/minor	Monitor	X
D_S300_b	05175300595*	Camping	Direct/minor	Monitor	X
D_P88_b	05175400312	Camping	Direct/minor	Monitor	X
D_14_b	05175500105*	Camping	Direct/minor	Monitor	X
D_14_j	05175500105*	Camping	Direct/minor	Monitor	X
D_18-19_a	05175500344	Camping	Direct/minor	Monitor	X
D_03-4_a	05175700148	Camping	Direct/minor	Monitor	X
SV-P14	05175600571	Displacement	Direct/minor	Install barriers to keep users on route	X
TKN-J13	05175700286	Displacement/shoreline erosion	Direct/moderate	Install barriers	X
TKN-J13	05175700287	Displacement/shoreline erosion	Direct/moderate	Install barriers	X
YRS-SF5	05175500272	None	None	Monitor	X

Note: * indicates a site listed multiple times but only counted once.

Alternative 5: Increased Motorized Recreation Access plus Reopening Maintenance Level 1 and Temporary Roads

Alternative 5 is based on the Proposed Action contained in the Notice of Intent as modified by an alternative submitted by the Blue Ribbon Coalition during the scoping process. Alternative 5 was developed to address the issue of providing sufficient wheeled motorized public access to TNF lands as well as public concerns about reduced motorized recreation opportunities.

Direct and Indirect Effects

Under Alternative 5, cross country travel is prohibited and a total of 80.4 miles of unauthorized motorized routes (5 miles of roads and 75.4 miles of trails) would be added to the Forest transportation system. There are a total of 77 sites within the APE for this alternative (15 sites are associated with multiple routes; they are noted in Table 3.05-14 with an *).

Additions to the NFTS: Sixty (60) sites have a direct/minor rating, 7 have a direct/moderate rating, and 10 have a "none" rating (these totals include the 19 cultural resources associated with reopening Maintenance Level 1 roads; these are noted in the table with ML 1 under the Route ID column). Of the 7 sites with moderate effect, the use of low impact barriers would reduce or eliminate the effects or the implementation of watershed, botany or recreation mitigations (i.e., barriers) would further protect the site. At Site 05175300217, there is an ongoing looting situation at this site. Law enforcement is actively patrolling this location. Monitoring is prescribed at many of the sites as effects were negligible and difficult to determine. Sites determined ineligible were not included in the table (Table 3.05-14).

Reopening Maintenance Level 1 roads There are 19 cultural resources associated with the proposal to reopen Maintenance Level 1 roads (routes are noted in Table 3.05-14 with the notation ML 1). With the exception of 2 sites, effects were negligible and difficult to determine at these sites since current use is sporadic. Monitoring will provide for adaptive management if effects change with increased use. This is a management option in the Motorized Recreation PA. There are two sites associated with the proposal to reopen a Maintenance Level 1 road (Route YRN-509) and the prescribed protection measure is to install barriers to prohibit unauthorized motorized use on the spur roads that access the sites.

Table 3.05-14. Summary of Effects to Cultural Resources at Risk: Alternative 5

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 5
25-9_p (ML 1)	05175300469	Displacement	Direct/minor	Monitor	X
491-3_1	05175300337	None	None	Monitor	X
491-3_2	05175300216	Displacement	Direct/minor	Monitor	X
H11E10	05175300696	Displacement	Direct/minor	Monitor	X
H301-6 (ML 1)	05175300176*	Displacement	Direct/minor	Monitor	X
H301-6 (ML 1)	05175300188*	Displacement	Direct/minor	Monitor	X
H3-4-4 (ML 1)	05175700148*	Displacement	Direct/minor	Monitor	X
H54-9 (ML 1)	05175600283	Displacement	Direct/minor	Monitor	X
H54-9 (ML 1)	05175600341	Displacement	Direct/minor	Monitor	X
H54-9 (ML 1)	05175600317	Displacement	Direct/minor	Monitor	X

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 5
H88-44 (ML 1)	05175400215	Displacement	Direct/minor	Monitor	X
H889-28	05175700088	Displacement	Direct/minor	Monitor	X
H889-3-18-5 (ML 1)	05175700563*	Displacement	Direct/minor	Monitor	X
H889-8	05175700395*	Displacement	Direct/minor	Monitor	X
H889-8	05175700401	Displacement	Direct/minor	Monitor	X
H894-5-1	05175700240/CA-NEV-81	Displacement	Direct/minor	Monitor	X
N25-1-1 (ML 1)	05175300347	Displacement	Direct/minor	Monitor	X
N25-1-1 (ML 1)	05175300348	Displacement	Direct/minor	Monitor	X
N25-2 (ML 1)	05175300454	Displacement	Direct/minor	Monitor	X
N25-6-1 (ML 1)	05175300356	Displacement	Direct/minor	Monitor	X
N25-7 (ML 1)	05175300034	Displacement	Direct/minor	Monitor	X
N261-8-15-2	05175700563*	Displacement	Direct/minor	Monitor	X
N27-3 (ML 1)	05175300514	Displacement	Direct/minor	Monitor	X
N27-5 (ML 1)	05175300446	Displacement	Direct/minor	Monitor	X
N39-5 (ML 1)	05175300217	Displacement/looting	Direct/minor	Monitor	X
N43-6-2	05175400368	Displacement	Direct/minor	Monitor	X
N860-20-1	05175600426	Displacement	Direct/minor	Monitor	X
N860-20-1	05175700540	Displacement	Direct/minor	Monitor	X
N886-14-10	05175700577	Displacement	Direct/minor	Monitor	X
N886-1-5	05175700009	Displacement	Direct/minor	Monitor	X
N886-1-5	05175700409	Displacement	Direct/minor	Monitor	X
N886-18-10	05175700447	Displacement	Direct/minor	Monitor	X
N886-18-10	05175700529	Displacement	Direct/minor	Monitor	X
N889-3-30-10	05175700304	Displacement	Direct/minor	Monitor	X
N890-14-5	05175700511	Displacement	Direct/minor	Monitor	X
N96-34-2-6	05175400325	Displacement	Direct/minor	Monitor	X
D_25_d	05175300004	Displacement	Direct/minor	Monitor-	X
D_11E03_b	05175300016*	Displacement/Camping	Direct/minor	Monitor	X
D_11E03_c	05175300016*	Displacement/Camping	Direct/minor	Monitor	X
D_11E03_d	05175300016*	Displacement/Camping	Direct/minor	Monitor	X
D_721-2_a	05175300074	Displacement/Camping	Direct/minor	Monitor	X
D_12E66_c	05175300156*	Camping	Direct/minor	Monitor	X
D_12E66_d	05175300156*	Camping	Direct/minor	Monitor	X
D_S-301_a	05175300176*	Camping	Direct/minor	Monitor	X
D_S-301_a	05175300188*	Camping	Direct/minor	Monitor	X
D_11E10_a	05175300386*	None	None	Monitor	X
D_12E66_a	05175300404*	Camping	Direct/minor	Monitor	X
D_12E66_a	05175300561*	Camping	Direct/minor	Monitor	X
D_12E67_d	05175300404*	Camping	Direct/minor	Monitor	X
D_12E67_d	05175300561*	Camping	Direct/minor	Monitor	X
D_S295_a	05175300436*	Camping	Direct/minor	Monitor	X

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 5
D_S295_b	05175300436*	Camping	Direct/minor	Monitor	X
D_12E68_a	05175300455	Camping	Direct/minor	Monitor	X
D_S300_a	05175300595*	Camping	Direct/minor	Monitor	X
D_S300_b	05175300595*	Camping	Direct/minor	Monitor	X
D_738-4_a	05175300883	Camping	Direct/minor	Monitor	X
D_12E66_b	05175300892	Camping	Direct/minor	Monitor	X
D_P88_b	05175400312	Camping	Direct/minor	Monitor	X
D_14_b	05175500105*	Camping	Direct/minor	Monitor	X
D_14_j	05175500105*	Camping	Direct/minor	Monitor	X
D_18-19_a	05175500344	Camping	Direct/minor	Monitor	X
D_738-4_f	05175500363*	Camping	Direct/minor	Monitor	X
D_738-4_g	05175500363*	Camping	Direct/minor	Monitor	X
D_738-4_e	05175500364	Camping	Direct/minor	Monitor	X
D_03-4_a	05175700148*	Camping	Direct/minor	Monitor	X
D_886-10_a	05175700379*	Camping	Direct/minor	Monitor	X
D_886-18_a	05175700379*	Camping	Direct/minor	Monitor	X
D_886-18_b	05175700379*	Camping	Direct/minor	Monitor	X
D_450-101_a	05175700779	Camping	Direct/minor	Monitor	X
SV-P14	05175600571	Displacement	Direct/minor	Install barriers to keep users on route	X
TKN-J11	05175700096	Camping	None	None	X
TKN-J13	05175700286	Displacement/shoreline erosion	Direct/moderate	Install barriers	X
TKN-J13	05175700287	Displacement/shoreline erosion	Direct/moderate	Install barriers	X
TKN-J6	05175700374	Displacement/camping	Direct/minor	Recreation mitigation protects site.	X
TKN-M2	05175700395*	Displacement	Direct/minor	Install barriers to keep users on route	X
TKN-M2	05175700397	Displacement	Direct/minor	Install barriers to keep users on route	X
TKN-M2	05175700734	Erosion/ Displacement	Direct/moderate	Install barriers to keep users on route. Watershed and botany mitigations will help protect site.	X
TKN-Q1	05175700087	Displacement	Direct/minor	Monitor	X
TKS-11	05175700735	None	None	None	X
TKS-11	05175700736	None	None	Monitor	X
YRN-004	05175300676	Displacement	Direct/minor	Monitor	X

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 5
YRN-007	05175300426	None	None	Monitor	X
YRN-008	05175300369	Displacment/ rutting	Direct/moderate	Install barriers to keep users on route and to designated camping areas.	X
YRN-1	05175300881	None	None	Monitor	X
YRN-2	05175300499	Erosion	Direct/moderate	Monitor-watershed mitigations will protect site from erosion.	X
YRN-2	05175300545	Displacement	Direct/minor	Install barriers to keep users on route	X
YRN-2	05175300546	None	None	Monitor	X
YRN-4	05175300386*	None	None	Monitor	X
YRN-509 (ML 1)	05175300198	Displacement	Direct/minor	Install barriers to prohibit use on spur road off main route	X
YRN-509 (ML 1)	05175300205	Displacement	Direct/minor	Install barriers to prohibit use on spur road off main route	X
YRN-7	05175300674	Erosion	Direct/moderate	Monitor-watershed mitigations will protect site from erosion.	X
YRN-M2	05175300671	Erosion	Direct/moderate	Monitor-watershed mitigations will protect site from erosion.	X
YRN-M2	05175300675	Displacement	Direct/minor	Monitor	X
YRN-M2	05175300890	None	None	Monitor	X
YRS-SF5	05175500272	None	None	Monitor	X

Note: * indicates a site listed multiple times but only counted once.

Alternative 6: Preferred Alternative Motorized Access and Resource Protection

Alternative 6 is the Preferred Alternative. It responds to issues of providing motorized public access and recreation opportunities while minimizing impacts to natural resources. It is designed to provide a diversity of road and trail opportunities for experiencing a variety of environments and modes of travel consistent with the National Forest's recreation role and land capability. Alternative 6 would provide motorized access to dispersed recreation opportunities and a diversity of motorized recreation opportunities.

Direct and Indirect Effects

Under Alternative 6, cross country travel would be prohibited and a total of 61.4 miles of unauthorized motorized routes (13.1 miles of road and 48.3 miles of trail) would be added to the Forest transportation system. Additionally, three motorized "Open Areas" would be established for a total of 244 acres (Boca Reservoir, Prosser Reservoir, and Stampede Reservoir). There are 59 sites within the APE for this alternative (12 sites are associated with multiple routes; they are noted in Table 3.05-15 with an *).

Additions to the NFTS: Forty-five (45) sites have a rating of direct/minor, 5 sites have a rating of direct/moderate, and 9 have a rating of "none" (these include the three sites associated with the proposal to reopen Maintenance Level 1 roads). Of the 5 sites with moderate effect, the use of low impact barriers would reduce or eliminate effects or the implementation of watershed, botany or recreation mitigations (i.e., barriers) would further protect the site. At Site 05175400008, there is an ongoing looting situation; law enforcement is actively patrolling this location. The district is considering installing interpretive signage. Monitoring is prescribed at many of the sites as effects were negligible and difficult to determine. Sites determined ineligible were not included in the table (Table 3.05-15).

Establishment of Motorized "Open Areas": There are no cultural resources located within the proposed 244 acres of "Open Areas." These specific areas are located at Boca, Prosser, and Stampede Reservoirs at the end of existing NFTS roads. They would provide shoreline access for motorized vehicles as water levels shrink throughout the year.

Reopening Maintenance Level 1 roads: There are three sites associated with the proposal to reopen Maintenance Level 1 roads (routes are noted in Table 3.05-15 with the notation ML 1). For route YRN-509, the protection measure is to install barriers to prohibit unauthorized motorized use on the spur roads that access the sites. For route 25-9_p, the protection measure is to monitor. Monitoring will provide for adaptive management if effects change with increased use. This is a management option in the Motorized Recreation PA.

Table 3.05.15. Summary of Effects to Cultural Resources at Risk: Alternative 6

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 6
25-9_p (ML 1)	05175300469	Displacement	Direct/minor	Monitor	X
491-3_1	05175300337	None	None	Monitor	X
D_25_d	05175300004	Displacement	Direct/minor	Monitor	X
D_11E03_b	05175300016*	Displacement/Camping	Direct/minor	Monitor	X
D_11E03_c	05175300016*	Displacement/Camping	Direct/minor	Monitor	X
D_11E03_d	05175300016*	Displacement/Camping	Direct/minor	Monitor	X
D_721-2_a	05175300074	Displacement/Camping	Direct/minor	Monitor	X
D_12E66_c	05175300156*	Camping	Direct/minor	Monitor	X
D_12E66_d	05175300156*	Camping	Direct/minor	Monitor	X
D_S-301_a	05175300176	Camping	Direct/minor	Monitor	X
D_S-301_a	05175300188	Camping	Direct/minor	Monitor	X
D_11E10_a	05175300386*	None	None	Monitor	X

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 6
D_12E66_a	05175300404*	Camping	Direct/minor	Monitor	X
D_12E66_a	05175300561*	Camping	Direct/minor	Monitor	X
D_12E67_d	05175300404*	Camping	Direct/minor	Monitor	X
D_12E67_d	05175300561*	Camping	Direct/minor	Monitor	X
D_S295_a	05175300436*	Camping	Direct/minor	Monitor	X
D_S295_b	05175300436*	Camping	Direct/minor	Monitor	X
D_12E68_a	05175300455	Camping	Direct/minor	Monitor	X
D_S300_a	05175300595*	Camping	Direct/minor	Monitor	X
D_S300_b	05175300595*	Camping	Direct/minor	Monitor	X
D_738-4_a	05175300883	Camping	Direct/minor	Monitor	X
D_12E66_b	05175300892	Camping	Direct/minor	Monitor	X
D_6149-31	05175400008	Camping/looting	Direct/minor	Monitor	X
D_P88_d	05175400176	None	None	Monitor	X
D_P88_b	05175400312	Camping	Direct/minor	Monitor	X
D_14_b	05175500105*	Camping	Direct/minor	Monitor	X
D_14_c	05175500105*	Camping	Direct/minor	Monitor	X
D_14_h	05175500105*	Camping	Direct/minor	Monitor	X
D_14_j	05175500105*	Camping	Direct/minor	Monitor	X
D_14-4	05175500105*	Camping	Direct/minor	Monitor	X
D_18-19_a	05175500344	Camping	Direct/minor	Monitor	X
D_738-4_f	05175500363*	Camping	Direct/minor	Monitor	X
D_738-4_g	05175500363*	Camping	Direct/minor	Monitor	X
D_738-4_e	05175500364	Camping	Direct/minor	Monitor	X
D_5_b	05175600018	Camping	Direct/minor	Monitor	X
D_16TH19-1	05175600119	Camping	Direct/minor	Monitor	X
D_7-10	05175600164	Camping	Direct/minor	Monitor	X
D_860-42	05175600202	Camping	Direct/minor	Monitor	X
D_S450	05175600338	Camping	Direct/minor	Monitor	X
D_5_a	05175600394	Camping	Direct/minor	Monitor	X
D_860-25	05175600421	Camping	Direct/minor	Monitor	X
D_SV-M1	05175600431	Camping	Direct/minor	Monitor	X
D_560-20_b	05175600442	Camping	Direct/minor	Monitor	X
D_03-4_a	05175700148	Camping	Direct/minor	Monitor	X
D_270-8_b	05175700358*	Camping	Direct/minor	Monitor	X
D_270-8_c	05175700358*	Camping	Direct/minor	Monitor	X
D_886-10_a	05175700379*	Camping	Direct/minor	Monitor	X
D_886-18_a	05175700379*	Camping	Direct/minor	Monitor	X
D_886-18_b	05175700379*	Camping	Direct/minor	Monitor	X
D_S860_a	05175700620	Camping	Direct/minor	Monitor	X
D_787-19	05175700756	Camping	Direct/minor	Monitor	X
D_450-101_a	05175700779	Camping	Direct/minor	Monitor	X
D_860-5_i	05175700096*	Camping	None	None	X

Route ID	Site Number	Effect	Type/Severity	Protection Measure	Alt 6
D_N886_18C	05175700778	Camping	Direct/minor	Monitor	X
SV-P14	05175600571	Displacement	Direct/minor	Install barriers to keep users on route	X
TKN-J11	05175700096*	Camping	None	None	X
TKN-J13	05175700286	Displacement/shoreline erosion	Direct/moderate	Install barriers	X
TKN-J13	05175700287	Displacement/shoreline erosion	Direct/moderate	Install barriers	X
TKN-J6	05175700374	Displacement/camping	Direct/minor	Recreation mitigation protects site.	X
TKN-M2	05175700395	Displacement	Direct/minor	Install barriers to keep users on route	X
TKN-M2	05175700397	Displacement	Direct/minor	Install barriers to keep users on route	X
TKN-M2	05175700734	Erosion/ Displacement	Direct/moderate	Install barriers to keep users on route-Watershed and botany mitigations will help protect site.	X
TKN-Q1	05175700087	Displacement	Direct/minor	Monitor	X
TKN-PP	05175700774	Displacement	Direct/minor	Monitor	X
TKS-11	05175700735	None	None	None	X
TKS-11	05175700736	None	None	Monitor	X
YRN-008	05175300369	Displacement/ rutting	Direct/moderate	Install barriers to keep users on route and to designated camping areas.	X
YRN-1	05175300881	None	None	Monitor	X
YRN-2	05175300499	Erosion	Direct/moderate	Monitor-watershed mitigations will protect site from erosion.	X
YRN-2	05175300545	Displacement	Direct/minor	Install barriers to keep users on route	X
YRN-2	05175300546	None	None	Monitor	X
YRN-4	05175300386*	None	None	Monitor	X
YRN-509 (ML 1)	05175300198	Displacement	Direct/minor	Install barriers to prohibit use on the spur road off main route	X
YRN-509 (ML 1)	05175300205	Displacement	Direct/minor	Install barriers to prohibit use on the spur road off main route	X
YRS-SF5	05175500272	None	None	Monitor	X

Note: * indicates a site listed multiple times but only counted once.

Alternative 7: Proposed Action as Identified in Notice of Intent (NOI)

Alternative 7 is the Proposed Action as published in the Notice of Intent in the Federal Register.

Direct and Indirect Effects

Under Alternative 7, cross country travel is prohibited and a total of 36.7 miles of unauthorized motorized routes (trails) would be added to the Forest transportation system. There are 13 sites within the APE for

this alternative. There are no sites in this alternative associated with multiple routes.

Additions to the NFTS: Three (3) sites have a rating of direct/minor, 4 sites have a rating of direct/moderate, and 6 have a rating of "none" (Table 3.05-16). Of the 4 sites with moderate effect, the use of low impact barriers would reduce or eliminate the effects or the implementation of watershed, botany or recreation mitigations (barriers) would protect the site. Monitoring is prescribed at many of the sites as effects were negligible and difficult to determine. Sites determined ineligible were not included in the table.

Reopening Maintenance Level 1 roads: There are no cultural resources sites associated with the 2 ML 1 roads totaling 1.1 miles that would be opened under Alternative 7.

Table 3.05.16. Summary of Effects to Cultural Resources at Risk: Alternative 7

Route ID	Site Number	Site Type	NRHP Status	Effect	Type/Severity	Protection Measure	Alt 7
SV-P14	05175600571	Prehistoric	Unevaluated	Displacement	Direct/minor	Install barriers to keep users on route	X
TKN-J13	05175700286	Multi	Unevaluated	Displacement/shoreline erosion	Direct/moderate	Install barriers	X
TKN-J13	05175700287	Prehistoric	Unevaluated	Displacement/shoreline erosion	Direct/moderate	Install barriers	X
TKN-J6	05175700374	Prehistoric	Unevaluated	Displacement/camping	Direct/minor	Recreation mitigation barriers	X
TKS-11	05175700735	Prehistoric	Unevaluated	None	None	None	X
TKS-11	05175700736	Prehistoric	Unevaluated	None	None	Monitor	X
YRN-1	05175300881	Historic	Unevaluated	None	None	Monitor	X
YRN-2	05175300499	Historic	Unevaluated	Erosion	Direct/moderate	Monitor	X
YRN-2	05175300545	Historic	Unevaluated	Displacement	Direct/minor	Install barriers to keep users on route	X
YRN-2	05175300546	Historic	Unevaluated	None	None	Monitor	X
YRN-4	05175300386	Historic	Unevaluated	None	None	Monitor	X
YRN-7	05175300674	Historic	Unevaluated	Erosion	Direct/moderate	Monitor	X
YRS-SF5	05175500272	Historic	Unevaluated	None	None	Monitor	X

Cumulative Effects

The geographic scope of the cumulative effects analysis is limited to the Forest's administrative boundary (836,041 acres) because impacts to cultural resources accumulate at their specific locations, irrespective of actions in surrounding areas.

Alternative 1 would allow cross country travel to continue. Alternative 1, when combined with the past, present and foreseeable future actions (see Appendix H), is expected to cumulatively lead to increased impacts to cultural resources.

The data reported in Table 3.05-11 demonstrate that the No Action Alternative would have unmitigated, long-term adverse effects on cultural resources. A minimum of 133 cultural resource sites would be adversely affected if no mitigation action was taken. Another 749 sites identified with other unauthorized routes not added to the NFTS under an alternative could potentially be affected in the absence of any long-term management actions or oversight; therefore, at least 882 cultural resource sites could be subject to adverse effects in the APE.

To quantify potential cumulative effects, one can calculate the average number of previously identified cultural resource sites per acre that would be susceptible to new routes created in the future without a prohibition. Within the TNF, 3,228 cultural resources sites have been identified. Site density averages .004 cultural resource sites for every acre. Excluding the 133 cultural resource sites that have already been identified (Table 3.05-5) within the APE, upwards of 3,095 additional cultural resource sites could be susceptible to an adverse effect if no management actions were implemented.

Alternative 2 has 85 cultural resource sites identified as resources at risk within the APE due to the cumulative effects of adding routes to the NFTS, and establishing "Open Areas." The 68 sites that have minor or moderate effects would be monitored or mitigated to reduce the effects.

Alternative 3 has no cultural resource sites identified as resources at risk within the APE due to no changes to the current NFTS.

Alternative 4 has 16 cultural resource sites identified as resources at risk within the APE due to the cumulative effects of adding routes to the NFTS. The 15 sites that have minor or moderate effects would be monitored or mitigated to reduce the effects.

Alternative 5 has 77 cultural resource sites identified as resources at risk within the APE due to the cumulative effects of adding routes to the NFTS and reopening ML 1 roads. The 67 sites that have minor or moderate effects would be monitored or mitigated to reduce the effects.

Alternative 6 has 59 cultural resource sites identified as resources at risk within the APE due to the cumulative effects of adding routes to the NFTS, establishing "Open Areas," and reopening ML 1 roads. The 50 sites that have minor or moderate effects would be monitored or mitigated to reduce the effects.

Alternative 7 has 13 cultural resource sites identified as resources at risk within the APE due to the cumulative effects of adding routes to the NFTS and reopening ML 1 roads. The 7 sites that have minor or moderate effects would be monitored or mitigated to reduce the effects.

Cross country travel would be halted under the action alternatives. The prohibition of cross country travel would simplify enforcement by prohibiting any motorized use off NFTS roads, trails, and "Open Areas". As a result, cumulative effects would be diminished under all action alternatives. Alternatives 2-7, when combined with prohibiting cross country, and the past, present and foreseeable future actions (see Appendix H), are expected to cumulatively lead to **reduced** impacts to cultural resources. At least 882 cultural resource sites would be protected from adverse effects.

Unregulated cross country travel, as occurring under the No Action Alternative, has the greatest potential for creating adverse effects to cultural resources making the route designation process an important part of preventing long-term effects to these resources.

Summary of Effects Analysis across All Alternatives

This section summarizes the effects analysis by discussing how well each alternative addresses the cultural resources for each measurement indicator. The following ranks were used in Table 3.05-17 that follows: A score of 7 indicates the alternative has the least impact for cultural resources; a score of 1 indicates the alternative has the most impact for cultural resources.

Table 3.05-17. Comparison of Effects to Cultural Resources

Indicators – Cultural Resources	Rankings of Alternatives for Each Indicator*						
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Degree to which the integrity of cultural resource values are diminished	1	3	7	5	2	4	6
Number of cultural resources within unauthorized routes at risk from ongoing use	1	2	7	5	4	3	6
Average number of cultural resources per acre protected from creation of new routes	1	2	7	5	4	3	6
Average for Cultural Resources	1	2	7	5	4	3	6

* A score of 7 indicates the alternative has the least impact for this resource; a score of 1 indicates the alternative has the most impact.

Compliance with the Forest Plan and Other Direction

Alternatives 2, 3, 4, 5, 6, and 7 comply with all Forest Plan S&Gs as well as with all federal laws identified in the Analysis Framework Section. Alternative 1 does not comply with Forest Plan S&Gs or with the federal laws identified in the Analysis Framework Section.

Chapter 3.06

Plant Communities

3.06. Plant Communities

Introduction

Management of plant/fungi species, native plant communities, and maintenance of plant diversity, is an important part of the mission of the Forest Service (FS) (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 FS 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 Land and Resource Management Plan (LRMP). Key parts include: developing and implementing management practices to ensure that species do not become threatened or endangered because of FS actions; maintaining viable populations of all native and desired non-native wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System (NFS) lands, and developing and implementing management objectives for populations and/or habitats of rare species.

Management decisions related to motorized travel can affect plant and fungi species, their habitats, and natural communities. 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 FS 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)). Therefore, management decisions related to motorized travel on NFS lands must consider effects to plant and fungi species, and their habitats.

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

Direction relevant to the Proposed Action as it affects native plants/plant communities includes:

Endangered Species Act (ESA): The ESA 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 FS policy to analyze impacts to TE species to ensure management activities are not likely to jeopardize the continued existence of a TE species, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. This assessment is documented in a Biological Assessment (BA) and is summarized or referenced in this chapter.

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

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

Sierra Nevada Forest Plan Amendment (SNFPA): The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified the following direction applicable to motorized travel management and botanical resources:

- Noxious weeds management (Management Standard & Guidelines 36-49).
- Wetland and Meadow Habitat (Management Standard & Guideline 70): See Appendix I (Riparian Conservation Objectives).
- Riparian Habitat (Management Standard & Guideline 92): See Water Resources section.
- Bog and Fen Habitat (SNFPA ROD page 65, S&G #118): Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles.
- Sensitive Plant Surveys (Corrected Errata, April 19, 2005): Conduct field surveys for threatened, endangered, proposed, and sensitive (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 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. (Management Standard & Guideline 125). The standards and guidelines provide direction for conducting field surveys, minimizing or eliminating direct and indirect impacts from management activities, and adherence to the Regional Native Plant Policy (USDA Forest Service 2004).

In addition, the Tahoe National Forest (TNF) has completed interim management guides (IMGs) for several sensitive species including: *Eriogonum umbellatum* var. *torreyanum* (1993); *Ivesia aperta* var. *aperta*, *Ivesia aperta* var. *canina*, *and Ivesia sericoleuca* (1992); and *Lewisia cantelovii* and *Lewisia serrata* (1997). The most commonly recommended management prescription in these IMGs is avoidance of direct, indirect and cumulative impacts.

Affected Environment

Background

TNF plant communities are made up of a series of vegetation types arranged in dynamic patterns. TNF plant communities are constantly changing due to the occurrence of such things as: wildfires, ecological succession, climate change, wind, drought, insects, management activities, etc.

As described in the SNFPA (2001), the physical structures that form the TNF and the diversity and number of plant species, have not changed much in the last 2 million years. However, the distribution and associations of plant species have changed significantly over time. Table 3.06-1 provides the acres and types of vegetation types found on the TNF (SNFPA 2001).

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 (SNFPA 2001). Plant species may be rare due to evolutionary history, basic population ecology, historic or current human activities, or a combination of these factors. Human activities may or may not be responsible for the current distribution and abundance of rare species. However, an important assumption in this analysis is that motorized vehicle use within and adjacent to rare species occurrences have the ability to negatively impact the trends of specific plant and fungi species. In particular, motorized vehicle use can reduce the quality of and/or the amount of habitats that support rare plant and fungi species. Table 3.06-2 displays the number of sensitive species occurrences known to occur on TNF system lands.

In addition to rare plant species, six of the native plant communities found in the TNF are impacted by motorized vehicle use: aquatic/riparian, serpentine, older forests, oak woodland, forest edges/openings, and high elevation openings/rocky areas. Two ecologically important disturbance related processes that are contributed to by motorized vehicle use are also discussed in detail: noxious weed infestation and native plant community fragmentation.

Aquatic/riparian, serpentine, older forest, oak woodland, forest edges/openings, and high elevation openings/rocky area plant communities are made up of several different vegetation types. These plant communities are of concern because of the amount of the plant community available, the condition of the remaining plant communities, and/or because the plant community provides habitat for a number of threatened, endangered, proposed, sensitive, (TEPS) and/or watchlist plants. The presence of and expansion of weeds into Sierra Nevada native plant communities is a serious threat to all plant communities. In addition, the lack of connectivity/fragmentation of plant communities is a concern.

Table 3.06-1. Acres of Vegetation Type on the TNF

Vegetation type	Acres
Unvegetated (includes rock outcrops, water, urban and agricultural)	50,159
Grassland (does not include grassy patches in the conifer zones)	34
Shrublands (does not include brush patches embedded in the conifer zone)	165,409
Black oak	50,306
Live oak	9,518
Riparian hardwoods (primarily aspen, willow and cottonwood species)	3,559
Mixed conifer	164,693
Ponderosa pine	11,645
Red fir	127,388
Westside white fir	174,455

The diversity of topography, geology, and elevation on the TNF has combined to create conditions that support a diverse flora. For example, the TNF is known to contain about 30 percent of the 5,000 native vascular plant species known to occur in the state of California. In Nevada County alone, there are over 1,490 native vascular plant species (Beedy and Brossard 2002). The TNF sensitive species list currently contains 30 rare vascular plants that are known to occur on or near TNF system lands. They include: *Arabis rigidissima* var. *demota*, *Astragalus webberi*, *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium lunaria*, *Botrychium minganense*, *Botrychium montanum*, *Calochortus clavatus* var. *avius*, *Clarkia biloba* ssp. *Brandegeae*, *Cypripedium fasciculatum*, *Cypripedium montanum*, *Epilobium howellii*, *Erigeron miser*, *Eriogonum umbellatum* var. *torreyanum*, *Fritillaria eastwoodiae*, *Ivesia aperta* var. *aperta*, *Ivesia aperta* var. *canina*, *Ivesia sericoleuca*, *Ivesia webberi*, *Lewisia cantelovii*, *Lewisia kelloggii* ssp. *hutchisonii*, *Lewisia kelloggii* ssp. *kelloggii*, *Lewisia longipetala*, *Lewisia serrata*, *Lupinus dalesiae*, *Monardella follettii*, *Penstemon personatus*, *Phacelia stebbinsii*, *Pyrrocoma lucida*, and *Tauschia howellii*. These 30 plants, 6 mosses, 1 lichen, and 3 fungi are listed in Table 3.06-2. The TNF also has 21 vascular plants on its watchlist.

There are 6 rare mosses known to occur on TNF system lands and/or adjacent to them. They include: *Bruchia bolanderi*, *Fissidens aphelotaxifolius*, *Helodium blandowii*, *Meesia triquetra*, *Meesia uliginosa*, and *Mielichhoferia elongata*. These mosses are habitat specific either occurring in aquatic/riparian areas or in rock with copper/heavy metals (*Mielichhoferia elongata*). They may have crucial roles in the hydrologic cycle and in the ecology of meadows and riparian areas. The TNF does not have a comprehensive moss flora. In addition, *Meesia longiseta* and *Sphagnum* moss species are included on the TNF watchlist. It is possible that *Meesia longiseta* occurs in fens on the TNF but at this time there are no known occurrences of *Meesia longiseta* on the TNF. Several fen habitats on the TNF are known to contain mosses in the genus *Sphagnum*. *Sphagnum* moss is ecologically important in that it prefers to grow in acidic conditions and actually contributes to the acidity by giving off hydrogen ions. In addition, *Sphagnum* moss can absorb more than 90 percent of its dry weight in water, which can be crucial in maintaining hydrological conditions in meadows and fens.

Motorized vehicles impact moss species in several ways. When mosses are run over by vehicles, they do not have an underground root system that can help them recover (compared to vascular plants). In addition, water temperature is important to the photosynthetic ability of mosses. As described in the SNFPA (2001) mosses can photosynthesize effectively at temperatures as low as 33 degrees F (compared to a lower limit of about 50 degrees F for vascular plants). Mosses stop photosynthesizing effectively at an upper limit of about 77 degrees F (in contrast to vascular plants, some of which can photosynthesize at temperatures of up to 100 degrees F). When moss layers are disturbed by vehicles, it is possible that water temperatures can go up due to hydrologic disruption.

The rare lichen, *Hydrothyria venosa*, is known to occur on or near TNF system lands. There are no lichens on the TNF watchlist. Lichens occur in all types of habitats, and frequently show specific substrate preferences. They are important in soil formation. Information regarding lichen distributions in the Sierra Nevada and on the TNF is incomplete. There is a great need for further study of lichen ecology and distribution in the Sierra Nevada. Motorized vehicle use affects lichens primarily through damage to the organisms themselves and by damaging the habitat where they are growing. Threats to *Hydrothyria venosa* include damage to the habitat component of clear water from introduction of sediment and possibly petroleum products.

There are 3 rare fungi known to occur on or adjacent to TNF system lands. They include: *Cudonia monticola*, *Dendrocollybia racemosa*, and *Phaeocollybia olivacea*. There are no fungi on the TNF watchlist. Information regarding fungal distributions and ecology on the TNF is incomplete. However, it is known that fungi break down organic material to make inorganic nutrients available for use by other organisms. In addition, many fungi are considered essential food sources for animals. Others play important roles as mycorrhizal symbionts for vascular plants where nutrients are exchanged between a fungus and the roots of a plant. Motorized vehicle use affects fungi primarily through damage to the underground portion of the fungus through compaction and/or displacement of soil, and/or damage to and/or displacement of host plants. Mycorrhizal relationships between fungi and vascular plants are essential for plant growth and survival. Motorized vehicles are recognized as carriers of non-native invasive plants (weeds) that can displace native vegetation.

Motorized vehicle use is also known to damage biotic (living) soil crusts. These soil crusts are formed from a relationship between the top few millimeters of the soil, and an assortment of lichens, mosses, liverworts, cyanobacteria, algae, fungi, and bacteria. Motorized vehicles break through these crusts exposing the soil to wind and/or water erosion.

Table 3.06-2. Number of Sensitive Species Occurrences Known to Occur on TNF System Lands

Scientific Name	Known Occurrences on TNF system lands	Estimated number of plants
Arabis rigidissima var. *demota*	None	0
Astragalus webberi	None	0
Botrychium ascendens	4	Less than 80
Botrychium crenulatum	8	Less than 500
Botrychium lunaria	None	0

Scientific Name	Known Occurrences on TNF system lands	Estimated number of plants
Botrychium minganense	None	0
Botrychium montanum	None	0
Bruchia bolanderi	4	Number of moss plants not estimated
Calochortus clavatus var. *avius*	None	0
Clarkia biloba ssp. *Brandegeae*	4	Varies by year – this is an annual plant – less than 4,000
Cudonia monticola	1	Not estimated – most of the fungus is underground.
Cypripedium fasciculatum	5	Less than 500
Cypripedium montanum	None	0
Dendrocollybia racemosa	1	Not estimated
Epilobium howellii	4	Less than 500
Erigeron miser	14	8,100
Eriogonum umbellatum var. *torreyanum*	11	7,000
Fissidens aphelotaxifolius	None	0
Fritillaria eastwoodiae	7	Less than 1,000
Helodium blandowii	None	0
Hydrothyria venosa	None	0
Ivesia aperta var. *aperta*	5	Less than 5,000
Ivesia aperta var. *canina*	None	0
Ivesia sericoleuca	28	50,000
Ivesia webberi	None	None
Lewisia cantelovii	16	Less than 5,000
Lewisia kelloggii ssp. *hutchisonii*	8	10,000+
Lewisia kelloggii ssp. *kelloggii*	None	0
Lewisia longipetala	4	Less than 1,000
Lewisia serrata	5	Less than 500
Lupinus dalesiae	2	Less than 500
Meesia triquetra	12	Number of moss plants not estimated.
Meesia uliginosa	17	Number of moss plants not estimated.
Mielichhoferia elongata	None	0
Monardella follettii	None	0
Penstemon personatus	2	Less than 1,000
Phacelia stebbinsii	19	Varies by year – this is an annual plant
Phaeocollybia olivacea	2	Not estimated – most of the fungus is underground.
Pyrrocoma lucida	12	Less than 25,000
Tauschia howellii	2	Less than 5,000

Plant Community Groups

Background: The following discussion groups TNF rare plants and fungi by the general types of habitats where they grow and/or places them into a non-specific plant community group. The plant community/

habitat grouping approach is not all inclusive. Important habitat elements necessary to the viability of a particular species may be missed. However, this grouping provides a rough approximation of the type of habitat each species needs and allows an evaluation of how the potential habitat is impacted by motorized vehicle use. An evaluation of how potential habitat is impacted is important since surveys are not considered up to date, especially along temporary and Management Level 1 (ML 1) roads. Unauthorized and system motorized vehicle roads/trails/areas may or may not have sensitive and/or watchlist species growing within or adjacent to them. However, it is reasonable to expect them to be in the potential habitat since there are known occurrences of sensitive/watchlist species and/or watchlist plant communities within and/or near NFTS roads/trails/areas.

Mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) would be implemented in all of the action alternatives (they become management requirements). These mitigation measures would provide benefits to sensitive/watchlist species and other native vegetation. All of the mitigation measures must be implemented before the motorized road/trail/area is available to be used. Regardless of which action alternative is selected, there would be benefits to native vegetation from implementation of these mitigation measures. However, impacts to native vegetation would still occur. These impacts are not considered significant unless those impacts are reducing the viability of a species or causing the loss of an entire plant community. Therefore, this analysis focuses on impacts to those plant/fungus species and/or plant communities that are considered limited, i.e. the sensitive/watchlist species and watchlist plant communities. The analysis is divided into the effects of impacts to known occurrences where surveys have been done, and effects to potential habitats where current surveys are not available.

Revegetation of unauthorized roads/trails/areas (routes): The amount of time necessary for an unauthorized road/trail/area (route) to revegetate is a concern primarily due to possible sediment loss through erosion and changes to the hydrology. The appearance of native vegetation in a disturbed area is considered one of the first visual signs of ecosystem recovery (Switalski et al. 2004). Vegetative recovery of sites is considered acceptable once an herbaceous understory of native vegetation is achieved (Gibson et al. 2000). Studies of the length of time it takes a disturbed area to achieve vegetative recovery indicate that the amount of time varies, and that extrapolation of the time frames from one site to another requires an accounting of site-specific historical and environmental factors (ibid). In addition, the limiting factors of the disturbed area (e.g. seed availability, plant recruitment and survival, and soil compaction) need to be defined (Roovers et al. 2005).

Rare plants/fungi and plant communities may continue to be negatively impacted by unauthorized routes for a period of time even after the motorized use is removed if erosion from the unauthorized motorized vehicle is not reduced and/or eliminated and hydrologic flow is not restored. It is recognized that continued use of routes in need of erosion control by other users (foot, mountain bike and horse traffic) may also prohibit vegetative recovery. Native vegetative cover protects against erosion and maintains infiltration capacity of the soil (Switalski et al. 2004). Soil and watershed surveys of unauthorized motorized vehicle routes indicate 50% of the routes had some level of erosion. Refer to the botanical and soil/water survey documentation located in the project record. Therefore, it is important to

estimate how long it might take an unauthorized motorized vehicle route to recover vegetatively once the motorized vehicle use is removed.

It is anticipated that some of the unauthorized motorized vehicle routes will not recover without restoration actions. These routes would be restored by the TNF as budgets and personnel are available. Some unauthorized routes may be proposed for addition to the NFTS at a later date after conducting NEPA and implementing mitigations to reduce and/or eliminate existing resource damage. Other routes may be used for non-motorized recreation. Still others would be left alone and they will revegetate without restoration actions. All of these scenarios add to and/or reduce impacts to native vegetation. As stated above, it is recognized that non-motorized recreational use may also negatively impact native vegetation. However, motorized vehicle use is recognized as more damaging to vegetation than pedestrians (USDA et al. 1998). In addition, the rate of vegetative 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 motorized vehicle use (USDA et al. 1998). The ecological effects of motorized vehicle routes can extend substantial distances from the road in terrestrial ecosystems (Trombulak and Frissell 2000). Motorized vehicle routes can injure organisms adjacent to them and alter physical conditions beneath them. They change soil density, temperature, soil water content, light levels, dust, surface waters, patterns or runoff and sedimentation. They can also add heavy metals (especially lead), salts, organic molecules, ozone, and nutrients to adjacent environments (ibid).

Aquatic/Riparian Plant Communities

Riparian vegetation is found near water sources at all elevations, and aquatic vegetation is found within the water. The SNFPA (2004) identified special aquatic features and defined them as unique wetlands of high biological diversity occupied by rare aquatic and terrestrial animal plant species. Aquatic and riparian ecosystems have significantly greater biodiversity than adjacent uplands (Kondolf et al. 1996), providing habitat for both aquatic and terrestrial plant and animal species. They are a critical component of biodiversity within the arid lands of the western United States and their importance is amplified by the small amount of land they occupy (Caicco 1998, Goebel et al. 2003). These ecosystems are also important for rare or endemic plant and animal species including rare or endemic invertebrate species (Erman 1996, Erman and Erman 1990).

Riparian plant communities are important even though they may cover only small areas. Some small riparian plant communities (those associated with streams and wetlands such as springs and seeps) are considered headwater systems. Headwater systems benefit humans by mitigating flooding, maintaining water quality and quantity, recycling nutrients, and providing habitat for plants and animals (Meyer et al 2003). The benefits that humans receive from the natural functioning of headwater systems are called ecosystem services. Intact physical and biological characteristics of small streams and wetlands provide natural flood control, recharge groundwater, trap sediments and pollution from fertilizers, recycle nutrients, create/maintain biological diversity, and sustain the biological productivity of downstream rivers, lakes and estuaries. Seasonal and perennial riparian and aquatic ecosystems provide these ecosystem services. Human disturbances such as extensive motorized vehicle use within headwater

systems can result in water pollution, stream filling, and/or the introduction of weeds and other exotic species, can diminish the biological diversity of the systems, and affect the downstream rivers and streams (ibid). Changes to vegetation or hydrology, water pollution, or the introduction of weeds can have profound effects on biota living in headwaters (ibid).

Most estimates indicate that more than 50 percent of the world's aquatic/riparian plant communities (wetlands) may have been altered, degraded or lost in the last 150 years through a wide range of human activities (O'Connell 2003). Aquatic/riparian plant communities in the Sierra Nevada have been directly removed or have had their functions impaired by gold mining, gravel mining, hydroelectric development, land clearance and diversions of water for irrigation, land drainage, timber harvest, construction of roads and railroads, urbanization, livestock grazing, and ground water abstraction (Kondolf et al. 1996). Many of the NFTS and unauthorized motorized vehicle routes cross perennial/intermittent streams and/or are located within 100 feet of aquatic/riparian plant communities.

This analysis used 100 feet from riparian vegetation to define the distance where direct/indirect impacts from motorized vehicles could occur. This distance has been successfully used in other projects to buffer native plants/plant communities from direct/indirect impacts. TNF soil/water staff has also used a 100-foot buffer for perennial water to reduce/eliminate impacts from a variety of projects (to protect water quality from negative impacts from other types of management activities). A recent review of scientific literature revealed that a 100-foot riparian buffer is adequate to mitigate against significantly impacting riparian and aquatic resources (Spackman and Hughes 1995 and Steinblums, I. J., H. A. Froehlich, and J. K. Lyons, 1984).

About 541 miles of motorized vehicle use are currently located within 100 feet of riparian vegetation on the TNF (about 395 miles of NFTS, state, county, and private, and 146 miles of unauthorized routes and closed NFTS roads still receiving some motorized use). A distance of one vehicle length from aquatic/riparian dependent rare plants was chosen as the distance from a route where motorized vehicle use could directly impact rare plants. The Tahoe has about 3,389 perennial and intermittent water crossings (NFTS, state, county, and private and unauthorized). According to information presented in Section 3.02, the condition of system routes varies - with areas of high motorized route density and high erosion risk having a higher risk of accelerated erosion and sediment production and/or deposition. Section 3.02 states that - in general, higher route densities translate into higher potential for adverse effects to aquatic/riparian habitats.

In this analysis, aquatic/riparian plant communities have been grouped to include: wet meadows, seeps, fens/peatlands, vernally wet areas, riparian (streamside and lakeside), wet/moist rock cliffs, and spring plant communities. Sensitive species that occur in/are dependent on aquatic/riparian plant communities include: *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium lunaria*, *Botrychium minganense*, *Botrychium montanum*, *Bruchia bolanderi*, *Epilobium howellii*, *Fissidens aphelotaxifolius*, *Helodium blandowii*, *Hydrothyria venosa*, *Ivesia aperta* var. *aperta*, *Ivesia aperta* var. *canina*, *Ivesia sericoleuca*, *Ivesia webberi*, *Lewisia cantelovii*, *Lewisia serrata*, *Meesia triquetra*, *Meesia uliginosa*, and *Pyrrocoma lucida*. Watchlist plants and plant communities that are dependent on aquatic/riparian plant communities include: *Darlingtonia californica*, *Drosera anglica*, *Drosera rotundifolia*, *Juncus*

marginatus var. *marginatus*, *Mimulus lacinatus*, *Potamogeton filiformis*, *Rhynchospora alba*, *Rhynchospora capitellata*, *Scutellaria galericulata*, *Sphagnum* moss species, *Utricularia minor*, *Veronica cusickii*, special aquatic features, and aspen groves. *Bruchia bolanderi* was found within 30 feet of TKN-J5. *Ivesia sericoleuca* was found within 1 foot of TKN-M2. *Epilobium howellii* was found at the end of YRN-001. A vernal pool was found adjacent to TKN-J2. Aspen plant communities were found along TKN-J11, TKN-J13, TKN-M2, TKS-11, SV-005, and SV-P14. Seep/spring plant communities were found along SV-005, TKN-5, TKN-J13, TKN-M2, YRS-066, YRS-SF4 and YRS-SF5.

Hydrologic alteration is considered one of the biggest threats to sensitive/watchlist species dependent on aquatic/riparian plant communities. Many NFTS and unauthorized motorized vehicle routes cross perennial and/or intermittent streams and/or are located within 100 feet of riparian vegetation. These crossings can alter the hydrologic conditions of the aquatic/riparian plant community at the crossing and downstream from the crossing. The significance of the hydrologic alterations (and therefore impacts to aquatic/riparian vegetation) is dependent on the condition of the soil and vegetation at the crossing. Surveys of crossings (refer to the project record) showed a wide range of existing conditions. Some crossings are well armored with rock and do not show significant signs of erosion (or impacts to aquatic/riparian vegetation). In other cases, the access to the crossing is too steep, erosion of the stream banks is occurring and/or riparian vegetation is lacking. Refer to Appendix A (Site Specific Road, Trail and Open Area Information) for more information about crossings.

In summary, sensitive/watchlist species dependent on aquatic/riparian plant communities benefit most when the health of the aquatic/riparian ecosystem is maintained or improved. Motorized vehicle use can negatively impact these plant communities by changing the pattern of water flow, reducing vegetative cover, compacting soil, causing erosion, depositing petroleum products/sediment thereby reducing water quality, and introducing invasive non-native plants (weeds). The significance of these negative impacts varies dependent on many factors.

Riparian vegetative recovery: Native riparian vegetation is adept at recovering from disturbance such as motorized vehicle use as long as the soil is healthy (healthy soil is not compacted or lost through erosion) and the hydrology of the disturbed area is not severely modified. However, each riparian site is different - for example, each stream has a unique combination of channel morphology, streamside vegetation, hydrology, geology, and soils. Therefore the recovery rates of riparian vegetation will vary. Routes located adjacent to streams and groundwater discharge areas (seeps and springs) will be susceptible to excessive wetness and periodic flooding (Leung and Marion 1996) and may continue to erode even after the motorized use is removed. The presence of weeds indicates a degrading ecosystem (Thompson et al 1998). Routes with extensive weed infestation may not recover vegetatively.

Light use: If the motorized vehicle disturbance was light (bare soil was not created/is limited, the route is already revegetating, and/or streambanks and floodplains were not significantly altered), vegetative recovery will occur rapidly (1 to 2 years based on personal observations) since the roots of the riparian vegetation will still be intact. Native riparian tree and shrub species have deep rooted, soil binding root systems. If native tree and shrub root systems are intact, species such as white or mountain alder (*Alnus rhombifolia* and *A. tenuifolia*) will sprout from the root crown and grow throughout the first

growing season after the disturbance. Native rhizomatous riparian species such as sedges (*Carex* species) will also continue to grow and provide soil cover if their root systems have not been significantly disturbed.

Heavy use: Heavily used riparian areas will have reduced infiltration due to soil compaction, and subsequent surface runoff; reduced and/or eliminated vegetative cover; and the streams and floodplains may have been physically modified. If restoration actions are not taken, erosion may continue and worsen dependent on many factors such as storm and high peak runoff events. In the case of riparian vegetation associated with streams, where a channel is beginning a cycle of erosion, native riparian vegetation seed sources may be absent, the channel gradients may be steep and recovery may require decades or longer (Elmore and Beschta 1987). These areas may not recover without restoration efforts and would be high priority restoration project areas.

Riparian vegetation associated with meadows can heal when remedial treatments reverse the downward trend in the following indicators (Zeedyk 1996):

- Incised channel with active headward erosion
- Eroding soil surface marked by sheet, rill or gully erosion, lowered water table and receding capillary zone
- Surface drying with loss of hydric soils
- Declining population of wetland plant species
- Increasing numbers of upland species
- Disappearance of wetland obligate fauna

Restoration of wet meadow areas begins when available soil moisture increases and the duration of moisture availability is extended enough to meet the minimum seasonal growth requirements of locally adapted wetland plants, especially sedges and rushes (Zeedyk 1996). Allowing unauthorized routes located within wet meadows to heal themselves is seldom a responsible decision with regard to restoring wetland integrity (Zeedyk 1996). The route surface must be reshaped to allow overland runoff to cross over rather than be captured by the unauthorized route. Simple revegetation is seldom sufficient to assure meadow restoration - structural work is usually required (ibid). This is especially true where the unauthorized route has incised below the meadow surface.

Riparian vegetation recovery in disturbed areas located in fen/peatland/spring/seep areas would be similar to what is described above under light and/or heavy use. However, if fen plant communities are heavily disturbed and the hydrology altered, the fen plant community may be converted to a wet meadow plant community. Fens/peatlands contain plant species adapted to specific conditions. Therefore there would be a change in plant species composition and a change in plant biodiversity for the area.

Intermediate use: In areas that have received intermediate use, the existing condition of riparian vegetation impacted by unauthorized motorized vehicle routes falls somewhere between being able to recover on its own, and needing extensive restoration work. Riparian vegetation located within one vehicle length of an unauthorized motorized vehicle route will need site specific evaluation to determine what is needed for revegetation, and monitoring to determine whether vegetative recovery is occurring.

The greater soil moisture in riparian plant communities magnifies the amount of plant and soil damage (Yorks et al 1997).

Serpentine and/or Copper/Heavy Metal Plant Communities

Serpentines (ultramafic soils) are looked upon as significant segments of the worldwide fabric of diversity (Kruckeberg 1984). The vegetation growing on serpentine areas can be highly distinctive. Many serpentine areas are sparsely vegetated and dry, while others are relatively productive and support mixed conifer and yellow pine communities. Plants that exist on serpentine soil have adapted to the unusual chemical composition of the soil. Many species have evolved that are specific to serpentine soil (such species are known as endemics). Several endemic serpentine sensitive and watchlist plant species only occur on serpentine soil. Currently there are about 1,660 acres of serpentine soils on TNF system lands that are impacted by motorized vehicle use of system and unauthorized roads/trails/areas (within 100 feet of the road/trail/area). There are 80 miles of NFTS, state, county, and private and 40 miles of unauthorized routes and closed NFTS roads still receiving some motorized use located within serpentine plant communities.

Serpentines are also identified as irreplaceable watershed systems (Kruckeberg 1984). Serpentine outcrops contain highly fractured and faulted metamorphic and igneous ultramafic rock which serves to store water in the water table. Year-around water such as springs, seeps, and other continuous water flow areas are common in these areas (ibid). Even undisturbed serpentine areas may have sheet erosion and mass wasting. However, disturbance severely enhances the erosion potential on serpentines (ibid).

In this analysis, serpentine plant communities include rocks and soils derived from serpentine that contain heavy metals. Serpentine rocks have iron magnesium silicate and impurities of chromium, nickel, and other toxic elements. As these rocks weather, soils develop that are high in magnesium and iron, low in calcium, and toxic to plants that are not specifically adapted to them. Therefore, they contain unique plant communities. Sensitive species that occur on serpentine soils or copper/heavy metal soils include: *Mielichhoferia elongata* and *Monardella follettii*. Watchlist species that are dependent on these types of habitats include: *Allium sanbornii* var. *congdonii*, *Allium sanbornii* var. *sanbornii*, *Chlorogalum grandiflorum*, and *Perideridia bacigalupi*. Many serpentine floras in California contain a high degree of endemism (Brooks 1987). TNF serpentines occur primarily along the lower western slopes of the forest (Kruckeberg 1984).

Motorized vehicle use impacts these plant communities by reducing vegetative cover, creating disturbed soils that are subject to erosion, and introducing weeds. Many serpentine habitats are open terrain lacking vegetation (Kruckeberg 1984). These habitats are limited (less than 1 percent of the earth) (Brooks 1987).

Serpentine vegetative recovery: Serpentine areas are characterized by critically low levels of most principal plant nutrients, exceptionally high levels of magnesium and iron, and a number of toxic trace elements (Safford et al. 2005). Safford and Harrison (2005) report that very low soil fertility in serpentine soils lead to:

- low rates of plant growth and low levels of community productivity

- thin vegetative cover and large extents of bare ground
- higher ratios of native to exotic species
- a higher component of perennial herbs than the adjacent nonserpentine areas

Human disturbance in serpentine areas such as off-highway vehicle use are generally easy to see because vegetation and soil recovery are very slow (Harrison et al 2006). Revegetation of serpentine areas disturbed by motorized vehicle use may also be dependent on whether topsoil remains in the disturbed area. In one study (Koide and Mooney 1987), revegetation of topsoil plots was much more effective than revegetation efforts on subsoil plots especially in serpentine areas with shallow soils. In another study, older trees harvested on serpentine soils were not replaced by old second growth trees for more than 150 years (Kruckeberg 1984). In addition, the types of plants that are capable of growing on serpentine soils appear to be limited (ibid). Many of the plants that are growing on non-serpentine soils located adjacent to serpentine soils do not appear to have the genetic preadaptation to become established on serpentine soils (ibid).

Since even undisturbed serpentine areas are considered erosive, it is expected that revegetation of unauthorized motorized vehicle routes would be slow especially if the use level was intermediate to heavy and there was a loss of top soil. Even lightly disturbed areas would have increased erosion potential. Therefore, in general terms, vegetative recovery of unauthorized motorized vehicle routes is not expected in the short term (1 to 5 years) and may not occur in the long term (5 years plus) without restoration efforts.

Older Forest Plant Communities

In this analysis, older forest is described as occurring in the red fir/upper montane forest and mixed-conifer forest. Other vegetation types exist that also have older trees, but mixed conifer and red fir are the primary types of older forest analyzed in this document. For more information about old forests, refer to the SNFPA (2001). There are about 285,728 acres of older forest on TNF system lands, of which 29,900 acres are currently, impacted by system and unauthorized, motorized vehicle roads/trails/areas (routes). This acreage number was obtained using about 100 feet on either side of system and unauthorized motorized vehicle routes that pass through vegetation mapped as CWHR 4 and above on NFS lands. There are about 2,057 miles of NFTS, state, county, and private and 817 miles of unauthorized routes and closed NFTS roads still receiving some motorized use located in older forest plant communities.

Plant and fungi species that are dependent on older forest plant communities rely on shade, protected microclimates, and infrequently disturbed substrates. Because of mycorrhizal associations, these species are intolerant of edge effects that change the temperature, moisture, and other microclimate conditions. Sensitive species dependent on these habitats include: *Cudonia monticola*, *Cypripedium fasciculatum*, *Cypripedium montanum*, *Dendrocollybia racemosa*, and *Phaeocollybia olivacea*. The TNF does not currently have any watchlist species or plant communities dependent on older forests.

Motorized vehicle use can impact older forest plant communities in several ways. The most significant impacts may be to underground mycelia and mycorrhizal networks. Motorized vehicle use

disturbs the litter/duff/soil organics, reduces soil shade/moisture, and creates openings. Openings created by motorized vehicle routes may be breaks in the mycelial network. Reductions in leaf litter and organic material in soils affects the amount of nutrients and water available to plants dependent on mycorrhizal associations and fungi. Creation of bare soil also increases the risk of weed introduction and spread.

Older Forest vegetative recovery: Guariguata and Dupuy (1997) found evidence of soil compaction in tracks of 3 out of the 4 logging roads studied 12 to 17 years after those roads were abandoned. They estimated recovery of tree basal area in road tracks to take at least 80 years to reach the status found in adjacent logged forest and that species richness could take even longer to recover. However, in this document, vegetative recovery is described as the amount of time to re-establish the native forb layer. The understory species associated with old growth, including those dependent on the litter depth and mycorrhizal fungi of old growth forest floors are known to grow into small openings (Lindh and Muir 2004) such as the width of a route. In the short term (five years or less), native vegetation may establish on routes that have little soil compaction. It is likely that routes with moderate to heavy soil compaction (within the wheel tracks) would take more than 5 years to recover vegetatively (develop native forb or shrub cover). In many cases, native shrubs growing along the sides of the route will lean into the route. However, the bare soil established by the motorized vehicle would remain unvegetated and subject to erosion.

Oak Woodland Plant Communities

California's oak woodlands are largely privately owned and are estimated to cover about 10 million acres (Ewing et al. in Bartolome and Standiford 1992). They provide shelter and food for wildlife, wood and fuel for humans, and feed for livestock (Jimerson and Carothers 2002). Oak woodlands contain some of the highest species diversity found in California native plant communities (Jimerson and others in Jimerson and Carothers 2002). The TNF manages about 13,886 acres oak woodland. There are about 75 miles of NFTS, state, county, and private and 23 miles of unauthorized routes and closed NFTS roads still receiving some motorized use located in oak woodland plant communities.

Oak woodlands have experienced extensive historic disturbance through harvest of the oaks for fuelwood cutting, mining timbers, domestic and commercial construction, and widespread and heavy livestock grazing (ibid). No other ecosystem in the Sierra Nevada has experienced more human influence over a longer time period than the oak woodlands (Anderson in SNFPA 2001). Threats to oak woodlands across the State include: urbanization, conversion to agriculture, fragmentation, low rates of regeneration, competition from weeds, and sudden oak death. Motorized vehicles impact these ecosystems on TNF lands by introducing and spreading weeds, damaging native vegetation, increasing soil erosion and fragmenting habitats. The TNF does not have any rare plants or fungi that are entirely dependent on oak woodlands.

Oak woodland vegetative recovery: It is believed that oak woodlands are not regenerating in a sustainable fashion (McCreary 2004). The natural regeneration of some oak species is apparently inadequate to replace trees that are harvested or die naturally (Bartolome et al in McCreary 2004). Therefore, unauthorized motorized vehicle routes located in oak woodlands that are no longer used by

motorized vehicles may not experience a significant amount of oak regeneration. However, it is recognized that the best growing site for acorns is shaded, bare mineral soil (McDonald and Tappeiner in SNEP 1996). Acorns that fall onto the bare soil (wheel track areas) created by these routes from adjacent trees may have a better chance of becoming established. However, unauthorized motorized vehicle routes will have changed soil porosity in the wheel track areas. The moisture content of soils under the wheel track areas declines even if the use is removed (Helvey and Kochenderfer 1990 in Trombulak and Frissell 2000) probably due to the changed soil porosity. In addition, the increase of sunlight to the ground in the motorized vehicle disturbed area may cause a change in ground cover from sparse grass to heavy grass and shrubs. However, the nature and rate of vegetative recovery will vary from site to site dependent on such factors as soil, slope, exposure to the sun and local microclimate (Johnson and Tietje – date unknown).

Forest Edges and Openings

Forests of all ages contain edges and openings. Plants dependent on edges and openings within forested plant communities are not considered habitat specific. Forest edges and openings occur in all plant communities. Therefore the number of acres of forested edge and openings on TNF system lands overlaps with the acreages in the other plant communities discussed. There are 3,489 miles of NFTS, state, county, and private and 1,148 miles of unauthorized routes and closed NFTS roads still receiving some motorized use within forest edges and opening plant communities. Forest edge and openings are constantly being created as trees and other vegetation dies. Forest edge and opening plant communities are lost as vegetation grows into them. In this analysis, sensitive species with potential habitat within forest edge and openings include: *Astragalus webberi, Calochortus clavatus* var. *avius, Clarkia biloba* ssp. *brandegeae, Fritillaria eastwoodiae, Lewisia kelloggii* ssp. *hutchisonii, Lewisia kelloggii* ssp. *kelloggii, Lupinus dalesiae, Penstemon personatus,* and *Phacelia stebbinsii*. Watchlist species with potential habitat within edge and opening plant communities include: *Androsace occidentalis* var. *simplex, Erigeron petrophilus* var. *sierrensis,* and *Lilium humboldtii* ssp. *humboldtii*.

Motorized vehicle use can impact these plant communities by increasing the risk of weed introduction and spread, reducing plant cover, increasing erosion, reducing photosynthetic ability by covering vegetation with dust, changing water flow patterns, and compacting soil.

Vegetative recovery in forest edge/opening areas: Native vegetation that responds to the creation of an opening in the canopy (increased light to the soil and increased nutrient availability) are generally considered earlier succession species. The length of time it takes a disturbed area to revegetate in forest edge/opening areas is dependent of a number of factors. In most cases, the soil contains seeds of native plants that will germinate and grow within the first year assuming top soil and water are available. This vegetative recovery is expected irregardless of the plant community where the forest edge/opening occurs. For example the understory species associated with old growth, including those dependent on the litter depth and mycorrhizal fungi of old-growth forest floors, will grow into small openings (Lindh and Muir 2004) as well as native shrub species located in young forest areas such as plantations (personal observation). Revegetation of motorized vehicle routes by native plants will begin within the first year as

long as the routes do not experience continued disturbance. Again, top soil and moisture will be needed for the native plants to survive. If the soil and hydrology of the route has been extremely altered, revegetation may not occur until further action is taken. The greatest species and plant losses take place in the first few passes by wheels. Plant and soil damage increase with the amount of weight and power applied (Yorks et al 1997). Greater soil moisture and/or deeper overstory shading magnify these impacts (ibid).

High Elevation Openings and Rocky Areas

Some plants only grow in openings at high elevations (generally 6,000 feet and above). Trees may be present in the area, but they do not form closed-canopy situations. The TNF manages 43,240 acres of high elevation openings and rocky areas. There are 54 miles of NFTS, state, county, and private and 18 miles of unauthorized routes and closed NFTS roads still receiving some motorized use in these plant communities. Sensitive species with potential habitat within these types of plant communities include: *Arabis rigidissima* var. *demota*, *Erigeron miser*, *Eriogonum umbellatum* var. *torreyanum*, *Lewisia longipetala*, and *Tauschia howellii*. Watchlist species that have potential habitat within these types of plant communities include: *Asplenium trichomanes-ramosum*, *Claytonia megarhiza* and *Tonestus eximius*.

Motor vehicle use is unlikely to impact certain rare plant habitats due to the steep or rocky nature of the surrounding terrain. However, since these habitats are generally steep and have highly erosive soils/rock outcrops/rocky openings when motorized vehicle use does occur near or within the habitat itself, damage to the habitat can be severe. The plants dependent on these plant communities do not appear to compete well with other vegetation. Therefore, weed introduction and/or spread is a significant risk. These plant communities are already subject to natural erosion and have a short growing period. Any disturbance increases erosion risk and can cause significant impacts to the soil and water components of the habitat.

Vegetative recovery in high elevation openings and rocky areas: Studies documenting the time it takes for a disturbed area to revegetate in high elevation, rocky areas are very limited. It is known that these areas have limited growing seasons and harsh conditions in regard to temperature extremes. Any disturbance within these habitats would disturb and/or remove vegetation and leaf litter. Due to the steepness of many of these habitats, disturbance would accelerate erosion. Given these factors, it is likely that disturbed areas would not recover on their own. This is dependent on the amount of disturbance and other factors. Climate factors such as heavy snow years and unchecked soil erosion can limit plant establishment and stop the vegetative recovery process or push it back by several decades (Willard et al. 2007).

Noxious Weeds

Sierra Nevada region biodiversity is at increased risk due to alterations in human uses, fire regimes, and climatic change and changes brought about by weed invasion (D' Antonio et al. 2004). Climate changes may result in massive geographical shifts in locations of sites that provide environments for native plants. Opportunities for replacement of native species with weeds will be enhanced (Franklin 2003). In general

terms, the majority of TNF system lands are considered weed free, with most weed occurrences located along roads and/or in highly disturbed areas such as landings. The lower elevations on the westside of the forest currently contain the worst weed infestations (other than the musk thistle occurrence on the Truckee Ranger District) and provide the entry points for many weeds into the TNF, i.e. the "source" for weeds that are moving upslope into coniferous forests.

When an area is heavily infested with weeds, the weeds directly compete with native plants and can cause their local displacement. In addition, weeds can have a number of indirect effects including changes to: aesthetic values, biological diversity and ecosystem services (D'Antonio et al. 2004). Potential impacts include: alteration of disturbance regimes (including wildfire), changes in the food base for wildlife species, soil erosion and loss of soil carbon storage, decreases in range or forest productivity and altered recreational or aesthetic values (Mack et al. 2000, Di Antonio et al. 2004). They can hybridize with native species (ibid) altering native plant genetics.

Maintaining or improving the NFS lands requires the maintenance and improvement of the basic ecosystem elements of soil, water and vegetation. The stability and ecological function of natural wildlands depend on a diverse community of native plants (Mullin et al 2000). Native vegetation provides resilience against drought, flooding, minimizes erosion, promotes water infiltration and storage, along with providing wildlife and recreation values. Areas infested with weeds do not provide these ecosystem services at the same level as native vegetation. Research has shown that sites dominated by weeds have increased rates of soil erosion and runoff causing degradation of habitat for wildlife and native vegetation.

Once weeds become established, it is hard to get rid of them. Weeds arrived in the United States (many come from Eurasia) without the insects and diseases that preyed on them, and the plants that evolved in competition with them in their native land. Without insects, diseases, etc. to control these weeds, they can increase at a rapid rate.

Disturbed areas generally have more weeds than non-disturbed areas. Weeds are more likely to have higher leaf area and lower tissue construction costs (advantageous under high light and nutrient conditions) and greater phenotypic plasticity than native plants. Increased resource availability and altered disturbance regimes associated with human activities often differentially increase the performance of weeds over that of natives (Daehler 2003). Refer to Table 3.06-3 for information about the weeds known to occur on TNF lands.

Motorized vehicle use is known to enhance weed introduction in a number of ways (Trombulak and Frissell 2000) including increasing weed introduction by moving weed seed and plant parts from place-to-place in the mud/soil on their tires, and/or on the vehicle body. In addition, motorized vehicle use disturbs native plant communities and makes them 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 motorcycle trails (NFTS and unauthorized-for public use) provide habitat for any weed seed deposited there.

Weeds are known to be spread by motorized vehicle use regardless of the season of use. Native vegetation is also known to be physically damaged by motorized 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 motorized vehicle use introduces weeds into new areas and the weeds become established, the fuel pattern is frequently changed. 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. In addition, motorized vehicle use of the various routes is known to increase the chance of ignition through engine sparks, sparks from friction (e.g. rock bouncing on rock), and human negligence. 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. Eliminating motorized vehicles from natural areas is the most effective strategy for stopping the introduction of weeds into new areas (Rooney 2003).

The rate that weeds are introduced to a new area from motorized vehicle use is unknown. In one study, Rooney (unpublished-2003) collected mud from the undercarriage of 14 motorized vehicles. He found that seeds germinated from the soil 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 motorized vehicle user days, he estimated that about 6 million seeds were transported per vehicle per year in Wisconsin. Rooney predicted that over the long term, with motorized vehicles as seed dispersers, the fraction of roads/trails colonized by weeds would increase until all routes had reached a weed saturation level. This prediction was based on the lack of constant, extensive, effective surveillance of motorized vehicle routes. He noted that motorized vehicles are known seed carriers, that there is invariably a time lag between the time weeds colonize an area and when they are detected, and another time lag between detection and eradication efforts. He also reported that weeds are generally better adapted to vehicular dispersal than native species due to their small seed size, high seed production, and persistent seed banks. In this analysis, 100 feet was chosen to define the distance that weed seed would travel on tires. In reality the distance is could be greater or less than 100 feet dependent on many factors.

When native plants are replaced by weeds, the entire ecosystem can be impacted including microbial flora and fauna and insect pollinators, all of which contribute to normal ecosystem function. In addition, these disturbed areas create edges within the various plant communities where they are located. 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.

Disturbance by motorized vehicles can have long-term effects to soils and favor weed establishment. Motorized vehicles compact soils reducing water infiltration and accelerating erosion. They also displace soils and sheer off vegetative roots. If these effects are severe there can be a loss of soil productivity. 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/trails/areas 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 motorized vehicle use that helps to spread weeds is tied to the use of recreational areas and facilities, such as trailheads, campgrounds, and dispersed camping areas. These areas are frequently the first site on NFS lands that the motorized vehicle comes in contact with after leaving major highways. Therefore, they frequently receive weed seed and plant parts. These areas have constant soil disturbance which provides a good seedbed for any weed seed that is deposited. In addition, the users themselves (recreationists) can also disperse weed seeds on their clothing, footwear, and camping equipment. Since many campgrounds are located near riparian plant communities and riparian areas in campgrounds frequently have high levels of public activity, they have a higher risk of weed infestation. Some weeds are adapted to aquatic/riparian plant communities and rapidly become established on sites where soils have been disturbed, such as streambanks and crossings areas. Water can carry weed seeds and plant parts great distances, increasing weed spread. Aquatic weeds, such as purple loosestrife, can take over whole wetland ecosystems, impeding water flow and reducing the quality of wetland habitats.

Table 3.06-3. Some of the Weeds known to occur on TNF System Lands

Weed Species	CDFA*	California Invasive Plant Council**
Ailanthus altissima (tree-of-heaven)	C	Moderate
Bromus tectorum (cheatgrass)	N/A	High
Carduus nutans (musk thistle)	A	Moderate
Carduus pycnocephalus (Italian thistle)	B	Moderate
Centaurea diffusa (diffuse knapweed)	A	Moderate
Centaurea maculosa (spotted knapweed)	A	High
Centaurea solstitialis (Yellow star thistle)	C	High
Centaurea melitensis (tocalote or Malta star thistle)	C	Moderate
Chondrilla juncea (skeleton weed)	A	Moderate
Cirsium arvense (Canada thistle)	B	Moderate
Cirsium vulgare (bull thistle)	C	Moderate
Cytisus scoparius (Scotch broom)	C	High
Genista monspessulana (French broom)	C	High
Hypericum perforatum (Klamath weed)	C	Moderate

Weed Species	CDFA*	California Invasive Plant Council**
Lepidium latifolium (tall whitetop)	B	High
Linaria genistifolia ssp. dalmatica (dalmatian toadflax)	A	Moderate
Robinia pseudoacacia (black locust)	N/A	Limited
Rubus armeniacus (=R. discolor) (Himalayan blackberry)	N/A	High
Spartium junceum (Spanish broom)	N/A	High
Verbascum thapsus (wooly mullein)	N/A	Limited

*California Department of Food and Agriculture Ratings (CDFA) 2007
A-Eradication, containment, rejection, or other holding action
B-Eradication, containment, control or other holding action at the direction of the County Agricultural Commissioner
C-State endorsed holding action and eradication only when found in a nursery

**California Invasive Plant Council Ratings (CalIPC)
High – Severe ecological impacts, reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Species usually widely distributed ecologically among and within ecosystems.
Moderate – Substantial and apparent, but not severe, ecological impacts; attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent on ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
Limited – Invasive, but either their ecological impacts are minor on a statewide level or information on them is insufficient to justify a higher rating, although they may cause significant problems in specific regions or habitats. Reproductive biology and other attributes result in low to moderate rates of invasion. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Sensitive plants and fungi and/or watchlist species occurrences located in and/or near motorized vehicle routes have a high risk of negative impacts from weed introduction and spread. Surveys of over 95 miles of unauthorized motorized roads/trails/areas have been completed. Refer to Table 3.06-13 for a list of the proposed additions to the NFTS that have weed occurrences located within 100 feet or less of them.

Weeds are known to directly/indirectly impact sensitive plant occurrences. For example, an occurrence of the sensitive species *Clarkia biloba* ssp. *Brandegeae* is currently being impacted by the invasion of yellow star thistle along the Mosquito Ridge road located outside of Foresthill. Table 3.06-4 displays the unauthorized routes and closed NFTS roads still receiving some motorized use where sensitive/watchlist plants and/or plant communities have been discovered. These occurrences 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 100 feet are at even greater risk of negative impacts from weed infestation.

Table 3.06-4. Unauthorized Routes and Closed NFTS roads still receiving some motorized use with Sensitive and Watchlist Plants/Plant Communities*

Route ID	Name of Sensitive/ Watchlist Plant, watchlist plant community	Known weed occurrence within 100 feet
TKN-J2	Vernal pool	None
TKN-J5	*Erigeron miser*, *Bruchia bolanderi*, seep/spring	None
TKN-J13	Aspen, seep/spring	Cheatgrass
TKN-M2	*Ivesia sericoleuca*, aspen, seep/spring	Cheatgrass
TKS-11	Aspen	None
YRN-001	*Epilobium howellii*	None
YRN-7	*Erigeron petrophilus* var. *sierrensis*	None

Route ID	Name of Sensitive/ Watchlist Plant, watchlist plant community	Known weed occurrence within 100 feet
YRS-F1 near Fordyce Creek crossing	*Erigeron miser*	None
YRS-SF4	Seep/spring	None
YRS-SF5	Seep/spring	None
SV-005	Aspen, seep/spring	None
SV-P14	Aspen	Cheatgrass, musk thistle

*Sensitive plant occurrence is within 100 feet of the road/trail/area.

Vegetative recovery in weed infested areas: When the motorized vehicle use on a route is removed, 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 et al 2008). The amount of time needed for the route to revegetate with native species is dependent on many factors including the type of weed at the site. Refer to the weed risk assessment for this project located in the project file for more information about ecological characteristics of weeds known to occur on the TNF. Continued motorized vehicle use within aspen plant communities could spread weeds so that aspen regeneration is reduced increasing the risk of loss of these plant communities.

Native Plant Habitat Fragmentation

Many acres of TNF system lands are considered fragmented with other ownership lands embedded within and adjacent to them. The presence of these inholdings affects the current condition and future outlook of TNF system lands. For example, most of the lower elevation, westside oak woodland plant communities are in private ownership and are experiencing rapid development as home sites. The existence of developed land adjacent to NFS land often increases the amount of human activity on the NFS land and increases the risk of unauthorized routes, and weed introduction/spread onto NFS lands. Plant communities located on inholding lands can be managed much differently than NFS lands and can reduce the desired connectivity of plant communities.

Connectivity of native plant communities is often described in terms of large geographic areas of particular vegetation types (such as mixed conifer) that are not fragmented by roads, development or other disturbances. The largest geographic areas other than wilderness on TNF system lands that have limited road/development/disturbance are the Inventoried Roadless Areas (IRAs). However, it is recognized that wilderness areas, Special Interest Areas (SIAs), and Research Natural Areas (RNAs) also provide some native plant community connectivity but generally on a smaller scale. Refer to Section 3.09 for a more information about wilderness, SIAs, and RNAs.

Wilderness: The Granite Chief wilderness is about 24,864 acres in size and contains high elevation forests and meadows. Motorized vehicle use within Granite Chief is prohibited. None of the alternatives change management of this wilderness area. Therefore, native plant connectivity within Granite Chief Wilderness area will not be impacted by motorized vehicle activity regardless of the alternative selected.

SIAs: The SIAs located on the TNF include: Placer County Big Tree Grove Botanical area, Devil's Postpile Geologic area, Glacier Meadow Geologic area, Grouse Falls Scenic area, Meadow Lake Cultural area, Sagehen Headwaters, and Mason Fen area. No changes in management of these SIAs will occur under implementation of any of the alternatives. Motorized vehicle use within these SIAs is either excluded or discouraged. Therefore, native plant connectivity within these SIAs will not be impacted by motorized vehicle activity. Placer County Big Tree Grove, Sagehen Headwaters, and Mason Fen SIAs were established for their native plant characteristics. However, these botanical SIAs are relatively small in area.

RNAs: Lyon Peak/Needle Lake, Sugar Pine Point and Babbitt Peak are the RNAs located on the TNF. Motor vehicles are excluded from all of these RNAs including the No Action Alternative. Therefore, native plant connectivity within these RNAs will not be impacted by motorized vehicle activity. None of the alternatives propose changes to the existing management of these RNAs. These RNAs provide some native plant community connectivity but at a much smaller scale than IRAs and Granite Chief Wilderness.

IRAs: The TNF has eleven IRAs. The character and amount of roads, private land, and motorized trails varies greatly by IRA. Refer to Section 3.09 for the names and acres of IRAs on the TNF. Some of the IRAs contain motorized vehicle roads/trails/areas (routes). The existing condition of routes within RNAs varies. Some started as mining trails and were not made for motorized vehicle use. Over time, these foot/animal trails became wagon trails and then vehicle trails and eventually some of them have become system motorized vehicle routes. Current use of the unauthorized motorized vehicle routes and closed NFTS roads in TNF IRAs is considered light to moderate primarily due to such factors as level of difficulty and remote location.

Large geographic areas such as IRAs that are relatively undisturbed by humans are important for native plants both individually and cumulatively to help maintain species viability and biodiversity (USDA FS 2000, Loomis et al. 2000). Nationally, they play an important role in providing habitat for threatened, endangered, proposed and sensitive (TEPS) plant species (ibid). TNF IRAs are not known to contain TEP plants, but do have occurrences of sensitive and watchlist plants. Nationally, IRAs provide important habitat for more than 1,400 sensitive and almost 100 threatened, endangered and/or proposed (TEP) plant species (ibid) and are considered important biological strongholds for native plant species and communities (ibid). TNF IRAs have not been surveyed. Therefore, the number of TEPS and watchlist plants/plant communities that occur within them is unknown.

Native vegetation within large geographic areas such as IRAs is less likely to be exposed to disruption by human activities such as collection, trampling, and other surface disturbance. This lower level of human disruption may make IRAs important references for understanding the natural composition and dynamics of native plant communities (USDA FS 2000). Roadless areas are less likely to experience problems with weed species and are more likely to be able to maintain intact native plant communities (ibid).

Conservation and management of the biodiversity of the Sierra Nevada is a priority and human land uses are considered the most pervasive threats to native plants in the Sierra Nevada (Murphy et al. 2004). Large geographic blocks of land contain naturally functioning ecosystems that provide many valuable

services including watershed protection, carbon storage, nutrient cycling, pest control, pollination, and fish and wildlife habitat. Preserving naturally functioning ecosystems (natural environments) provides many benefits to society (Krutilla and Fisher 1975 in Loomis et al. 2000).

The effects of motorized vehicle use on native plant connectivity have not been fully studied. However, motorized vehicle use is known to change the plant composition within the areas where the use occurs. In one study done in Idaho, native shrubs/bunch grasses/microbiotic crusts were less prevalent and disturbance loving plants were more prevalent closer to motorized trails. Motorized vehicles directly damaged the native plants and microbiotic crusts and disturbed the surrounding habitat enough to facilitate invasion by weeds. Many weeds (such as the cheatgrass in this study) are known to help spread fire. When wildfire occurs in areas infested with cheatgrass, the native vegetation is frequently lost and the cheatgrass spreads - eventually becoming a monoculture. Motorized vehicle use is also known to increase the amount of bare ground and decrease the cover of microbiotic crust, negatively affecting nutrient cycling and increasing erosion. Dust created by the motorized vehicle use has been shown to decrease native plant cover by reducing rates of photosynthesis, leaf conductance, transpiration, and water use efficiency. Dust can also increase temperatures of leaves and stems and decrease leaf surface areas (Munger et al 2003). Changes in plant composition and plant community functions (such as the rate and spread of wildfire) reduce native plant connectivity and fragment native plant communities. In general, the degree of fragmentation/amount of connectivity loss depends on the intensity and extent of motorized vehicle use. However, even a single motorized vehicle pass can kill and/or injure many types of native plants and introduce weed seed. Native plants with shallow root systems are especially vulnerable (Wilshire 1983, Lacey et al. 1997). Native vegetation species vary in their ability to resist being damaged and in their ability to recover from the damage (Cole 1995). However, all native vegetation appears to have a threshold beyond which the species can no longer recover from motorized vehicle damage and/or other disturbances.

Loss of native vegetation increases the risk of soil loss due to wind and water erosion. Soil erosion accelerates decomposition of organic matter, weakens soil aggregate stability and results in the formation of inorganic surface crusts. Inorganic surface crusts increase water runoff, inhibit seed germination and emergence of seedlings, and reduce water penetration. Natural soil stabilizers such as lichen, fungal and algal crusts are highly vulnerable to damage from motorized vehicle use (Cole 1995).

Motorized vehicle use is known to influence the native vegetation and therefore the biodiversity of the area where the use is occurring. As mentioned above, plant biodiversity is at an increased risk of adverse cumulative effects from increased population growth and associated land uses, land conversions, and nonnative species invasions both nationally and regionally. National Forests with many inholdings such as the TNF have increased risks to biodiversity from nonnative species invasions. Limiting motorized vehicle disturbance within these large geographic areas would provide increased assurances that biological diversity in those areas would be conserved. This biological diversity conservation would be achieved by maintaining the native plant communities where weed species are currently rare, uncommon, or absent because motorized vehicles are known to introduce weeds into new areas. Once weeds are established, they provide a source of weed seed to spread to new areas. The value of large

geographic areas such as IRAs in conserving biodiversity is likely to increase as native plant communities are lost and/or degraded (USFS 2000). Native plant community loss and degradation, and impacts to native plant communities from the invasion and/or encroachment of weeds are increasing nationally and regionally. Increased weed infestation is recognized as a primary threat to biodiversity.

Environmental Consequences

All of the action alternatives reduce the effects of motorized vehicle travel on native plants/plant communities by prohibiting cross country travel. In addition, all action alternatives prohibit motorized vehicle use on some unauthorized roads/trails/areas (routes) and closed NFTS roads still receiving some motorized use. A number of things could happen to routes when motorized vehicle use is prohibited (refer to the affected environment discussion). Some of the routes may be actively closed by the TNF after conducting NEPA. This would benefit sensitive/ watchlist species because they would be avoided during route closure and would have reduced risk after the route was closed. Some of the routes may be proposed for addition to the NFTS at a later date, again after conducting NEPA. In this scenario, sensitive/watchlist species would be avoided during reconstruction/maintenance, but would be at increased risk from dust and weed invasion. Some of the routes may be left to revegetate and will not be visible on the ground after about 5 years. Under this scenario some sensitive/watchlist species would benefit. Others that need openings would not benefit. Other routes may continue to be used for non-motorized recreation. Non-motorized recreational activities can also negatively impact sensitive/watchlist species through direct impacts to the plants and competition from invading weeds, but foot and horse travel are considered less impacting than motorized travel.

Assumptions

The analysis of effects to botanical resources/native vegetation is based on the assumptions listed below:

- Motorized vehicle use within and adjacent to rare species occurrences have the ability to negatively impact the long-term viability of specific plant and fungi species.
- Impacts to sensitive/watchlist species and/or native plant communities are assumed to be limited to the route footprint and the area immediately adjacent (within 100 feet) to it.
- Sensitive/watchlist species and/or native plant communities located within 100 feet of a proposed motorized addition to the NFTS may be indirectly impacted by motorized vehicle use - regardless of the alternative selected.
- Sensitive/watchlist species and/or native plant communities located within one vehicle length of a proposed motorized addition to the NFTS may be directly impacted by motorized vehicle use regardless of the alternative selected.
- Sensitive/watchlist species and/or native plant communities occur within the identified potential habitat that has not been surveyed. Occurrence is assumed until surveys are completed so that analysis of possible impacts can be done.
- Without specific prevention and/or control measures, non-native plants (weeds) will continue to spread along and within surfaced and unsurfaced motorized vehicle roads/trails/areas.

- It is the agency position that just putting a route on a map will not increase the use of that route. However, it is assumed that motor vehicle use of unsurfaced roads/trails/areas will increase sediment production and erosion and that increased use will cause increased sediment production and erosion.
- The projects identified in Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) will be analyzed and implemented on TNF system lands within the next 5 to 10 years.
- All vehicles are assumed "equal." All vehicles were assumed equal in this analysis as many of the motorized routes being analyzed would be open to all types of motorized vehicles, making it impossible to determine which type of vehicle would be using which route at any given time. Hence the impacts to sensitive/watchlist species/native plant communities from a motorcycle are assumed equal to those impacts from a 4-wheeled vehicle.
- Volunteers can effectively maintain adopted trails over the long term.

Data Sources

Data from the following sources was used in this analysis:

- Road/trail/area specific surveys for this project.
- TNF GIS layers for weeds, special aquatic features, streams, sensitive plants, watchlist plants and plant communities, RNAs, SIAs, soils, and vegetation.
- Botanical surveys conducted for a variety of projects including: livestock grazing allotments, fuel reduction, mining, etc.
- Scientific literature on: specific rare plants/fungi and/or their habitats, native plant communities, non-native plants (weeds), climate change and its effects on weed spread/native plant communities, and native plant habitat fragmentation.
- Other data sources including: CNDDB, CNPS On-line Inventory, PLANTS database, Nature Serve, and Jepson Interchange.

Indicator Measures

The following general indicator measures were used to compare alternatives in regard to known occurrences of sensitive/watchlist species and/or plant communities and to potential habitat without current surveys. These indicator measures were selected based on literature review and professional judgment.

- **Number of perennial and intermittent water crossings**.
- **Proposed addition to the NFTS within 100 feet of unsurveyed potential habitat**.
- **Sensitive/watchlist species and/or watchlist plant communities within one vehicle length of proposed additions (direct effects).** Since vehicles are allowed to pull off routes to a distance of one vehicle length, there is a possibility of direct impacts to sensitive/watchlist species and/or other vegetation within that distance from the proposed addition.
- **Sensitive/watchlist species and/or watchlist plant communities within 100 feet of proposed addition (indirect effects).** One hundred feet was chosen to define the distance for indirect impacts to sensitive/watchlist species based on successful reduction of direct and indirect impacts

to sensitive/watchlist species located more than 100 feet away from other types of ground-disturbing management activities that have been implemented in the past. Soil and water TNF staff has used a 100-foot buffer for perennial water to reduce/eliminate impacts from a variety of projects (to protect water quality from negative impacts from other types of management activities). Soil and water staff report that "A recent review of scientific literature revealed that a 100-foot riparian buffer is adequate to mitigate against significantly impacting riparian and aquatic resources" (Spackman and Hughes 1995 and Steinblums, I. J., H. A. Froehlich, and J. K. Lyons, 1984).

- **Weed infestations within 100 feet of the proposed addition**. One hundred feet was chosen to define the distance that weed seed could travel from an established weed occurrence via vehicle tires. In reality, the distance would probably be further than 100 feet and/or less than 100 feet dependent on many factors.
- **Miles of proposed additions within inventoried roadless areas**. This indicator was chosen to assess potential effects on plant community fragmentation in large blocks of land.

Elements of the proposal

In addition to the indicator measures, the alternatives are compared by plant community with a focus on the major parts of the proposal:

- Prohibition of cross country travel [including unauthorized routes and closed NFTS roads still receiving some motorized use].
- Additions to the NFTS (including roads and motorized trails)
- Establishment of motorized "Open Areas"
- Changes to the NFTS (including change in the class of vehicles resulting from approval of mixed use, change in the class of vehicles resulting from changes in maintenance levels, changes in seasonal restrictions, over the snow travel, and re-opening Maintenance Level 1 (ML 1) roads making them ML-2 roads).
- Amendments to the Forest Plan
- Cumulative effects including all of the above and the reasonably foreseeable. The spatial boundary of the cumulative effects analysis area is the TNF.

There are some elements of the project proposal that do not differ significantly in their impacts to sensitive/watchlist species and/or plant communities regardless of the alternative selected, or the type of plant community. These elements of the proposal include: Establishment of motorized "Open Areas," changes to the NFTS, and amendments to the Forest Plan. The consequences of implementing these elements of the proposal are presented below:

Establishment of motorized "Open Areas"

Indicator(s) used to measure effects:

- Acres of "Open Area"

No Action: Alternative 1 does not propose acres of "Open Areas" for reservoir access or the Greenhorn area, but it does not prohibit use of these areas either. Alternative 1 has the greatest risk of negative effects to native vegetation, when compared to the action alternatives. However, since the reservoir shoreline access areas and the Greenhorn area have been surveyed and no sensitive/watchlist species were found, direct impacts to sensitive/watchlist species are not expected. Implementation of Alternative 1 could spread weeds and could therefore indirectly impact sensitive/watchlist species and/or native plant communities in other areas. Bare soil such as what appears around reservoirs when the water level recedes, provides ideal areas for weeds to become established. Weeds can grow in these areas for several growing seasons - until water levels rise again and are high enough (and stay high enough) to drown or rot any seeds in the soil. The amount of bare soil around reservoirs and timing/duration of water levels is difficult to predict. However, any vehicle that drives over a weed infested area has the ability to spread weed seed and/or plant parts from the open area to other areas. The spreading of weeds from one place to another is an indirect impact to the native plants located where the weeds are spread. The area around Boca Reservoir is known to be heavily infested with the "A" rated weed – musk thistle and has areas adjacent to the Reservoir that have been infested with spotted knapweed. The bare soil in the low water line around Boca Reservoir provides suitable establishment sites for musk thistle and spotted knapweed. Use of this bare soil area by motor vehicles could spread these highly invasive weeds to new areas.

Action alternatives: In general terms, the action alternatives prohibit cross country travel, however, Alternatives 2 and 6 allow cross country travel in "Open Areas." Alternative 2 proposes the addition of about 2,649 acres of "Open Areas" as open shoreline access on dry soils around Boca, Prosser and Stampede Reservoirs (2,589 acres) and the Greenhorn open area (60 acres). Alternative 6 proposes specific designated access routes through the open shoreline areas of Boca, Prosser and Stampede (244 acres), but does not propose the addition of the Greenhorn open area. Alternatives 3, 4, 5, and 7 do not propose shoreline access or the Greenhorn open area.

None of the action alternatives would directly impact sensitive/watchlist species through addition of "Open Areas" since the "Open Areas" have been surveyed and no sensitive/watchlist species were found. However, Alternatives 2 and 6 could indirectly impact sensitive/watchlist species and native plant communities. Alternative 2 has the greatest risk of the action alternatives of indirectly impacting sensitive/watchlist species and/or native plant communities through the spread of weeds since it proposes the addition of the most acres of open area. Alternative 6 has less risk of weed spread than Alternative 2 because it proposes the addition of specific "lanes" for low water access. Providing access along specific routes reduces the area that would be used by motorized vehicles reducing the area in need of future weed survey. Weeds are much easier to treat if they are detected when they are first becoming established.

Changes to the NFTS

No Action: Alternative 1 does not change the class of vehicles that can use a particular route and does not implement seasonal restrictions. Implementation of Alternative 1 would not impact sensitive/watchlist species and/or native plant communities any differently than they are currently being impacted. Impacts

would vary dependent on many variables including the types of plant communities the route passes through (different plant communities provide habitat for different sensitive/watchlist species); amount of motorized use of the route; etc.

Action alternatives: It is difficult to determine how implementation of a particular action alternative could impact sensitive/watchlist species and/or native plant communities when there is a change in the class of vehicles that use a system route or a change in the time when a road can be used (implementation of seasonal restrictions). Refer to the following discussion:

1. Change in type of vehicle: Changing the type of vehicle that can use a specific route could negatively impact sensitive/watchlist species and/or native plant communities that occur along that route. It is recognized that the width of the route could vary if the proposed change made the route narrower. However, many of the motorized routes being analyzed would be open to all types of motorized vehicles and do not reduce the width of routes. It is impossible to predict what type of motorized vehicle will be using which route at any given time since motorcycles and 4-wheel-drive vehicles can all use many of the routes. Hence for analysis purposes, the impacts to sensitive/watchlist species and/or native plant communities from use of a motorcycle are assumed equal to those impacts from a 4-wheeled vehicle and do not differ significantly by action alternative.

It is likely that direct impacts to sensitive/watchlist species and/or plant communities occurred when the road was developed. Indirect impacts may still be occurring if the sensitive/watchlist species and/or plant communities have survived within 100 feet of the road. These indirect/cumulative impacts would continue regardless of the type of vehicle using the road. In addition, there are no studies that indicate one type of vehicle spreads weed seed and/or weed plant parts more than another. Therefore, changing the class of vehicle does not make the road more or less susceptible to weed introduction and spread and does not reduce the risk of sensitive/watchlist species and/or plant communities being lost or degraded.

2. Seasonal restrictions: The impact to native plant communities and the sensitive/watchlist species dependent on them from implementation of seasonal restrictions varies by plant community and species. However, the significance of beneficial or negative impacts from the seasonal restriction is difficult to quantify for a number of reasons. Removing motorized vehicle use from routes during the wet season does reduce the potential amount of erosion from that route that could occur especially if the route becomes rutted. However, this amount of potential erosion can not be quantified. Determining where the rutting and erosion would take place and if that erosion would impact sensitive/watchlist species and/or plant communities is difficult. It is reasonable to assume that those sensitive/watchlist species and/or native plant communities located within one vehicle length of a proposed addition to the NFTS would not benefit from soil erosion regardless of the season of use.

Some sensitive/watchlist species would have limited impacts from season of use restrictions. Those sensitive/watchlist species that are aquatic/riparian plant community dependent are always subject to erosion and/or soil rutting because those native plants grow in soils that are wet/moist year-around. Serpentine (ultramafic soils) plant communities are considered highly erosive year-around. The known occurrences of rare plants located within one vehicle length of a system motorized vehicle route that are dependent on older forest plant communities (such as *Cypripedium fasciculatum* occurrences) are all

located within road cut-banks. Due to their location in reference to the system roads, they would not be at risk from increased erosion unless the entire road washed out. Erosion at levels that would wash out entire roads is not expected regardless of the season of use. It is recognized that implementing seasonal restrictions to reduce the amount of motorized use on wet soils could benefit sensitive/watchlist species and/or native plant communities. However, even one vehicle pass can kill a plant or group of plants regardless of the time of year the tire passes over the vegetation. Therefore, it is very difficult to quantify differences between action alternatives based on seasonal restrictions. In addition, the seasonal restrictions do not necessarily prohibit motorized vehicle use during the growing season. For example, the season of use for TKN-M2 that has a known occurrence of *Ivesia sericoleuca* is May 1 to December 1. *Ivesia sericoleuca* grows on the eastside of the Forest at elevations where snowmelt from meadows would occur near May 1. Therefore the seasonal restriction does not benefit the *Ivesia sericoleuca* occurrence other than possibly reducing the amount of soil compaction/rutting/water channeling that could occur if the route were open earlier than May 1.

The action alternatives that do not have seasonal restrictions could negatively impact sensitive/watchlist species and/or plant communities if motorized use occurs on a route when the soils are wet. However, many of the proposed additions occur at elevations that would prohibit use of the route before May 1st anyway due to snow accumulation. For example, *Epilobium howellii* occurs at the end of YRN-001. YRN-001 is proposed for addition to the NFTS in Alternatives 2, 5 and 6. Alternative 2 would have YRN-001 open all year; Alternative 5 would have the season of use from May 1 to December 31; and Alternative 6 would have the season of use from April 1 to December 31. From personal experience, it is rare to be able to access the area where YRN-001 is located before mid June and most years the area is snowed in by December. In addition, if there is a known sensitive/watchlist species and/or plant community within 100 feet of a route, mitigations have been developed to reduce or eliminate impacts and seasonal restrictions would not change the mitigations. Therefore, there really isn't a difference in impacts to sensitive/watchlist species and/or plant communities for any alternative in regard to seasonal restrictions. When compared to Alternative 1, there is no difference in impacts.

Amendments to the Forest Plan

No Action: Alternative 1 does not propose Forest Plan amendments. Therefore implementation of this portion of Alternative 1 would not impact sensitive/watchlist species and/or native plant communities.

Action alternatives: Alternatives 2, 5 and 6 propose amendments to the Forest Plan (change the seasonal restriction for deer winter range in Management Area 84).The other action alternatives do not propose this Forest Plan amendment. Amending the Forest plan in regard to seasonal restriction for deer winter range in Management Area 84 would not impact sensitive/watchlist species and/or native plant communities.

Elements of the Proposal that Vary by Alternative

Implementation of some elements of the proposal shows variation of effects by alternative and by plant community. These elements of the proposal include: 1) prohibition of cross country travel, 2) additions to

the NFTS and reopening of ML 1 roads, and 3) cumulative impacts including reasonably foreseeable. These three elements of the proposal are analyzed by plant community.

Aquatic/Riparian Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited (thereby reducing the mileage of routes available for motorized use). Mileage reduction includes unauthorized routes and closed NFTS roads still receiving some motorized use located within 100 feet of riparian vegetation.
- Number of perennial and intermittent water crossings on routes where public motorized vehicle use is prohibited

No Action: Alternative 1 does not prohibit cross country travel. Therefore, about 134,222 acres of riparian vegetation could be impacted by cross country travel. Under implementation of Alternative 1 impacts to known occurrences of sensitive/watchlist species dependent on aquatic/riparian plant communities would likely increase over time as motorized vehicle use increases. As yet undiscovered sensitive/watchlist species would be at risk as new routes were created. It is likely that cross country use would kill and/or injure at least some sensitive/watchlist species and it is reasonable to expect that some occurrences would be lost. Those sensitive species considered in downward trend would be most at risk for loss of viability. TNF sensitive plants in a downward trend that are dependent on aquatic/riparian plant communities include: *Ivesia aperta* var. *canina* and *Ivesia webberi*. Since *Ivesia aperta* var. *canina* and *Ivesia webberi* are experiencing a downward trend across their range of occurrence, impacts to them could be significant if they occur on TNF system lands.

Direct/indirect impacts could be significant at least at the local, site specific level. Possible direct impacts include killing and/or injuring sensitive/watchlist species and/or native vegetation by running over them. Severe and persistent disturbance to sensitive/watchlist species occurrences and/or aquatic/riparian plant communities could convert them to a different type of plant community. The significance of these impacts is dependent on many factors including the amount of disturbance, the sensitive/watchlist species being impacted, and in some cases, the season when the disturbance takes place (for example, running over a sensitive/watchlist species while it is in bloom could negatively impact reproduction - at a minimum. Running over the same plant while it is dormant and underground would not have the same impacts - especially if the soil health is not reduced). The significance of impacts is also dependent on the number of sensitive/watchlist species that occur in a specific location and how many of them are injured and/or killed. In addition, the significance of impacts is dependent on the amount and condition of the type of habitat needed by a particular sensitive/watchlist species across its range of distribution.

When a sensitive/watchlist species is dependent on plant communities that are limited (for example *Meesia uliginosa* is usually found in fens and fens are plant communities of limited distribution), impacts could be significant. The type of motorized vehicle is not a factor since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007). It is impossible to know when or where

cross country motorized vehicle use would occur, but since it would not be restricted in Alternative 1, the risk of significant direct/indirect impacts is higher than in the action alternatives.

If cross country motorized vehicle use reduced the soil health within a sensitive/watchlist occurrence through compaction, increased erosion, changed water flows, and/or introduced weeds, the sensitive/watchlist occurrence would have reduced health, and/or could be converted to a different plant community. Conversion to another plant community would be considered significant especially at the site specific level.

In most cases, recommendations for sensitive/watchlist species – especially aquatic/riparian plant communities - are for protection from impacts. Most TNF sensitive/watchlist species are considered aquatic/riparian dependent and are limited in distribution. When an occurrence has reductions in the health of the soil and/or changes to the amount or health of water/air/vegetation components of the habitat, those sensitive/watchlist species habitats may not be able to maintain and/or perform their natural prescribed functions (Foltz and Meadows 2007). Refer to Section 3.02 for more information regarding soil and water. Allowing unrestricted motorized vehicle use across the Forest greatly increases the risk of negative direct/indirect impacts to sensitive/watchlist species.

Unauthorized routes and continued motorized use of closed NFTS roads are considered an expression of cross country travel. TNF unauthorized routes and closed NFTS roads still receiving some motorized use have about 908 perennial and intermittent water crossings and 146 miles located within 100 feet of riparian vegetation. Alternative 1 has the greatest number of perennial and intermittent water crossings and greatest number of miles of motorized vehicle use located within 100 feet of riparian vegetation of all alternatives. Therefore, Alternative 1 has the greatest risk of negative impacts to aquatic/riparian plant communities and those species dependent on them.

Action alternatives: In general terms, the action alternatives prohibit cross country travel. Therefore, no direct, indirect, or cumulative impacts to sensitive/watchlist species and/or aquatic/riparian watchlist plant communities (from cross country travel) are expected.

2. Additions to the NFTS and Reopening ML 1 Roads

Indicator(s) used to measure effects:

- Miles of proposed additions to the NFTS that are located within 100 feet of riparian vegetation.
- Number of proposed additions with perennial and intermittent water crossings
- Sensitive/watchlist species and/or watchlist plant communities located within 100 feet of proposed additions to the NFTS
- Weed sites located within 100 feet of proposed additions to the NFTS

No Action: Alternative 1 does not propose the addition of routes to the NFTS. However, implementation of Alternative 1 could impact sensitive/watchlist species and/or aquatic/riparian plant communities directly/indirectly by continuing use of about 908 perennial and intermittent water crossings and 146 miles of route located within 100 feet of riparian vegetation. Refer to the discussion under effects of cross country use under the No Action Alternative above. Direct/indirect impacts could be significant at least at the site specific level.

Surveys located several aquatic/riparian dependent sensitive/watchlist species and/or plant communities along or within 100 feet of several routes: *Bruchia bolanderi* along TKN-J5; *Epilobium howellii* at the end of YRN-001; *Ivesia sericoleuca* along TKN-M2 (cheatgrass infestations were found within 100 feet of the TKN-M2 *Ivesia sericoleuca* occurrence); aspen along TKN-M2, TKS-11, SV-005, and SV-P14; a vernal pool at the end of TKN-J2; and springs/seeps along SV-005, TKN-J5, TKN-M2, YRS-SF4 and YRS-SF5.

Implementation of Alternative 1 would continue to impact these sensitive/watchlist species and/or watchlist aquatic/riparian plant communities directly, indirectly, and cumulatively. The significance of these impacts is dependent on many factors including the amount of disturbance. Under implementation of Alternative 1 the risk of significant (occurrence scale) soil compaction, increased erosion, changed water flows, and/or weed introduction is high.

Action alternatives: Tables 3.06-5, 3.06-6, and 3.06-7 display the number of perennial and intermittent water crossings, the number of miles of proposed additions located within 100 feet of riparian vegetation, and identify the proposed additions to the NFTS where surveys identified sensitive/watchlist species and/or watchlist plant communities. The following discussion is divided into impacts to known occurrences and impacts to potential habitat that lacks current surveys.

A. Impacts to known occurrences:

Vernal pool watchlist plant community: Implementation of Alternatives 2, 4, 5, 6, and 7 would impact the vernal pool at the end of TKN-J2. TKN-J2 is proposed for addition to the NFTS under all action alternatives except Alternative 3. Mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) require barriers to placed around the vernal pool/seasonal wetland so that damage from motorized use is reduced/eliminated. Continued motorized vehicle use within this vernal pool would eventually cause a loss of the native plants within it - if mitigations were not implemented, and the vernal pool plant community would be lost. Barriers would be placed at the end of TKN-J2 to eliminate direct impacts to the vernal pool from motorized vehicle travel. The vernal pool would still be at risk from indirect impacts under Alternatives 2, 4, 5, 6, and 7 – especially increased risk of weed introduction and spread. Implementation of Alternative 3 provides benefits to the vernal pool by reducing the risk of weed introduction/spread and the amount of dust produced by motor vehicle use of TKN-J2.

Seep/spring watchlist plant communities: As mentioned above, seep/spring plant communities were found along routes SV-005, TKN-J5, TKN-J13, TKN-M2, YRS-066, YRS-SF4, and YRS-SF5. SV-005 and YRS-066 are proposed in Alternatives 2, 5 and 6. No mitigations are proposed for SV-005 since motorized vehicle use is not currently impacting the seep/spring plant community along the route. No mitigations are proposed for YRS-066 since motorized vehicle use is not currently impacting the developed spring located about 50 feet away from it. TKN-J5 is proposed in Alternatives 2, 5, 6, and 7. The water from the seep would be directed to the meadow instead of down the route. TKN-M2 is proposed in Alternatives 2, 5 and 6. Barriers would be placed along the route where it passes through the seep/spring plant community. YRS-SF4 is proposed in Alternatives 2, 5, and 6. Water from the seep/spring plant communities would be directed so it does not flow down the road. TKN-J13 and YRS-

SF5 is proposed in Alternatives 2, 4, 5, 6, and 7. The damaged seep/spring plant community located off of route YRS-SF5 would be restored prior to this route being available for motorized use. The wet areas along TKN-J13 would have soil and water mitigations implemented in Alternatives 2, 4, 5 and 7. In Alternative 6, TKN-J13 was shortened from 1.6 miles to .1 miles in length to avoid the seep/spring plant communities altogether. When compared to Alternative 1, implementation of these mitigations would reduce, but not eliminate, impacts to these seep/spring plant communities. Remaining impacts to the seep/spring plant communities contribute to cumulative impacts to aquatic/riparian plant communities. Alternatives 3 and 4 do not propose the addition of SV-005, TKN-J5, TKN-M2, YRS-066 or YRS-SF4 to the NFTS and Alternative 3 does not propose the addition of TKN-J13 or YRS-SF5 to the NFTS. Therefore, seep/spring plant communities along those proposed additions benefit from the prohibition of public motorized vehicle use of those routes in Alternatives 3 and 4.

Aspen watchlist plant communities: Aspen watchlist aquatic/riparian plant communities were found along SV-005, SV-P14, TKN-J11, TKN-M2, and TKS-11. Barriers would be placed on either side of the proposed additions where they pass through the aspen plant communities along routes SV-P14, TKS-11 and TKN-M2. Impacts to aspen communities, caused from implementing the action alternatives, would be less than Alternative 1. No mitigations were proposed for aspen plant communities located along routes SV-005 and TKN-J11 since negative impacts to the aspen from motorized vehicle use were not detected during field surveys.

Sensitive plants: Table 3.06-7 shows that *Bruchia bolanderi* along TKN-J5 and *Ivesia sericoleuca* along TKN-M2 are at higher risk in Alternatives 2, 5, 6, and 7 because both of those routes are proposed additions in those alternatives. The stream crossing at Castle Creek (TKN-J5) would be routinely checked to determine whether users are widening the crossing. Widening the crossing would put motor vehicles that much closer to *Bruchia bolanderi*. Barriers and signs would be placed adjacent to Castle Creek to keep users from reducing vegetative cover adjacent to the stream, increasing sediment. Barriers would also be placed so that turn-arounds, camping and parking do not occur with 100 feet of Castle Creek. These mitigations would reduce but not eliminate impacts to the *Bruchia bolanderi* occurrence located along Castle Creek, when compared to Alternative 1.

Barriers would also be placed on either side of TKN-M2 where it goes through the *Ivesia sericoleuca* and to block access to the route spur that passes through the occurrence. Any cheatgrass that spreads to the *Ivesia sericoleuca* occurrence would be manually treated. Barriers would also be placed on either side of TKN-M2 where it passes through the aspen plant community. Impacts to the *Ivesia sericoleuca* along TKN-M2 from motorized vehicle use would be reduced, but not eliminated. Indirect impacts of risk of weed infestation and dust would still occur. Over the long term, the risk of cheatgrass spreading and out-competing native vegetation including *Ivesia sericoleuca* along TKN-M2 is high. Refer to the weed risk assessment located in the project files for more information.

Epilobium howellii at the end of YRN-001 is at higher risk in Alternatives 2, 5, and 6. Barriers would be placed at the end of YRN-001 to reduce impacts to *Epilobium howellii* and to the riparian vegetation growing adjacent to the pond. Implementation of the mitigations along these routes reduces the risk of significant impacts to the sensitive/watchlist species and/or watchlist plant communities. Alternative 7

does not propose the addition of routes TKN-M2 and YRN-001. Alternatives 3 and 4 do not propose the addition of routes TKN-J5, TKN-M2, or YRN-001. Sensitive species and aquatic/riparian plant communities along those routes benefit from the prohibition of motorized vehicle use on those routes.

B. Impacts to potential habitat:

Compared to Alternative 1, all action alternatives would reduce the number of perennial/intermittent water crossings and the miles of proposed additions to the NFTS located within 100 feet of riparian vegetation and thus reduce the risk of negative impacts to aquatic/riparian plant communities and those sensitive/watchlist species dependent on them. Of the action alternatives, Alternative 2 has the greatest risk of negatively impacting aquatic/riparian plant communities and the sensitive/watchlist species dependent on them. Alternative 2 proposes the addition of 28 water crossings, about 5 miles of route within 100 feet or riparian vegetation, and 2,649 acres of open area next to Boca, Stampede, and Prosser Reservoirs and in the Greenhorn area. Refer to Tables 3.06-5 and 3.06-6. However, even though much of the 2,649 acres is located within 100 feet of water, those acres support little riparian vegetation and have been surveyed and sensitive/watchlist species are not present. These “Open Areas” have a high risk of spreading weeds to other areas however.

Implementation of Alternatives 5 and/or 6 have a slightly smaller risk of negatively impacting aquatic/riparian plant communities and the sensitive/watchlist species dependent on them than Alternative 2. Alternative 5 proposes the addition of 33 water crossings and about 7 miles of additions to the NFTS. Alternative 6 proposes the addition of 36 water crossings and about 7 miles of additions to the NFTS. Alternatives 5 and 6 do not propose the establishment of Prosser, Boca, Stampede or Greenhorn “Open Areas.” However, Alternative 6 does propose the establishment of access areas to Prosser, Boca, and Stampede Reservoirs (about 244 acres).

Alternatives 4 and 7 have less risk of negatively impacting aquatic/riparian plant communities and the sensitive/watchlist species dependent on them than Alternatives 2, 5 and 6. Alternative 7 proposes the addition of 14 water crossings and about 3 miles of additions to the NFTS. Alternative 4 proposes the addition of about 13 water crossings and about 3 miles of additions to the NFTS. Of the action alternatives, Alternative 3 has the least risk of negative impacts to sensitive/watchlist species dependent on aquatic/riparian plant communities because it does not propose the addition of any water crossings or miles to the NFTS and does not propose “Open Areas” or reservoir access areas. Alternative 3 provides the greatest benefits to sensitive/watchlist species dependent on aquatic/riparian plant communities that may occur within potential habitat.

Table 3.06-5. Number of perennial and intermittent water crossings by alternative*

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross country travel		908	0	0	0	0	0	0
2. Additions to the NFTS	**# of perennial and intermittent stream crossings**	N/A	28	0	13	33	36	14
3. Establishment of Motorized "Open Areas" (acres)		N/A	2,649	0	0	0	244	0
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	No Effect						
	b. Change in Class of Vehicles resulting from changes in maintenance levels	No Effect						
	c. Change in Season of Use	No Effect						
	d. Reopening Maintenance Level 1 Roads	0	0	0	0	46	3	0
5. Amendments to the Forest Plan		No Effect						
	Total Crossings	**3,389**	**2,509**	**2,481**	**2,497**	**2,604**	**2,529**	**2,495**

*Crossings include lands under all ownerships.

The total includes crossings on State, County, and private roads. Alternative 1 total also includes unauthorized routes and closed NFTS roads still receiving some motorized use.

Table 3.06-6. Miles* of proposed additions to the NFS located within 100 feet of riparian vegetation by alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross country travel (miles) (acres)		 146 134,222	0	0	0	0	0	0
2. Additions to the NFTS	**Miles added within 100 feet of riparian**	N/A	5	0	3	7	7	3
3. Establishment of Motorized "Open Areas" (acres for entire area)		N/A	2,649	0	0	0	244	0
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	No Effect						
	b. Change in Class of Vehicles resulting from changes in maintenance levels	No Effect						
	c. Change in Season of Use	No Effect						
	d. Reopening Maintenance Level 1 Roads	0	0	0	0	6	1	0
5. Amendments to the Forest Plan		No Effect						
	Total Miles **Total Acres**	**541** **134,222**	**400** **2,649**	**395** **0**	**398** **0**	**408** **0**	**403** **244**	**398** **0**

***** Miles are approximate. Note that there are 141,396 acres located within 100 feet of riparian vegetation on the Forest but 7,174 of those acres are located in areas closed by the LRMP. The total mileage includes State, County, and private roads. Alternative 1 total also includes unauthorized routes and closed NFTS roads still receiving some motorized use.

Table 3.06-7. Proposed additions to the NFTS that pass through sensitive/watchlist occurrences and/or watchlist aquatic/riparian plant communities by alternative

Route ID	Aquatic/riparian vegetation	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
SV-005	Aspen, seep/spring	Yes	No	No	Yes	Yes	No
SV-P14	Aspen	Yes	No	Yes	Yes	Yes	Yes
TKN-J2	Vernal pool	Yes	No	Yes	Yes	Yes	Yes
TKN-J5	*Bruchia bolanderi*, seep/spring	Yes	No	No	Yes	Yes	Yes
TKN-J13	Aspen, seep/spring	Yes	No	Yes	Yes	Yes but shortened	Yes
TKN-M2	*Ivesia sericoleuca*, aspen, seep/spring	Yes	No	No	Yes	Yes	No
TKS-11	Aspen	Yes	No	No	Yes	Yes	Yes
YRN-001	*Epilobium howellii*	Yes	No	No	Yes	Yes	No
YRS-066	Seep/spring within 50 feet	Yes	No	No	Yes	Yes	No
YRS-SF4	Seeps/springs	Yes	No	No	Yes	Yes	No
YRS-SF5	Seep/spring	Yes	No	Yes	Yes	Yes	Yes

***** Existing unauthorized routes and closed NFTS roads still receiving some motorized use listed here are also in Alternative 1.

3. Cumulative effects including reasonably foreseeable

Past/present/reasonably foreseeable future actions that could potentially affect or do affect aquatic/riparian plant communities and the sensitive/watchlist species dependent on them as well as the benefits from prohibiting public motorized use of routes are discussed. It is assumed that implementation of all of the action alternatives avoid significant long term cumulative impacts by implementing frequent and consistent evaluation of perennial and intermittent water crossings, implementing mitigations to reduce impacts to sensitive/watchlist species, and detection/treatment of weeds. This evaluation combined with rapid mitigation of resource damage/weed treatment avoids significant impacts to aquatic/riparian plant communities and the sensitive/watchlist species dependent on them in the long term.

Past: Management activities have occurred on Tahoe National Forest System (NFS) lands and privately owned lands for over a century, creating the existing condition as we see it. Historic management activities on NFS lands that impacted aquatic/riparian plant communities include: gold mining, gravel mining, hydroelectric development, land clearance, diversions of water for irrigation, land drainage, timber harvest, construction of roads and railroads, urbanization, livestock grazing, ground water abstraction, and others (Kondolf et al. 1996). This long history of disturbance to aquatic/riparian plant communities has contributed to the lack of an undisturbed reference for most aquatic/riparian dependent sensitive/watchlist species. Therefore, it is not possible to specifically quantify how these past management activities have impacted them. It is known that historic management activities altered springs, creeks, and rivers by diversion of water; that meadows, peatlands/fens were converted to other types of plant community when water was diverted and they dried out; that aquatic/riparian plant communities were repeatedly and heavily grazed by domestic livestock; and that numerous roads were built within RCAs changing the hydrology of the aquatic/riparian plant communities associated with

rivers and streams. These past management activities and others have cumulatively reduced the amount of aquatic/riparian plant communities within TNF watersheds that would be suitable habitat for the sensitive/watchlist species dependent on them. The amount of reduction is unknown.

In addition, aquatic/riparian plant communities were impacted when past management created conditions on the landscape that contributed to cross country travel. For example, skid trails and temporary roads that were created during past timber harvest projects are generally blocked off where they connect to system roads and trails once the project has been implemented. However, in a number of areas motorized vehicle users have removed or gone around the barriers that blocked access. Continued use of the old skid trail and/or temporary road created a motorized route that was not designed for continuous motorized use and may be located in an area that is not best suited to that use. For example, temporary crossings of streams are designed differently than permanent stream crossings. Trail planning and design – especially location – are important considerations for limiting disturbances to natural resources (Foltz and Meadows 2007) such as sensitive/watchlist species.

Current: It is recognized that current impacts to aquatic/riparian plant communities come from a variety of management activities - including motorized vehicle use. It is also recognized that motorized vehicle use within aquatic/riparian plant communities and their zones of influence (RCAs) negatively impacts the soil/vegetation/water in those site specific areas. For example, use of roads/trails/areas while the soils are wet can cause the formation of ruts/wheel tracks that can channel water away from the vegetation located near the rut. The channeled water frequently runs down the road or trail altering area hydrology and causing erosion of soil. Aquatic/riparian vegetation located in areas of changed hydrology and soil erosion often has reduced vigor and may die if the changes are severe.

Aquatic/riparian vegetation located within 30 feet of the road/trail can also be negatively impacted when it is run over as users park along the road/trail, or pull over to let others pass. Aquatic/riparian vegetation located within 100 feet of the route can be covered in dust causing a loss of plant growth. Water quality can also be negatively impacted when motorized vehicles add sediment and other pollutants to aquatic plant communities. (Refer to Section 3.02 for more information about impacts to soil and water.) Motorized vehicle use within aquatic/riparian plant communities and their zones of influence does not benefit soil, water and native vegetation within those areas. However, the significance of the negative impacts to soil/vegetation/water within specific aquatic/riparian plant communities varies. Refer to Appendix A (Site Specific Road, Trail and Open Area Information) for additional information about aquatic/riparian plant communities that are impacted by motorized vehicles.

Other on-going projects on the Forest that impact aquatic/riparian plant communities include: special uses projects such as utility corridor construction and maintenance (utility lines pass through and impact many different types of plant communities including aquatic/riparian); minerals operations that remove native vegetation and recontour the landscape; and livestock grazing projects (impacts to aquatic/riparian plant communities as livestock eat the vegetation and punch hoof holes into the soil). These on-going impacts to aquatic/riparian vegetation contribute to cumulative effects to these plant communities.

Surveys of over 95 miles and many acres of proposed additions to the NFTS showed that there are occurrences of sensitive/watchlist species and/or aquatic/riparian watchlist plant communities that are

negatively impacted by motorized vehicle use of NFTS routes, unauthorized routes, and by cross country use. Examples of these impacts are discussed below:

Example 1: *Meesia triquetra* is a sensitive moss that is dependent on aquatic/riparian plant communities called peatlands or fens. An occurrence of *Meesia triquetra* is currently being impacted by cross country motorized vehicle travel in Summit fen. Cross country travel onto the fen created bare soil by killing the vegetation where the wheel tracks occurred. In addition, Summit fen is also being indirectly impacted by the system route located within 100 feet above it. The system route is channeling water and sediment into the fen covering vegetation with sediment and creating bare soil areas. In addition, the addition of sediment may be changing the acidity of the water (pH) in the fen (formal monitoring of the water pH and possible peat loss has not occurred). It is known that damage to fens/peatlands from motorized vehicle use alters surface and subsurface flow patterns and can result in areas of bare peat and soil. Areas of exposed (bare) peat are at increased risk of drying out and decomposing. Wheel tracks can also weaken or destroy the rhizomatous root network of the clonal peat forming plants. Functioning fens/peatlands store carbon. Loss of moisture to the fen/peatland (from water being channeled down the road/trail) could cause the plants that make up this fen to die releasing carbon. Peat forming wetlands (such as Summit fen) also provide important benefits within TNF watersheds by improving water quality and providing habitat for unique plant communities. Because of the large historical loss of this type of plant community, remaining fens are considered rare.

Example 2: *Ivesia sericoleuca* and *Ivesia aperta* var. *aperta* occurrences are located on the eastside of the Forest in meadows and vernally wet areas (meadows and vernally wet areas also considered aquatic/riparian plant communities). Cross country motorized vehicle use has negatively impacted occurrences of these sensitive plants in several locations. Motorized vehicles have created ruts within occurrences that act as channels taking water and soil away from the sensitive plant occurrences. Several plants show pedestaling – where the body of the plant appears to be “perched” above the soil level. In addition, motorized vehicles have killed and/or injured individual plants by driving over them. Plants located within wheel tracks show reduced vigor – are much smaller than those located outside of wheel track areas.

Reasonably foreseeable: When past and current impacts are added to the impacts of the reasonably foreseeable future actions identified in Appendix H (Reasonably Foreseeable Projects and Cumulative Effects), risks to aquatic/riparian plant communities and the sensitive/watchlist species dependent on them increase.

Some current and reasonably foreseeable management actions do not impact aquatic/riparian plant communities and others are expected to have minimal direct impacts. For example, fuel reduction/timber harvest projects routinely establish a 50-100 foot buffer around aquatic/riparian plant communities (such as riparian vegetation along streams, peatlands, fens, springs, and seeps) where no management activities are implemented. This buffer is designed to reduce and/or eliminate direct/indirect impacts to aquatic/riparian plant communities and/or the sensitive/watchlist species that occur within them. Other projects such as conifer removal from aspen plant communities are designed to improve the health of aspen by improving its reproduction. Aspen conifer removal projects do not buffer riparian vegetation

from disturbance but attempt to limit the amount of disturbance within those aquatic/riparian plant communities. Therefore impacts to riparian vegetation and other riparian resources are expected to be minimal.

No Action: Implementation of Alternative 1 carries a high risk of cumulative impacts to sensitive/watchlist species dependent on aquatic/riparian plant communities. Since (in general terms) no restrictions would be in place to limit where motorized vehicle use could occur, all aquatic/riparian plant communities and sensitive/watchlist species dependent on them that grow in areas that are accessible by motorized vehicles would be at risk. Since complete surveys for the Forest are not available, and an undisturbed reference for aquatic/riparian plant community dependent sensitive/watchlist species is also lacking, this analysis focuses on cumulative impacts to aquatic/riparian plant communities without current botanical surveys and discussion of cumulative impacts to individual species where cross country travel/motorized vehicle use is known to impact them.

When the impacts of all past, current and reasonably foreseeable management actions are added to the possible impacts of implementing Alternative 1, (especially cross country travel) the potential to significantly impact (long term – over 5 years) aquatic/riparian plant communities and the sensitive/watchlist plant species dependent on them is high. Cumulative impacts include possible conversion of peatlands/fens and other wetlands to other types of plant communities from altered hydrology, soil erosion, and weed infestation. Aquatic/riparian plant communities frequently lack the vegetative barriers to keep motorized vehicle use from accessing them (for example wet meadow areas). Therefore, under Alternative 1, it is reasonable to expect cross country motorized vehicle use within them. Several examples of how uses of system and unauthorized routes, and cross country travel impact sensitive/watchlist species in aquatic/riparian plant communities are provided below. These examples are provided to give the reader information about the types of impacts that could occur with cross country motorized vehicle travel.

Example – *Bruchia bolanderi*: *Bruchia bolanderi* is currently indirectly/cumulatively impacted by motorized vehicle use in several locations. This sensitive moss occurs along Castle Creek and is located about 50 feet upstream and 30 feet downstream from the Castle Creek stream crossing along TKN-J5. There are limited numbers of this moss known to occur on the TNF. Known occurrences include Castle Valley, Summit fen, Round Valley meadow, and Upper Lola Montez areas. Both the Upper Lola Montez and Castle Creek occurrences are being impacted by motorized vehicles. In addition, TKN-J5 channels water and has altered the hydrology of site specific areas along it. Impacts are not currently considered significant. However, if motorized vehicle use causes significant hydrologic alternation or soil compaction, the moss occurrences could be lost. All occurrences of this moss on the TNF are small in area and could be significantly reduced by one vehicle pass. Implementation of Alternative 1 carries a high risk (short and long term) that motorized vehicles could significantly impact *Bruchia bolanderi* moss occurrences since they are all located in areas that are fairly accessible to motorized vehicles. In addition, over the long term, weeds could be introduced into the wet meadow plant community containing *Bruchia bolanderi*. If weeds were to become established in the *Bruchia bolanderi* locations, the sensitive moss plants would be lost. When, where, and if weeds would become established is unknown.

Example – *Ivesia sericoleuca*: *Ivesia sericoleuca* was discovered along TKN-M2. Cross country motorized vehicle use has killed and injured individual plants within this occurrence. These impacts are not considered significant at this time. However, over the long term, impacts to *Ivesia sericoleuca* occurrences from cross country travel by motorized vehicles may be significant.

Most of the known occurrences of *Ivesia sericoleuca* are known to be impacted by a combination of motorized and non-motorized vehicles, livestock grazing and/or cheatgrass invasion. Even though there are tens of thousands of *Ivesia sericoleuca* plants known to occur on Tahoe NFS lands, the majority are being negatively impacted. *Ivesia sericoleuca* plants grow in meadow plant communities where terrain and vegetation do not provide obstacles to cross country travel. TNF occurrence records for the 28 known occurrences indicate that 18 of the known occurrences are negatively impacted by off-highway vehicles (OHVs). Only two occurrence records indicate no disturbances. Twenty of the 28 occurrence records indicate that livestock grazing is a negative disturbance. Over the long term, cross country travel by motorized vehicles in these plant communities, combined with past/current impacts could significantly reduce the number of *Ivesia sericoleuca* plants on the TNF. In addition, over the long term, other occurrences of sensitive species, such as *Ivesia aperta* var. *aperta* and *Pyrrocoma lucida*, which are accessible by motorized vehicles traveling cross country could also be significantly reduced. Occurrences of all three of these sensitive plants are currently known to be negatively impacted by motorized vehicle use. Refer to the occurrence records for these plants located in the Supervisor's Office.

Example – *Populus tremuloides*/aspen: Aspen clones (watchlist plant communities) were found along several routes including TKN-M2, TKS-11, SV-005, and SV-P14. Over the long term, cross country travel could damage aspen so much that the aspen are killed and/or weakened. Weakened aspen are more susceptible to disease and/or insect infestation. Cross country travel through aspen stands could alter soil properties. Shepperd et al. (2006) reported that recreation activities can alter soil properties if continued vehicle passes cause the stripping of small moisture-absorbing roots from large lateral roots. Severe motorized vehicle use could increase runoff from storm events in these aspen clones increasing erosion (Shepperd et al. 2006). Over the long term (more than 5 years), continued motorized vehicle use within aspen could introduce disease, spread weeds so that regeneration is reduced, and increase the risk of loss of these plant communities.

Example – wet meadows: Some system and unauthorized motorized vehicle roads/trails end at the edge of wet meadows. For example, YRN-11 is an unauthorized road that ends at a wet meadow. There is evidence (wheel tracks) that some motorized users are driving past the end of the route onto the meadow. When motorized vehicle use occurs in wet meadows, soils are compacted, the hydrology is altered, and vegetation is killed. Implementation of Alternative 1 would not place barriers at the end of unauthorized trails such as YRN-11 and it is reasonable to assume that cross country travel across wet meadows would occur. Restoration of aquatic/riparian plant communities such as wet meadows is often time consuming and expensive and successful methods of reintroduction of sensitive/watchlist species are not always available.

Alternative 1 has the greatest number of perennial and intermittent water crossings, the most miles of motorized vehicle roads/trails/areas within 100 feet of riparian vegetation, and allows cross country

travel. Refer to Tables 3.06-5 and 3.06-6. In addition, implementation of Alternative 1 has the greatest risk of introducing and spreading weeds into aquatic/riparian habitats (Refer to the Noxious Weed Risk Assessment located in the project files).

Given all of the above information, implementation of Alternative 1 may impact *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium lunaria*, *Botrychium minganense*, *Botrychium montanum*, *Bruchia bolanderi*, *Epilobium howellii*, *Fissidens aphelotaxifolius*, *Helodium blandowii*, *Hydrothyria venosa*, *Ivesia aperta* var. *aperta*, *Ivesia aperta* var. *canina*, *Ivesia sericoleuca*, *Ivesia webberi*, *Meesia triquetra*, *Meesia uliginosa*, and *Pyrrocoma lucida* and may contribute to a trend for listing them as threatened or endangered over the long term. Implementation of Alternative 1 may also impact *Androsace occidentalis* var. *simplex*, *Darlingtonia californica*, *Drosera anglica*, *Drosera rotundifolia*, *Juncus marginatus* var. *marginatus*, *Mimulus lacinatus*, *Potamogeton filiformis*, *Rhynchospora alba*, *Rhynchospora capitellata*, *Scutellaria galericulata*, *Sphagnum* species, *Utricularia minor*, *Veronica cusickii*, special aquatic features and aspen groves. At this time, impacts to watchlist plants and/or plant communities are not considered significant unless entire plant communities are lost. Based on current information, watchlist plants/plant communities that are aquatic/riparian dependent are not at risk of being lost in the short term (less than 5 years). The number of aquatic/riparian plant communities that could be converted to other types of plant communities due to cross country motorized vehicle use is unknown. It is also unknown how such variables as climatic variation and future water demands from NFS lands combined with cross country motorized travel would impact aquatic/riparian plant communities. It is known that implementation of Alternative 1 could continue to negatively impact these limited plant communities. Refer to the watchlist report located in the project record. It is believed that implementation of Alternative 1 puts these plant communities at risk of being lost in the long term.

Action alternatives: Implementation of the action alternatives would cumulatively impact aquatic/ riparian plant communities and the sensitive/watchlist species dependent on them. When the impacts of all past, current and reasonably foreseeable management actions are added to the possible impacts of adding intermittent/perennial water crossings and miles of road/trail/area located within 100 feet of riparian vegetation, there is the potential to significantly impact (long term – over 5 years) them. However, as discussed previously, mitigations have been developed for those proposed additions to the NFTS that have current surveys (over 95 miles).

Motorized vehicle use of proposed additions that lack current surveys may be impacting sensitive/ watchlist species and/or aquatic/riparian plant communities. Direct/indirect impacts could be significant in the long term if sensitive/watchlist species and/or aquatic/riparian plant communities are lost. Impacts could also be significant over the long term if sensitive/watchlist species and/or aquatic/riparian plant communities are replaced by weeds. Currently there are no cost effective mitigations available to prevent the introduction of weeds from motorized vehicle use along roads/trails and within areas. Since the existing condition of the proposed additions without current surveys is unknown, the following alternative comparison is done for impacts to known occurrences and potential habitats.

Alternative 2: Of the action alternatives, Alternative 2 has the greatest risk of cumulatively impacting aquatic/riparian plant communities and the sensitive/watchlist species dependent on them. Alternative 2

proposes the addition of 28 water crossings, about 5 miles of route within 100 feet of riparian vegetation, and 2,649 acres of ”Open areas” next to Boca, Stampede, and Prosser Reservoirs and in the Greenhorn area. These “Open Areas” have a high risk of spreading weeds to other areas.

Implementation of Alternative 2 would also impact known occurrences of sensitive/watchlist species and/or aquatic/riparian plant communities along proposed additions. Mitigations have been developed to reduce and/or eliminate impacts to known occurrences; however, known occurrences are still at risk from indirect impacts such as dust and weed infestation. There are no mitigations available that effectively reduce the indirect impacts of increased risk of weed introduction/spread and reduced vigor due to dust. Motorized vehicle use along proposed additions that have weed infestations and sensitive/watchlist species and/or aquatic/riparian plant communities have the greatest risk that these species and/or plant communities would be infested with weeds over time. In addition, sensitive/watchlist species located within 100 feet of proposed additions are at increased risk of reduced vigor from dust. Dust covered plants do not reproduce or grow as well as those plants that are not covered in dust. Dust covered plants could be weakened to the point that they can no longer compete effectively with weeds or other vegetation. The amount of dust is dependent on many variables such as the amount of use, the type of soil, wind patterns, etc. Over the long term, competition for soil and water due to weed invasion and weakening of plants due to being covered with dust could kill plants. However, frequent field visits with rapid implementation of mitigations to reduce/eliminate impacts (including weed treatment) are expected to reduce the significance of these impacts. Therefore, impacts to known occurrences and/or potential habitats without current botanical surveys from implementation of Alternative 2 are not considered significant.

Alternatives 5 and 6: Implementation of Alternatives 5 and/or 6 have a slightly smaller risk of cumulatively impacting aquatic/riparian plant communities and the sensitive/watchlist species dependent on them than Alternative 2. Alternative 5 proposes the addition of 33 water crossings, about 7 miles of additions to the NFTS and reopens the most miles of ML 1 roads (about 46 miles) in aquatic and riparian communities. Alternative 6 proposes the addition of 36 water crossings, about 7 miles of additions to the NFTS and reopens about 3 miles of ML 1 roads in this community type. Alternatives 5 and 6 do not propose the same additions of Prosser, Boca, Stampede or Greenhorn “Open Areas” - Alternative 6 proposes 244 acres and Alternative 5 proposes no “Open Areas.” Therefore, Alternative 2 has a higher risk of weed spread than Alternatives 5 and 6.

Implementation of Alternatives 5 and 6 would also impact known occurrences of sensitive/watchlist species and/or aquatic/riparian plant communities along proposed additions. Known occurrences are still at risk from indirect impacts such as dust and weed infestation. Frequent field visits with rapid implementation of mitigations to reduce/eliminate impacts (including weed treatment) are expected to reduce the significance of these impacts. Therefore, impacts to known occurrences and/or potential habitats without current botanical surveys from implementation of Alternatives 5 and 6 are not considered significant.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 cumulatively impacts aquatic/riparian plant communities and the sensitive/watchlist species dependent on them. However, these cumulative

impacts are less than those under Alternatives 2, 5 and 6. Alternative 7 proposes the addition of 14 water crossings, about 3 miles of additions to the NFTS and does not have any water crossings associated with the reopening of any ML 1 roads. Alternative 4 proposes the addition of about 13 water crossings, about 3 miles of additions to the NFTS and does not have any water crossings associated with the reopening of any ML 1 roads. In addition, the amount of indirect impacts that known occurrences would experience is reduced in Alternatives 4 and 7 because they do not propose additions of specific routes with known occurrences. Implementation of Alternative 4 would not indirectly impact *Bruchia bolanderi* and the seep along TKN-J5; *Ivesia sericoleuca*, a spring, and aspen along TKN-M2; or aspen along TKS-11 and SV-005 because these routes are not proposed for addition to the NFTS under Alternative 4. Aspen along SV-P14 would continue to be indirectly impacted under Alternative 4. In addition, implementation of Alternative 4 would not spread cheatgrass along TKN-M2 through motorized vehicle use since motorized vehicle use of that route would be prohibited. Alternative 7 would continue to indirectly impact *Bruchia bolanderi* and the seep along TKN-J5 and aspen along TKS-11 and SV-P14. Alternative 7 would not impact *Ivesia sericoleuca*, a spring and aspen along TKN-M2, or continue to spread cheatgrass along TKN-M2.

Alternative 3: Implementation of Alternative 3 would cumulatively impact aquatic/riparian plant communities and those sensitive/watchlist species dependent on them through use of system routes. Of the action alternatives, Alternative 3 has the least risk of negative impacts to sensitive/watchlist species dependent on aquatic/riparian plant communities because it does not propose the addition of any water crossings or miles to the NFTS and does not propose "Open Areas." Implementation of Alternative 3 has the lowest weed risk of the action alternatives and provides the greatest benefit to aquatic/riparian plant communities and those sensitive/watchlist species dependent on them.

Given the above information, implementation of the action alternatives could impact: *Botrychium ascendens*, *Botrychium crenulatum*, *Botrychium lunaria*, *Botrychium minganense*, *Botrychium montanum*, *Bruchia bolanderi*, *Epilobium howellii*, *Fissidens aphelotaxifolius*, *Helodium blandowii*, *Hydrothyria venosa*, *Ivesia aperta* var. *aperta*, *Ivesia aperta* var. *canina*, *Ivesia sericoleuca*, *Ivesia webberi*, *Meesia triquetra*, *Meesia uliginosa*, or *Pyrrocoma lucida* but would not contribute to a trend for listing them as threatened or endangered. Implementation of the action alternatives could also impact *Androsace occidentalis* var. *simplex*, *Darlingtonia californica*, *Drosera anglica*, *Drosera rotundifolia*, *Juncus marginatus* var. *marginatus*, *Meesia longiseta*, *Mimulus lacinatus*, *Potamogeton filiformis*, *Rhynchospora alba*, *Rhynchospora capitellata*, *Scutellaria galericulata*, *Sphagnum* species, *Utricularia minor*, *Veronica cusickii*, special aquatic features and aspen groves but those impacts are not expected to be significant in the short or long term. Since it is assumed that motorized vehicle users would stay on designated routes regardless of the action alternative selected, and motorized vehicle use does not benefit aquatic/riparian plant communities, the alternative with the least number of miles within and adjacent to aquatic/riparian plant communities is the most beneficial to those plant communities and the resources dependent on them, i.e. Alternative 3.

Serpentine and/or Copper/Heavy Metal Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited (thereby reducing the mileage of routes available for motorized use) Mileage reduction includes unauthorized routes and closed NFTS roads still receiving some motorized use located within 100 feet of serpentine and/or copper/heavy metal plant communities.

No Action: Alternative 1 does not prohibit cross country travel on the 14,412 acres of serpentine soil within the TNF. Under implementation of Alternative 1 as yet undiscovered serpentine/copper/heavy metal dependent sensitive/watchlist species and/or plant communities could be negatively impacted by motorized vehicle use if they are located in areas accessible by vehicles. It is reasonable to expect that over time, cross country use would kill or injure sensitive/watchlist species and significantly impact serpentine plant communities. Cross country use in these plant communities could increase soil erosion. The significance of direct/indirect impacts is dependent on many factors including the amount of disturbance, the sensitive/watchlist 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/ watchlist species that occur in a specific location and how many of them are damaged. For example, some serpentine dependent sensitive species, such as *Mielichhoferia elongata* and *Monardella follettii*, have not been found on the TNF. If they were found in/along proposed additions to the NFTS, the occurrence would be considered an important range extension of the species and disturbances could be considered significant.

The TNF has about 80 miles of NFTS roads/trails open to motor vehicle use and 40 miles of unauthorized routes and closed NFTS roads still receiving some motorized use located within serpentine plant communities. About 1 mile of unauthorized route is located within an area closed to motorized vehicle travel by existing forest order. Since serpentine plant communities are sparsely vegetated, under Alternative 1, motor vehicles could access almost all of these communities via cross country travel. Dependent on many factors such as amount of motor vehicle use, amount of erosion, and amount of vegetation loss, impacts could be significant over the long term.

No sensitive species were found in the surveys of about 95 miles of unauthorized routes and closed NFTS roads still receiving some motorized use. An occurrence of the watchlist plant *Erigeron petrophilus* var. *sierrensis* was found within and along YRN-7. This is the only occurrence of this plant known on the TNF. Motorized vehicle use of YRN-7 is directly/indirectly impacting about 50% of the plants within the occurrence since about 50% of the plants are located within 100 feet of wheel tracks of YRN-7. Implementation of Alternative 1 could significantly reduce the size of this occurrence and/or kill all of these plants through cross country travel since the occurrence area is sparsely vegetated and there is evidence of cross country travel currently. Loss of the only occurrence of *Erigeron petrophilus* var. *sierrensis* on the TNF would be significant.

Action alternatives: All of the action alternatives prohibit cross country travel. Therefore, direct/ indirect impacts to sensitive/watchlist species dependent on these plant communities from cross country travel would not occur. Since unauthorized routes and continued motorized use of closed NFTS roads are considered an expression of cross country travel, the number of miles where motorized vehicle use is prohibited provides benefits to these plant communities. Alternatives 2 and 5 prohibit motorized use on the fewest miles of unauthorized routes and closed NFTS roads still receiving some motorized use of the action alternatives – about 36 miles or 90 percent. Alternatives 4 and 7 prohibit public motorized use on about 37 miles of unauthorized routes and closed NFTS roads still receiving some motorized use or 93 percent. Alternatives 3 and 6 prohibit public motorized use on 100 percent of the unauthorized routes and closed NFTS roads still receiving some motorized use located within serpentine/copper/heavy metal plant communities and would have the least risk of indirect and cumulative impacts to sensitive/watchlist species dependent on these plant communities.

2. Additions to the NFTS and Reopening ML 1 Roads

Indicator(s) used to measure effects:

- Miles of proposed additions to the NFTS that pass through serpentine (ultramafic) soils. Areas of copper/heavy metal soils are usually small and not identified as distinct soil mapping units. Therefore, the miles of unsurveyed proposed motorized vehicle road/trail/area in copper and heavy metal areas are not known. Areas of copper/heavy metal are identified during on the ground surveys.
- Sensitive/watchlist species located within 100 feet of proposed additions to the NFTS and/or miles of potential habitat lacking current surveys.

No Action: Alternative 1 does not propose additions to the NFTS; however, implementation of Alternative 1 could impact sensitive/watchlist species and/or serpentine/copper/heavy metal plant communities directly, indirectly, and cumulatively by continuing use of about 40 miles of unauthorized routes and closed NFTS roads, continuing use of the 80 miles of open NFTS roads/trails, state, county, and private routes, and allowing cross country travel within these plant communities. These impacts could be significant dependent on the species of plant, amount of disturbance, etc. Refer to the discussion above under the No Action Alternative for information about the effects of cross country travel.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles open for motorized vehicle use within serpentine/copper/heavy metal plant communities. Refer to Table 3.06-8.

A. Impacts to known occurrences: No sensitive species were found in surveys of proposed additions located within serpentine/copper/heavy metal plant communities. However, an occurrence of the watchlist plant *Erigeron petrophilus* var. *sierrensis* was found within and along YRN-7. Motorized vehicle use of YRN-7 is directly/indirectly impacting about ½ of the plants within this occurrence since about 50 percent of them are located within 100 feet of the route. Loss of 50 percent of the only known occurrence of this plant on the TNF would be significant. Therefore, mitigations were developed to reduce direct impacts. Barriers would be placed along both sides of YRN-7 where it passes through the occurrence. Indirect

impacts from dust and increased weed risk would continue. Therefore, those alternatives that propose the addition of YRN-7 have the greatest risk of indirect impacts to this plant. Alternatives 2, 5 and 7 propose the addition of YRN-7 to the NFTS. Alternatives 3, 4 and 6 do not propose YRN-7.

B. Impacts to potential habitat: Alternatives 2 and 5 propose the addition of about 4 miles, the most miles within this plant community. Alternatives 4 and 7 both propose the addition of about 3 miles of route within these plant communities. Alternatives 3 and 6 do not propose the addition of any routes within serpentine plant communities and therefore have the least risk of negative impacts to native plants including sensitive and watchlist species located within these plant communities.

Table 3.06-8. Miles* of road/trail/area within serpentine plant communities by alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross country travel (miles located within serpentine plant communities) (acres located within serpentine plant communities)		40 14,412	0	0	0	0	0	0
2. Additions to the NFTS	**Miles added within 100 feet of serpentine (ultramafic) soil**	N/A	4	0	3	4	0	3
3. Establishment of Motorized "Open Areas" (acres)		N/A	0	0	0	0	0	0
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	No Effect						
	b. Change in Class of Vehicles resulting from changes in maintenance levels	No Effect						
	c. Change in Season of Use	No Effect						
	d. Reopening Maintenance Level 1 Roads	0.0	0.0	0.0	0.0	0.2	0.2	0.0
5. Amendments to the Forest Plan		No Effect						
	Total Miles	**120**	**85**	**81**	**84**	**85**	**84**	**84**
	Total Acres	**14,412**	**0**	**0**	**0**	**0**	**0**	**0**

*Miles are approximate. The total mileage includes NFTS, State, County, and private roads. Alternative 1 total also includes unauthorized routes and closed NFTS roads still receiving some motorized use.

3. Cumulative effects including reasonably foreseeable

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact serpentine/copper/heavy metal plant communities as well as the sensitive/watchlist species dependent on them, including the benefits from prohibiting use of unauthorized routes and closed NFTS roads still receiving some motorized use are discussed. It is assumed that all of the action alternatives avoid significant long term cumulative impacts by implementing frequent evaluation of routes, implementing mitigations to reduce impacts to sensitive/watchlist species, and conducting weed detection surveys with rapid treatment of weeds. This route evaluation combined with rapid mitigation of resource damage avoids significant impacts to serpentine/copper/heavy metal plant communities and the sensitive/watchlist species dependent on them in the short and long term.

Past: Serpentine habitats in the Sierra Nevada have been reduced in area and/or have had their functions impaired. Gold mining, timber harvest, road construction, recreational uses, and gravel mining are a few of the management activities that have impacted the serpentine habitats on the TNF.

Serpentine habitats are frequently open terrain (Kruckeberg 1984). Therefore they lack vegetation to prevent cross country travel by motorized vehicles. *Allium sanbornii* var. *congdonii, Allium sanbornii* var. *sanbornii, Chlorogalum grandiflorum, Mielichhoferia elongata, Monardella follettii* and *Perideridia bacigalupi* are the sensitive/watchlist species that are considered dependent on serpentine/copper/heavy metal habitats. Historic activities have cumulatively reduced the quality of serpentine habitat that would be suitable for these plants within TNF watersheds. The amount of reduction is unknown.

Current: Current management (2004 on) has added to cumulative impacts to serpentine/copper/heavy metal plant communities primarily through continued mining operations, utility corridor maintenance, and motorized vehicle use. Current management for sensitive/watchlist species being negatively impacted by motorized vehicle use has involved blocking the access with wooden and/or rock barriers. This method has not always been effective since the lack of vegetation in these plant communities allow access around the barriers. However, this analysis assumes that users would stay on routes and would not use routes where motorized vehicle use is prohibited.

Special uses projects such as utility corridor construction and maintenance pass through and impact many different types of plant communities including serpentine/copper/heavy metal. Mining/minerals projects are also known to impact serpentine/copper/heavy metal plant communities - and eliminate significant amounts of vegetation in some areas. Most of the serpentine plant communities on the TNF are considered disturbed, primarily by historic mining.

Reasonably foreseeable: Serpentine plant communities are cumulatively impacted when past impacts, the impacts of implementing the alternatives, and on-going impacts are added to the impacts of those actions identified in Appendix H (Reasonably Foreseeable Projects and Cumulative Effects). However, the reasonably foreseeable actions identified in Appendix H are not located in or near serpentine/copper/heavy metal plant communities. Therefore, the reasonably foreseeable projects listed in Appendix H are not expected to add to the cumulative impacts that serpentine/copper/heavy metal plant communities on the TNF experience.

No Action: Implementation of Alternative 1 carries a high risk of cumulative impacts to sensitive/watchlist species dependent on serpentine/copper/heavy metal plant communities. Since (in general terms) no restrictions would be in place to limit where motorized vehicle use could occur, all serpentine/copper/heavy metal plant community dependent sensitive/watchlist species would be at risk. These plant communities are frequently open terrain (Kruckeberg 1984) and lack vegetation to prevent cross country travel by motorized vehicles. In addition, Alternative 1 does not prohibit motorized vehicle use on unauthorized routes and closed NFTS roads still receiving some motorized use. When the impacts of all past, current and reasonably foreseeable management actions are added to the possible impacts of cross country travel, implementation of Alternative 1 has the potential to significantly impact serpentine/copper/heavy metal plant communities and the sensitive/watchlist species dependent on them. Implementation of Alternative 1 may impact *Mielichhoferia elongata* and *Monardella follettii* if they

occur on the unsurveyed potential habitat and may contribute to a trend for listing them as federally listed as threatened or endangered over the short or long term. Neither species has been found on TNF system lands. Therefore discovering either species on the TNF would make them important occurrences and impacts to them could be significant. Implementation of Alternative 1 may also impact *Allium sanbornii* var. *congdonii*, *Allium sanbornii* var. *sanbornii*, *Chlorogalum grandiflorum*, and *Perideridia bacigalupi*, but those impacts are not considered significant at this time even though cross country travel could negatively impact entire occurrences if they exist in the potential habitat that lacks current botanical surveys. Refer to the Biological Evaluation for Sensitive Plants and Fungi and the Watchlist Plant and Plant Community Report located in the project record more discussion of the past, current and reasonably foreseeable actions that contribute to cumulative impacts to serpentine/copper/ heavy metal plant communities. Over the long term, with cross country travel and other continued disturbances, some of the serpentine plant communities may lose significant amounts of vegetation and experience increased erosion. This could be locally significant and may be regionally significant over the long term since serpentine plant communities/areas of copper/heavy metals are limited in distribution and are known to have a high number of endemic plants.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles of road/trail open for public motorized use in serpentine/copper/heavy metal plant communities. However, implementation of the action alternatives could add to cumulative impacts experienced by sensitive/watchlist species dependent on serpentine/copper/heavy metal plant communities. Surveys to date have not detected any sensitive species along proposed additions to the NFTS. However, the watchlist plant *Erigeron petrophilus* var. *sierrensis* was discovered within and adjacent to YRN-7.

The action alternatives propose 8 routes that pass through serpentine soils. Two of the 8 are ML 1 or temporary route proposed additions in Alternative 5 only. The other routes are identified as: ARM-2, ARM-3r, YRN-509, YRN-7, and YRN-M2.

Alternatives 2 and 5: Cumulative impacts from implementations of Alternatives 2 and 5 are not considered significant. Of the action alternatives, implementation of Alternatives 2 and 5 propose the most miles of route in these plant communities and restrict public use of the fewest miles of unauthorized routes and closed NFTS roads still receiving some motorized use in these plant communities. Therefore, implementation of Alternatives 2 and 5 have the greatest risk of cumulatively impacting sensitive and/or watchlist species dependent on serpentine/copper/heavy metal plant communities of the action alternatives. The risk of cumulative impacts to serpentine plant communities is higher in Alternative 5 than in Alternative 2 because the ML 1 and temporary routes proposed under Alternative 5 do not have current surveys. Therefore, the risk of cumulatively impacting occurrences of sensitive/watchlist plants dependent on these plant communities (should they occur in the unsurveyed habitat) is less in Alternative 2 than in Alternative 5. All serpentine/cooper/heavy metal dependent sensitive/watchlist plants would have mitigations implemented to reduce and/or eliminate impacts from motorized vehicles when they are discovered. The management requirements (mitigations) for the known occurrence of *Erigeron petrophilus* var. *sierrensis* located immediately adjacent to YRN-7 are identified in Appendix A (Site Specific Road, Trail and Open Area Information). It is believed that these management requirements

would reduce (but not eliminate impacts to *Erigeron petrophilus* var. *sierrensis* plants from motorized use of YRN-7. In addition, serpentine/copper/heavy metal dependent rare plants could go undetected under implementation of Alternative 5 along routes without current botanical surveys.

Alternatives 4 and 7: Cumulative impacts from implementation of Alternatives 4 and 7 are not considered significant. Alternatives 4 and 7 both propose about 3 miles of additions to the NFTS within these plant communities and do not propose ML 1/temporary roads without current botanical surveys. Alternatives 4 and 7 prohibit motorized vehicle use of 37 miles of unauthorized routes and closed NFTS roads still receiving some motorized use within these plant communities. Sensitive/watchlist species would be indirectly impacted, but would have mitigations implemented to reduce/eliminate direct impacts to them under implementation of Alternatives 4 and 7 (should they occur in the unsurveyed habitat). Therefore, implementation of Alternatives 4 and 7 could indirectly and cumulatively impact *Mielichhoferia elongata* and *Monardella follettii* if they occur on the unsurveyed potential habitat, but would not contribute to a trend for federally listing them as threatened or endangered. Implementation of Alternatives 4 and 7 may also indirectly and cumulatively impact *Allium sanbornii* var. *congdonii, Allium sanbornii* var. *sanbornii, Chlorogalum grandiflorum,* and *Perideridia bacigalupi,* but those impacts are not considered significant at this time unless entire occurrences are negatively impacted.

Alternatives 3 and 6: Cumulative impacts from implementation of Alternatives 3 and 6 are not considered significant. Alternatives 3 and 6 do not propose any additions to the NFTS within this plant community and would prohibit motorized vehicle use of all 40 miles of route located within these serpentine/copper/heavy metal plant communities. Therefore, implementation of Alternatives 3 and 6 may cumulatively impact *Mielichhoferia elongata* and *Monardella follettii*, but would not contribute to a trend for federally listing them as threatened or endangered. Implementation of Alternatives 3 and 6 may also impact *Allium sanbornii* var. *congdonii, Allium sanbornii* var. *sanbornii, Chlorogalum grandiflorum* and *Perideridia bacigalupi* if they occur along system routes, but those impacts are not considered significant in the short or long term unless entire occurrences are eliminated.

Given the above information, implementation of the action alternatives may indirectly and cumulatively impact *Mielichhoferia elongata* and *Monardella follettii* if they occur on the unsurveyed potential habitat, but would not contribute to a trend for listing them as federally listed as threatened or endangered over the short or long term. Implementation of the action alternatives may also indirectly and cumulatively impact *Allium sanbornii* var. *congdonii, Allium sanbornii* var. *sanbornii, Chlorogalum grandiflorum*, and *Perideridia bacigalupi,* but those impacts are not considered significant at this time unless entire occurrences are negatively impacted.

Older Forest Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited thereby reducing the mileage of route available for motorized use within older forests.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact older forest plant communities and the sensitive species dependent on them**.** (There are currently no watchlist plants or plant communities dependent on older forests.) Alternative 1 does not prohibit cross country travel on 285,728 acres of TNF older forests. Under implementation of Alternative 1 as yet undiscovered sensitive species occurrences dependent on older forest plant communities would be at risk as new routes were created. It is expected that cross country use would damage at least some sensitive species occurrences (if they are present on TNF system lands) and it is reasonable to expect that some occurrences would be lost even though older forest plant communities are not considered open terrain.

There are about 285,728 acres of older forest on TNF system lands, of which 29,900 acres or about 11 percent are currently, impacted by system and unauthorized, motorized vehicle roads/trails/areas (routes). This acreage number was obtained using about 100 feet on either side of system and unauthorized motorized vehicle routes that pass through vegetation mapped as CWHR 4 and above on NFS lands. The significance of eleven percent disturbance is unknown. There are about 2,057 miles of NFTS, state, county, and private routes within these plant communities.

Direct/indirect impacts to sensitive species dependent on older forest plant communities from implementation of Alternative 1 could be significant at least at the local, site specific level. Cross country use could kill/injure these older forest dependent sensitive species directly, and/or indirectly kill/injure them through soil changes and the introduction/spread of weeds. Cross country use would also damage other native vegetation in these plant communities increasing the risk of erosion and possibly damaging mycorrhizal networks. The significance of direct/indirect impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, the number of sensitive species that occur in a specific location, and how many of them are damaged. The following example is provided to show how current use is impacting older forest dependent species.

Example - Several occurrences of *Cypripedium fasciculatum* are currently impacted by maintenance of NFTS roads. In addition, NFTS routes have provided access to *Cypripedium fasciculatum* occurrences which has contributed to poaching of these plants (plants have been dug up and removed). Over the long term, cross country motorized vehicles could kill significant numbers of these plants and occurrences could be lost. In addition, introduction of weeds could eventually eliminate the occurrences. Nonnative blackberries have been introduced near the roadside occurrences of this orchid in the Rock Creek area. This aggressive weed could eventually displace the orchids in this area.

Severe cross country impacts to older forest plant communities containing sensitive species would be considered significant. It is impossible to know when or where cross country motorized vehicle use would occur, so these disturbances are difficult to quantify. Since Alternative 1 allows cross county travel, the risk of significant impacts to sensitive species that may occur within unsurveyed potential habitats and within known occurrences is higher than the action alternatives. Reducing and/or eliminating impacts to sensitive species are considered effective methods of reducing cumulative impacts to them. However, flag and avoid is not a practical mitigation when cross country travel is allowed. Allowing unrestricted motorized vehicle use across the Forest greatly increases the risk of negative indirect impacts to sensitive species.

Action alternatives: None of the action alternatives allow cross country travel within older forest plant communities. Therefore, direct/indirect impacts to sensitive species dependent on older forest plant communities from cross country travel would not occur. Refer to Table 3.06-9. Alternative 5 prohibits public motorized use of about 727 of the 768 miles of unauthorized routes and closed NFTS roads still receiving some motorized use located within older forest plant communities or about 95 percent. (About 49 miles of the 817 miles of unauthorized routes and closed NFTS roads within older forest plant communities is already prohibited by existing Forest Orders.) Alternative 2 prohibits public motorized use of about 735 miles in older forest plant communities or about 96 percent. Alternative 6 prohibits public motorized use on about 736 miles or about 96 percent also. Alternative 4 prohibits use on about 752 miles or 98 percent and Alternative 7 prohibits motorized use on 747 miles or about 97 percent. Alternative 3 prohibits public motorized use on all 817 miles of unauthorized routes and closed NFTS roads still receiving some motorized use.

2. Additions to the NFTS and Reopening ML 1 Roads

Indicator(s) used to measure effects:

- Miles of proposed additions to the NFTS within older forest plant communities. The miles of proposed additions that pass through older forests (CWHR 4 and above) is the indicator used to analyze impacts to unsurveyed older forest habitats. Table 3.06-9 displays the number of miles of motorized vehicle road/trail/areas in older forest plant communities by alternative.
- Sensitive species (associated with older forests) located within 100 feet of proposed additional NFTS motorized recreation opportunities. Surveys to date have shown that *Cypripedium fasciculatum* is located within 30 feet of several NFTS roads.

Table 3.06-9. Miles* of road/trail/area within older forest plant communities by alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross country travel (miles located within older forest plant communities) (acres located within older forest plant communities)		817 285,728	0	0	0	0	0	0
2. Additions to the NFTS	**Miles added within 100 feet of older forest**	N/A	33	0	16	41	32	21
3. Establishment of Motorized "Open Areas" (acres)		N/A	0	0	0	0	0	0
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	No Effect						
	b. Change in Class of Vehicles resulting from changes in maintenance levels	No Effect						
	c. Change in Season of Use	No Effect						
	d. Reopening Maintenance Level 1 Roads	0	0	0	0.1	51	5	1
5. Amendments to the Forest Plan		No Effect						
	Total Miles **Total Acres**	**2,874** **285,728**	**2,090** **0**	**2,057** **0**	**2,073** **0**	**2,149** **0**	**2,094** **0**	**2,079** **0**

*Miles are approximate. The total mileage includes NFTS, State, County, and private roads. Alternative 1 total mileage also includes unauthorized routes and closed NFTS roads still receiving some motorized use.

No Action: Alternative 1 does not propose additions to the NFTS but it does not prohibit public motorized use of unauthorized routes and closed NFTS roads still receiving some motorized use and it allows cross country travel. Implementation of Alternative 1 could impact sensitive species directly/indirectly by continuing use of about 817 miles of unauthorized routes and closed NFTS roads still receiving some motorized use located within older forest plant communities. Refer to Table 3.06-9 which shows the miles of route within these plant communities by alternative. Implementation of Alternative 1 could also directly/ indirectly impact sensitive species through use of about 2,057 miles of NFTS, state, county, and private routes located within these plant communities. Direct/indirect impacts could be significant.

Sensitive species dependent on older forests were not found in the more recent botanical surveys (about 95 miles of recent survey). No new weed occurrences were found in older forest plant communities in these surveys.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles of unauthorized routes and closed NFTS still receiving some motorized use designated as open for motorized vehicles in older forest plant communities. Of the action alternatives, implementation of Alternative 5 proposes the most miles of addition to the NFTS – about 41 miles. Therefore, implementation of Alternative 5 has the greatest risk of negative impacts to sensitive species dependent on older plant communities of the action alternatives. Alternatives 2 and 6 propose the addition of 33 and 32 miles respectively to the NFTS. Alternative 7 proposes to add about 21 miles to the NFTS. Alternative

4 proposes to add about 16 miles to the NFTS. Alternative 3 does not propose any additions to the NFTS or propose reopening any ML 1 roads.

About 32 miles of proposed additions to the NFTS located within older forest plant communities have been surveyed and no sensitive species were found. However, these surveys did not target sensitive fungi. Therefore, sensitive fungi may be present even in the areas that received recent botanical surveys. Of the action alternatives, Alternative 5 carries the greatest risk to sensitive species dependent on older forests since at least 9 miles of proposed additions have not received current botanical surveys. Alternative 3 carries the least risk.

3. Cumulative effects including reasonably foreseeable

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact older forest plant communities and the sensitive species dependent on them as well as the benefits from prohibiting public motorized use on unauthorized routes and closed NFTS roads are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by implementing frequent evaluation of routes, implementing mitigations to reduce impacts to sensitive species, and conducting annual weed detection surveys with rapid treatment of weeds. This route evaluation combined with rapid mitigation of resource damage avoids significant impacts to older forest plant communities and the sensitive species dependent on them in the short and long term.

Past: Many acres of older forest plant communities in the Sierra Nevada have been directly removed or have had their functions impaired. In the Sierra Nevada, late-successional older forests of middle elevations (westside mixed conifer, red fir, white fir, eastside mixed conifer, and eastside pine types) at present constitute 7 to 30 percent of the Forest cover, depending on forest type (Sierra Nevada Ecosystem Project 1996). It is reasonable to expect that the native plant species dependent on older forest plant communities have also experienced a decline in range and population viability since pre-settlement times. For example, sensitive fungi are dependent on specific vegetation (hosts) and certain amounts of leaf litter/duff. These habitat components for fungi have been historically reduced and/or eliminated through the removal of vegetation and alteration of older forest plant communities. The amount of reduction is unknown. In addition, the underground mycelial network has been broken through the creation of openings such as clearcuts and roads. Therefore, it is reasonable to expect that past management activities have cumulatively reduced the amount of older forest within TNF watersheds that would be suitable habitat for: *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa,* and *Phaeocollybia olivacea*. As stated above, the amount of reduction is unknown.

Current: In this analysis, older forest is described as occurring in the red fir/upper montane forest and mixed-conifer forest. Other vegetation types exist that also have older trees, but mixed conifer and red fir are the primary types of older forest analyzed in this document. For more information about old forests, refer to the SNFPA (2001).

As mentioned previously, there are about 285,728 acres of older forest on TNF system lands, of which 29,900 acres or about 11 percent are currently, impacted by system and unauthorized, motorized vehicle roads/trails/areas (routes). This acreage number was obtained using about 100 feet on either side

of system and unauthorized motorized vehicle routes and closed NFTS roads still receiving some motorized use that pass through vegetation mapped as CWHR 4 and above on NFS lands. The significance of this percentage is unknown. Refer to the wildlife biological evaluation located in the project record for a discussion of cumulative effects to older forest dependent animal species. Current impacts (that contribute to cumulative effects primarily from use of system routes) to known occurrences of the older forest dependent sensitive plant species – *Cypripedium fasciculatum* are discussed below.

There are 5 occurrences of *Cypripedium fasciculatum* on TNF system lands. One of the 5 known occurrences contains only 3 plants (Lafayette Ridge occurrence) and is not impacted directly /indirectly by motorized vehicle use. The remaining four occurrences are indirectly impacted by motorized vehicle use of the NFTS. There are *Cypripedium fasciculatum* occurrences located within 100 feet of the 25-28 road (50 plants directly above the road), the Rock Creek road (less than 30 plants some located directly adjacent to the road), the Madrone Springs road (about 20 plants located on the road cut bank), and the largest occurrence (about 350 plants) located at the end of a road near Old Condon Mill. (Note that the 25-28 road is analyzed for decommissioning in the Canyon Project – FY 2008.) Indirect impacts include dust and increased risk of weed introduction and spread. These indirect impacts are not considered significant at this time. However, illegal road maintenance and poaching have killed some plants. It is unknown whether these illegal activities would continue. However, the existence of the system roads in these locations adds to the cumulative effects to these plants.

Special uses projects such as utility corridor construction and maintenance, mining operations, and livestock grazing are all ongoing projects that are not known to impact occurrences of *Cypripedium fasciculatum*.

Reasonably foreseeable: Over the long term, with continued disturbance, older forest plant communities would continue to be fragmented through implementation of reasonably foreseeable management actions. In general terms, motorized vehicle use of system routes creates linear disturbances. As mentioned previously, there are 1,258 miles of NFTS, state, county, and private routes in older forests on Forest lands. The impacts of linear disturbances within older forest plant communities are not fully studied. The fuel reduction/timber harvest activities identified in Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) impact older forests but must retain some older forest characteristics due to SNFPA direction for maintenance of specific canopies and retention of larger trees. The effects of fuel reduction/timber harvest on mycorrhizal interactions are not fully understood. The other types of reasonably foreseeable projects (other than fuel reduction/timber harvest) listed in Appendix H are expected to have little impact on older forest plant communities.

No action: Implementation of Alternative 1 cumulatively impacts older forest plant communities. Older forests are not considered sparsely vegetated and the ability to drive across the terrain is somewhat limited. However, surveys to date have shown that motorcycles are not limited in their ability to drive cross country through older forest plant communities. Refer to the project files and the survey records of specific routes. In addition, some older forests lack a middle story which makes them more accessible to motorized vehicles.

When the impacts of all past, current and reasonably foreseeable management actions are added to the possible impacts of cross country travel, use of unauthorized and system routes, there is the potential to significantly impact older forests and the sensitive species dependent on them over the long term (5 years plus). One of the biggest impacts of disturbance of any kind is the introduction and spread of weeds. Refer to the weed risk assessment located in the project record for more discussion of how weeds are introduced and spread within older forest plant communities.

Given the above information, the determination is that implementation of Alternative 1 could impact *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa,* and *Phaeocollybia olivacea*. Impacts to the sensitive fungi: *Cudonia monticola, Dendrocollybia racemosa,* and *Phaeocollybia olivacea* would not contribute to a trend for federal listing because the ESA does not apply to fungi. Impacts to *Cypripedium fasciculatum* and *Cypripedium montanum* could contribute to a trend toward federal listing over the long term primarily due to cross country travel.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles of unauthorized routes and closed NFTS roads designated as open for motorized vehicles in older forest plant communities. However, implementation of the action alternatives could cumulatively impact sensitive species dependent on older forest plant communities.

Past management activities have cumulatively reduced the amount of older forest plant communities within TNF watersheds. Current impacts including the use of system routes, add to those cumulative impacts. Some proposed additions to the NFTS and some ML 1 roads proposed for reopening do not have current surveys and may have sensitive species present within or along them. Impacts from motorized use of these routes may be adding to the cumulative impacts to older forests. Some of the reasonably foreseeable actions listed in Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) are located within older forest plant communities and/or would reduce the amount of large down wood/canopy closure/litter and duff - changing older forest characteristics for some older forest dependent sensitive species.

As mentioned previously, older forest plant communities in the Sierra Nevada have been directly removed or have had their functions impaired. Given the past history of the Sierra Nevada, it is reasonable to expect that the plant and fungi species dependent on older forest conditions have experienced a significant decline in range and population viability since pre-settlement times (although this assumption is unproven).

Alternative 5: Implementation of Alternative 5 cumulatively impacts older forest plant communities and the sensitive species dependent on them. Alternative 5 proposes the most miles of additions to the NFTS and the reopening of the most miles of ML 1 roads of all of the action alternatives. Alternative 5 also prohibits public motorized use of the fewest miles of route located within older forests. Therefore implementation of Alternative 5 has the greatest risk of negatively impacting older forest plant communities and the sensitive species dependent on them. The significance of possible impacts is dependent on many factors including the sensitive species and the amount of impact. However, as stated previously, it is assumed that all of the action alternatives avoid significant long term cumulative impacts by implementing frequent evaluation of routes, implementing mitigations to reduce impacts to

sensitive/watchlist species, and conducting weed detection surveys with rapid treatment of weeds. This route evaluation combined with rapid mitigation of resource damage avoids significant impacts to older forest plant communities and the sensitive/watchlist species dependent on them in the short and long term.

Alternatives 2 and 6: Implementation of Alternatives 2 and 6 could add to the cumulative impacts to older forest plant communities and the sensitive species dependent on them primarily through dust and increased risk of weed introduction and spread. These additional cumulative impacts are not considered significant even when added to past, current, and reasonably foreseeable future management actions. The risk of negative impacts due to implementation of Alternatives 2 and 6 is less than under implementation of Alternatives 1 and 5.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 could add to the cumulative impacts to older forest plant communities and the sensitive species dependent on them primarily through dust and increased risk of weed introduction and spread. Those impacts are not considered significant even when added to past, current, and reasonably foreseeable future management actions. The risk of negative impacts due to implementation of Alternatives 4 and 7 is less than under implementation of Alternatives 1 due to the prohibition of cross country travel and Alternatives 5, 2, and 6 because they propose fewer miles of addition to the NFTS and reopen fewer ML 1 roads.

Alternative 3: Implementation of Alternative 3 could cumulatively add to the cumulative impacts to older forest plant communities and the sensitive species dependent on them primarily through use of system routes. However, implementation of Alternative 3 has the least number of miles of motorized vehicle road/trail/area available for public use within older forest plant communities and has the least risk of cumulative impacts to sensitive species that require older forest plant communities of all of the action alternatives. Alternative 3 does not propose additions to the NFTS and does not reopen ML 1 roads.

Given the above information, it is my determination that implementation of the action alternatives could impact *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa,* and *Phaeocollybia olivacea*. Impacts to the sensitive fungi (*Cudonia monticola, Dendrocollybia racemosa,* and *Phaeocollybia olivacea*) would not contribute to a trend for federal listing because the ESA does not apply to fungi. Impacts to *Cypripedium fasciculatum* and *Cypripedium montanum* would not contribute to a trend toward federal listing due to the assumptions that frequent route evaluation would occur along with implementation of mitigations to reduce impacts to sensitive/watchlist species, and weed detection surveys with rapid treatment of weeds.

Oak Woodland Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited thereby reducing the mileage of route available for motorized use within oak woodlands.

No Action: Implementation of Alternative 1 could directly, indirectly, and cumulatively impact oak woodland plant communities and the sensitive/watchlist species that may occur within them. Alternative 1

does not prohibit cross country travel and as yet undiscovered sensitive/watchlist species would be at risk as new routes were created. It is expected that cross country use would damage at least some sensitive/watchlist species (if they are present on Tahoe NFS lands) and it is reasonable to expect that some occurrences would be lost. Oak woodland plant communities are considered fairly open terrain.

There are about 13,886 acres of oak woodland on TNF system lands, with about 75 miles of NFTS and 23 miles of unauthorized routes and closed NFTS roads still receiving some motorized use located within them. Alternative 1 closes one mile of unauthorized route within oak woodlands by existing Forest Order.

Direct impacts to sensitive/watchlist species from implementation of Alternative 1 could be significant at least at the local, site specific level. Cross country use could kill and/or injure sensitive/watchlist species and other vegetation by running over them or by indirect soil/water changes and the introduction and spread of weeds. The significance of direct and indirect impacts is dependent on many factors including the amount of disturbance, the sensitive/watchlist species being impacted, and in some cases, the season when the disturbance takes place. Currently there are no sensitive/watchlist species on the TNF list that are oak woodland plant community dependent. However, several of the sensitive/watchlist species on the TNF list could grow in oak woodlands.

Severe cross country impacts within oak woodland plant communities containing sensitive/watchlist species would be considered significant. It is impossible to know when or where cross country motorized vehicle use would occur, so these disturbances are difficult to quantify. Since Alternative 1 allows cross county travel, the risk of significant impacts to sensitive/watchlist species that may occur within potential habitats lacking current surveys is higher than in the action alternatives. Reducing and/or eliminating impacts to sensitive/watchlist species are considered effective methods of reducing cumulative impacts to them. However, flag and avoid is not a practical mitigation when cross country travel/unrestricted motorized vehicle use is allowed.

Action alternatives: None of the action alternatives allow cross country travel. Therefore, direct impacts to sensitive/watchlist species within oak woodland plant communities from cross country travel would not occur. In addition, all of the action alternatives prohibit public motorized vehicle use of the about 23 miles of unauthorized routes and closed NFTS roads still receiving some motorized use located within oak woodland plant communities.

2. Additions to the NFTS and Reopening ML 1 Roads

Indicator(s) used to measure effects:

- Miles of proposed additions to the NFTS system located within oak woodland plant communities.

No Action: Alternative 1 does not propose additions to the NFTS. However, implementation of Alternative 1 could impact sensitive/watchlist species directly, indirectly, and cumulatively by continuing motorized vehicle use of 23 miles of route located within oak woodland plant communities. Refer to Table 3.06-10. Motorized vehicle use of about 75 miles of NFTS, state, county, and private routes located within these plant communities also adds to cumulative impacts. Direct/indirect impacts could be

significant dependent on many factors such as the species type, amount of disturbance, etc. Surveys to date have not detected any sensitive/watchlist species or new weed occurrences within oak woodlands.

Table 3.06-10. Miles* of road/trail/area within oak woodland plant communities by alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross country travel (miles located within oak woodland plant communities)		23	0	0	0	0	0	0
(acres located within oak woodland plant communities)		13,886						
2. Additions to the NFTS	**Miles added within oak woodlands**	N/A	0	0	0	0	0	0
3. Establishment of Motorized "Open Areas" (acres)		N/A	0	0	0	0	0	0
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	No Effect						
	b. Change in Class of Vehicles resulting from changes in maintenance levels	No Effect						
	c. Change in Season of Use	No Effect						
	d. Reopening Maintenance Level 1 Roads	0	0	0	0	1	0	0
5. Amendments to the Forest Plan		No Effect						
	Total Miles	**98**	**75**	**75**	**75**	**76**	**75**	**75**
	Total Acres	**13,886**	**0**	**0**	**0**	**0**	**0**	**0**

*Miles are approximate. The total mileage includes NFTS, State, County, and private roads. Alternative 1 total mileage also includes unauthorized routes and closed NFTS roads still receiving some motorized use.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles open for motorized vehicles in oak woodland plant communities. Of the action alternatives, implementation of Alternative 5 proposes the reopening of about 1 mile of ML 1 road. Therefore, of the action alternatives, implementation of Alternative 5 has the greatest risk of negative impacts to sensitive/watchlist species that may occur within oak woodland plant communities. ML 1 roads lack current botanical surveys. Sensitive/watchlist species and/or plant communities could occur within/adjacent to them and could be experiencing negative impacts from motorized vehicle use. Alternatives 2, 3, 4, 6, and 7 do not propose adding any miles to the NFTS and do not propose reopening any ML 1 roads.

3. Cumulative effects including reasonably foreseeable

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact oak woodland plant communities and the sensitive/watchlist species and/or watchlist plant communities that may occur within them, as well as the benefits from prohibiting public motorized vehicle use of unauthorized routes and closed NFTS roads are discussed.

Past: As identified previously, California's oak woodlands have experienced extensive historic disturbance. No other ecosystem in the Sierra Nevada has experienced more human influence over a longer time period than the oak woodlands (Anderson in SNFPA 2001). The amount of oak woodland plant communities and their health has been reduced across the State.

Current: Motorized vehicles impact TNF oak woodlands by: introducing and spreading weeds, damaging native vegetation, increasing soil erosion, and fragmenting habitats. Refer to Table 3.06-10 for the number of miles of motorized vehicle road/trail/area proposed within oak woodlands by alternative. Other ongoing projects on the Forest that impact oak woodlands include: special uses projects such as utility corridor construction and maintenance that pass through and impact oak woodlands; minerals operations that remove native vegetation and recontour the landscape; and livestock grazing projects. The TNF does not have any sensitive/watchlist species that are entirely dependent on oak woodlands. However, several sensitive plant species are known to occur in oak woodlands including *Clarkia biloba* ssp. *Brandegeae*.

Reasonably foreseeable: When the past and current impacts are added to the impacts of the reasonably foreseeable future actions identified in Appendix H (Reasonably Foreseeable Projects and Cumulative Effects), risks to oak woodlands increase. Some of the reasonably foreseeable projects identified in Appendix H would benefit oaks even though they are not located in oak woodlands because some oak tree species occur within mixed conifer plant communities. Some of the fuel reduction/timber harvest activities identified in Appendix H retain oaks and remove conifers from around the larger oak trees so they receive more light and nutrients – for example the Canyon Forest Health project. The biggest negative impact of disturbance of any kind within oak woodlands is the increased risk of introduction and spread of weeds.

No action: Implementation of Alternative 1 allows cross country use within TNF oak woodland plant communities and carries the greatest risk of negative impacts to those plant communities. Oak woodlands have a high risk that weeds would be introduced and become established due to the lower elevations of these plant communities. Cross country travel could introduce and spread weeds. Refer to the weed risk assessment (located in the project record) for the effects of weed infestation. In summary, weeds can displace sensitive/watchlist species and other native vegetation if the weeds become established and spread. Weed introduction and spread within sensitive/watchlist species occurrences is considered a significant long term impact. Therefore, when the impacts of all past, current and reasonably foreseeable management actions are added together, the possible impacts of cross country travel and motorized use of unauthorized routes and closed NFTS roads within oak woodlands has the potential to significantly impact sensitive/watchlist species over the long term (5 years plus).

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles open for motorized vehicle use in oak woodlands. Implementation of the action alternatives reduces cumulative impacts to sensitive/watchlist species and/or native vegetation located within oak woodlands. The significance of these impacts is unknown. It is assumed that all of the action alternatives avoid long term cumulative impacts by implementing: frequent evaluation of routes, mitigations designed to reduce impacts to sensitive/watchlist species, and conducting frequent weed detection/treatment activities.

Implementation of these activities along with rapid mitigation of resource damage avoids significant impacts to oak woodlands plant communities and sensitive/watchlist species in the short and long term.

Alternative 5: Compared to Alternative 1, implementation of Alternative 5 has less risk of negative impacts to sensitive/watchlist species within oak woodlands. Conversely, implementation of Alternative 5 carries the highest risk of negative impacts to oak woodland plant communities of the action alternatives since it proposes to reopen one mile of ML 1 road. Compared to Alternative 1, Alternative 5 reduces cumulative impacts to oak woodland plant communities by prohibiting cross country travel.

Alternatives 2, 3, 4, 6, and 7: These action alternatives do not propose additions to the NFTS and do not reopen ML 1 roads in oak woodland plant communities. Therefore, implementation of these alternatives carries less risk of weed introduction and spread than Alternatives 1 and 5, and reduces cumulative impacts to oak woodland plant communities when compared to Alternatives 1 and 5.

Forest edges and openings

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited thereby reducing the mileage of route available for motorized use within forest edges/openings. (Note: there is overlap between these plant communities and aquatic/riparian, serpentine, older forest, oak woodland and high elevation rocky opening plant communities. Therefore the number of miles of unauthorized routes and closed NFTS roads still receiving some motorized use present in forest edge and openings plant communities contains some of the miles of same routes shown in other plant communities and the totals from all plant communities do not add up to the total of about 1,698 miles.)

No Action: Implementation of Alternative 1 could directly, indirectly, and cumulatively impact the sensitive/watchlist species dependent on forest edges and openings. Over the long term (5 years plus) those impacts could be significant. Alternative 1 does not prohibit cross country travel and plant communities located within forest edges and openings are accessible to motorized vehicles. Under implementation of Alternative 1 known and as yet undiscovered sensitive/watchlist species would be at risk of negative impacts. It is expected that long term cross country use would injure/kill some sensitive/watchlist species and it is reasonable to expect that some occurrences would be lost.

There are about 630,667 acres of forest edge/openings on Tahoe NFS lands, with about 3,489 miles of NFTS, state, county, and private routes and 1,148 miles of unauthorized routes and closed NFTS roads still receiving some motorized use located within them.

Direct impacts to sensitive/watchlist species from cross country use could be significant at least at the local, site specific level. The significance of direct/indirect impacts is dependent on many factors including the amount of disturbance, the sensitive/watchlist 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/watchlist species that occur in a specific location and how many of them are damaged. Occurrences of *Clarkia biloba* ssp. *Brandegeae*, *Fritillaria eastwoodiae*, *Lewisia kelloggii* ssp.

hutchisonii, *Lilium humboldtii* ssp. *humboldtii*, *Lupinus dalesiae*, and *Phacelia stebbinsii* are known to be impacted by use of system routes. Refer to the occurrence records located in the TNF files.

Severe cross country impacts within forest edge/openings containing sensitive/watchlist species would be considered significant. It is impossible to know when or where cross country motorized vehicle use would occur, so these disturbances are difficult to quantify. Since Alternative 1 allows cross county travel, the risk of significant impacts to sensitive/watchlist species is higher than in the action alternatives. Reducing and/or eliminating impacts to sensitive/watchlist species through flag and avoid methods is not a practical mitigation when cross country travel is allowed. Allowing unrestricted motorized vehicle use across the forest greatly increases the risk of negative impacts to sensitive/watchlist species.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles open for motorized vehicles. None of the action alternatives allow cross country travel. Therefore, direct/indirect impacts to sensitive/watchlist species within forest edges/openings from cross country travel would not occur. Refer to Table 3.06-11. Alternative 5 prohibits motorized public use on about 1,098 miles of the 1,148 miles of unauthorized routes and closed NFTS roads still receiving some motorized use or about 96 percent of them. Alternatives 2 and 6 prohibit motorized public use on about 1,116 and 1,112 miles respectively or about 97 percent of them. Alternatives 4 and 7 prohibit motorized public use on 1,134 and 1,130 miles or about 99 and 98 percent of them. Alternative 3 prohibits motorized public use on all 1,148 miles of unauthorized routes and closed NFTS roads still receiving some motorized use located within forest edges/openings.

Table 3.06-11. Miles of road/trail/area within forest edge/opening plant communities* by alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross country travel (miles) (acres)		1,148 630,667	0	0	0	0	0	0
2. Additions to the NFTS	**Miles added within forest edge/opening plant communities**	N/A	32	0	14	50	36	18
3. Establishment of Motorized "Open Areas" (acres)		N/A	0	0	0	0	0	0
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	No Effect						
	b. Change in Class of Vehicles resulting from changes in maintenance levels	No Effect						
	c. Change in Season of Use	No Effect						
	d. Reopening Maintenance Level 1 Roads	0	0	0	0	72	9	1
5. Amendments to the Forest Plan		No Effect						
	Total Miles **Total Acres**	**4,637** **630,667**	**3,521** **0**	**3,489** **0**	**3,503** **0**	**3,611** **0**	**3,534** **0**	**3,508** **0**

*Forest edge/opening plant communities are those that are not considered older forest, oak woodland, aquatic/riparian, high elevation opening/rocky area, and serpentine. Miles represent routes that pass within 100 feet of forested plant communities. Miles are approximate. The total mileage includes NFTS, State, County, and private roads. Alternative 1 total mileage also includes unauthorized routes and closed NFTS roads still receiving some motorized use.

2. Additions to the NFTS and Reopening ML 1 Roads

Indicator(s) used to measure effects:

- Miles proposed for addition to the NFTS located within forest edges/openings.

No Action: Alternative 1 does not add routes to the NFTS but it does not prohibit public motorized vehicle use of 1,148 miles of unauthorized routes and closed NFTS roads still receiving some motorized use. Implementation of Alternative 1 could impact sensitive/watchlist species directly/indirectly by continuing use of those unauthorized routes and closed NFTS roads. Implementation of Alternative 1 could also directly/indirectly impact sensitive/watchlist species through use of about 3,489 miles of NFTS located within these plant communities. Refer to the discussion under effects of cross country use under the No Action Alternative above. Direct/indirect impacts could be significant at least at the site specific, local level.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles open for motorized vehicles in forest edges/openings. No sensitive/watchlist species and/or new weed occurrences were found in forest edges/openings during surveys for this project. However, ML 1 and temporary roads do not have current botanical surveys. Therefore, it is possible that sensitive/ watchlist species exist within/along them and they are being impacted.

Refer to Table 3.06-11 which shows the miles of proposed additions to the NFTS and miles of ML 1 roads proposed to be reopened within these plant communities by alternative. Alternative 5 proposes the addition of 50 miles to the NFTS. Alternatives 2 and 6 add 32 and 36 miles respectively. The risk of negative impacts to sensitive/watchlist species from implementing Alternatives 2 and 6 is less than Alternative 5. Alternatives 4 and 7 add 14 and 18 miles respectively. Therefore, the risk of negative impacts to sensitive/watchlist species from implementing Alternatives 4 and 7 is less than Alternatives 5, 2 and 6. Alternative 3 does not propose additions to the NFTS within forest edges/openings. Therefore, implementation of Alternative 3 has the least risk of negatively impacting sensitive/watchlist species through motorized vehicle use.

3. Cumulative effects including reasonably foreseeable

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact forest edges/openings and the sensitive/watchlist species that may occur within them, as well as the benefits from prohibiting public motorized vehicle use of unauthorized routes and closed NFTS roads are discussed.

Past: Plants that are dependent on openings and edges within forested plant communities are not considered habitat specific and the plant communities/habitats are not considered limited. Management activities have occurred on TNF system and privately owned lands for over a century. This long history of disturbance has contributed to the lack of an undisturbed reference for most plant species. Therefore, it is not possible to quantify how these past management activities have impacted sensitive plants/fungi and watchlist plants/plant communities. In addition, as previously mentioned past management has created conditions on the landscape that frequently contribute to cross country travel through the creation of skid trails and temporary roads. In a number of areas motorized vehicle users have removed the barriers

blocking the temporary road and/or have gone around the barriers. Past management activities have cumulatively added to the amount of forest edge/opening habitats but it is unknown if the edge and opening habitats created were suitable for: *Androsace occidentalis* var. *simplex*, *Clarkia biloba* ssp. *Brandegeae*, *Erigeron petrophyllus* var. *sierrensis*, *Fritillaria eastwoodiae*, *Lewisia kelloggii* ssp. *hutchisonii*, *Lilium humboldtii* ssp. *humboldtii*, *Lupinus dalesiae*, and *Phacelia stebbinsii*.

Current: Openings and forest edges are constantly being created naturally as trees and other vegetation dies, and lost when shrubs and other vegetation grow into them. In addition, forest edge/ opening plant communities located along roads/trails/areas and other highly disturbed areas such as landings have frequently become invaded by weeds. Most of the known weed occurrences on the TNF are located along or within roads/trails and landings.

The TNF is considered well roaded. Motorized vehicle use of roads is known to increase the risk of weed introduction and spread into new areas, reduce native plant cover, increase erosion, reduce photosynthetic ability of native plants by covering vegetation with dust, change water flow patterns across the landscape, and compact soil. Refer to the Sensitive Plant and Fungus Biological Evaluation and the Noxious Weed Risk Assessment located in the project record. Examples of current impacts to known occurrences of sensitive/watchlist species are provided below to show how current cross country travel by motorized vehicles adds to cumulative impacts.

Example 1: The TNF has limited numbers of the sensitive plant *Lewisia kelloggii* var. *hutchisonii* and limited amounts of suitable habitat. Several occurrences are currently being directly/indirectly impacted by cross country motorized vehicle use and use of NFTS routes. Other occurrences are currently being impacted by fuel reduction/timber harvest projects – for example in the American River Wildfire Complex. The habitat where this plant grows frequently appears barren since this plant completes its life cycle in a period of weeks. Over the long term (over 5 years), continued and increased cross country motorized vehicle use within these occurrences would eventually kill plants through soil compaction, changes in hydrology, and/or direct impacts such as running over them. An example of where these negative impacts are occurring is within the occurrence located along and within road 302-15.

Example 2: Most of the known occurrences of *Clarkia biloba* ssp. *Brandegeae* on the TNF are growing next to roads where occurrences are currently being run-over by cross country motorized vehicles. In addition, in some areas, invasive exotic weeds have been introduced into these plant communities by motorized vehicles causing a degradation of the habitat for these sensitive plants. For example, the *Clarkia biloba* ssp. *Brandegeae* occurrence located near Mosquito Ridge road is infested with yellow star thistle due in part to people pulling off the road and introducing these weed seeds into new areas. Competition from the yellow star thistle for water and nutrients may eventually kill the *Clarkia biloba* ssp. *Brandegeae* occurrence. Current impacts include reduction of vigor and lack of reproduction of this annual plant, compaction and/or degradation of the soil within the occurrence, and/or changes to water movement where they are growing.

Example 3: Several species are known to be negatively impacted by road maintenance and/or weed infestation. *Lilium humboldtii* ssp. *humboldtii* is currently being impacted by use of NFTS and other roads. Impacts to known occurrences include introduction and spread of weeds and loss of the plants

through road maintenance. Since this is a spring flowering bulb species, impacts from dust are not considered significant. Examples of where weeds are competing with this plant can be found along Highway 49 near Coyote Street where Scotch broom has moved into the area where this lily is growing and crowding out the lilies. Examples of where road maintenance has eliminated these lilies occurred along Highway 174 near Bear River (personal observation). *Lupinus dalesiae* occurrences are being directly/indirectly impacted by maintenance of system roads in several locations for example along the Gold Lakes Road.

Example 4: *Phacelia stebbinsii* plants are being directly/indirectly impacted by motorized vehicle use on system and user created trails in the Pierce OHV area. Cross country travel has created wheel tracks that have been blocked off to protect these sensitive plants and wetlands, but users continue to go around the barricades. Plants have been crushed and killed prior to setting seed which has reduced reproduction for this annual plant.

Reasonably foreseeable: Forest edge/opening habitats are cumulatively impacted when past and current impacts are added to the reasonably foreseeable future actions identified in Appendix H (Reasonably Foreseeable Projects and Cumulative Effects). The lower elevation forest edge/opening habitats located along system roads/trails/areas have frequently received weed seed from motorized vehicle use. All of the projects identified in Appendix H would disturb existing forest edge/openings and/or create new ones. Most of the ground disturbing projects identified in Appendix H have had botanical surveys to identify presence or absence of sensitive/watchlist species. Where sensitive/watchlist species were found, mitigations were implemented to reduce and/or eliminate impacts to them.

No action: Implementation of Alternative 1 allows cross country use within NFS forest edge/opening habitats and carries the greatest risk of negative impacts to those habitats. Cross country use could directly/indirectly impact *Astragalus webberi, Calochortus clavatus* var. *avius, Clarkia biloba* ssp. *brandegeae, Fritillaria eastwoodiae, Lewisia kelloggii* ssp. *hutchisonii, Lewisia kelloggii* ssp. *kelloggii, Lupinus dalesiae, Penstemon personatus*, and *Phacelia stebbinsii* (if they occur within the area of cross county use). Predicting where cross country motorized vehicle use would occur is not possible. It is likely that this cross country travel would damage and/or kill sensitive/watchlist species. In addition, impacts to known occurrences would occur. Impacts could be significant dependent on such factors as the sensitive/watchlist species being impacted, the number of individuals being impacted, and the severity of the disturbance. For example, direct impacts to an annual plant (such as *Phacelia stebbinsii*) that has already gone to seed would not be as adverse (as long as significant habitat alteration has not occurred) as direct impacts to an annual plant that has not set seed. If motorized vehicle use impacted a sensitive/ watchlist species to the point that it might not remain viable in an area and the loss of that species in that particular area would substantially influence the extinction risk of the entire species, the motorized vehicle use would have significant impacts to that species (Waples et al. 2007). As noted above, it is impossible to know when or where cross country motorized vehicle use would occur but since it would not be restricted in the No Action Alternative, the risk of negative impacts is higher. Since (in general terms) no restrictions would be in place to limit where motorized vehicle use could occur, all sensitive/watchlist species that can be accessed by motorized vehicles would be at increased risk.

Cumulative impacts could be significant. Over the long term, cross country motorized vehicle use could kill significant numbers of sensitive/watchlist species and the occurrences could be lost. In addition, introduction of weeds could eventually eliminate the occurrences.

Given the above information, implementation of Alternative 1 could impact *Astragalus webberi, Calochortus clavatus* var. *avius, Clarkia biloba* ssp. *brandegeae, Fritillaria eastwoodiae, Lewisia kelloggii* ssp. *hutchisonii, Lewisia kelloggii* ssp. *kelloggii, Lupinus dalesiae, Penstemon personatus,* and *Phacelia stebbinsii* and those impacts could contribute to a trend for federal listing as threatened or endangered. Implementation of Alternative 1 could also impact the watchlist plants, *Erigeron petrophyllus* var. *sierrensis,* and *Lilium humboldtii* ssp. *humboldtii.* Impacts to watchlist plants are not considered significant unless entire occurrences are lost. Over the long term, cross country travel within the only known occurrence of *Erigeron petrophyllus* var. *sierrensis* on the TNF could cause the loss of the entire occurrence.

Action alternatives: As identified previously, it is assumed that all of the action alternatives avoid long term cumulative impacts by implementing frequent evaluation of routes, implementing mitigations to reduce impacts to sensitive/watchlist species, and rapid detection/treatment of weeds. This route evaluation combined with rapid mitigation of resource damage avoids significant impacts to forest edges/openings and sensitive/watchlist species in the short and long term.

Surveys of proposed additions to the NFTS identified an occurrence of *Erigeron petrophyllus* var. *sierrensis* growing in a serpentine plant community along and within YRN-7. Refer to that section for a discussion of impacts to this watchlist plant. No other sensitive/watchlist species were found in surveyed forest edge/rocky opening plant communities. However, temporary and ML 1 roads do not have current surveys. In addition, many of the dispersed camping access routes also lack current surveys. Since forest edge/opening plant communities have a high likelihood of having been disturbed in the more recent past, there is a high risk of weeds being present in those areas lacking current surveys. The list of proposed additions that pass through forest edges/openings is located within the project record since it is a long list (9 pages long). However, Table 3.06-11 displays the number of miles of proposed additions and the miles of ML 1 roads proposed for reopening within forest edge/opening plant communities by alternative.

Alternative 5: Of the action alternatives, implementation of Alternative 5 has the highest risk of indirect/cumulative impacts to sensitive/watchlist plants that may be growing in forest edge/opening plant communities. However, implementation of Alternative 5 has less risk of indirect/cumulative impacts to sensitive/watchlist species growing in forest edges/openings than Alternative 1 because it does not allow cross country travel. Alternative 5 proposes the addition of 50 miles to the NFTS, and reopening about 72 miles of ML 1 roads. If sensitive/watchlist species occur within 100 feet of ML 1 or temporary roads proposed in Alternative 5 they would continue to be impacted until they are detected during routine maintenance checks. The significance of these impacts to sensitive/watchlist species would vary dependent on such factors as the type of species, amount of disturbance, and location of the sensitive/ watchlist species. Impacts are not considered significant over the short term (5 years or less). Over the long term, the risk of weeds being introduced and/or spreading from undetected weed occurrences is high. However, it is assumed that routine evaluation of routes would occur by personnel who can identify weed

species while the infestation is small in size and easily treated. Current impacts from cross country travel would not occur – it is assumed that users would stay on designated routes. When impacts from reasonably foreseeable projects are added to implementation of Alternative 5, the risk to sensitive/ watchlist species is high primarily from weed introduction and spread.

Alternatives 2 and 6: Implementation of Alternatives 2 and 6 could cumulatively impact sensitive/ watchlist species dependent on forest edge/opening habitats but those impacts are not considered significant for the reasons given under Alternative 5. Alternatives 2 and 6 propose the addition of 32 and 36 miles of route (respectively) which is less than the 50 miles proposed under Alternative 5. Alternative 2 does not propose to reopen ML 1 roads and Alternative 6 would reopen about 9 miles of ML 1 road which is less miles of road than the 72 miles proposed under Alternative 5. The risk of negative impacts to sensitive/watchlist species from implementing Alternative 6 is higher than in Alternative 2 but less than Alternative 5. As in Alternative 5, it is assumed that current impacts from cross country travel would not occur because users would stay on designated routes. However, when impacts from reasonably foreseeable projects are added to implementation of Alternatives 2 and 6, the risk to sensitive/watchlist species is high primarily from weed introduction and spread.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 adds to the cumulative impacts to sensitive/watchlist species in forest edges/openings. Alternatives 4 and 7 add 14 and 18 miles respectively. Alternative 4 does not propose to reopen any ML 1 roads and Alternative 7 proposes to open less than about 1 mile of ML 1 road. Current impacts from cross country travel are not expected. When the impacts from reasonably foreseeable projects are added to implementation of Alternatives 4 and 7, the risk to sensitive/watchlist species is lower than in Alternatives 5, 2 and 6.

Alternative 3: Implementation of Alternative 3 adds to the cumulative impacts of forest edge/opening plant communities and the sensitive/watchlist species growing in them, from the use of the NFTS. Alternative 3 does not propose any additions to the NFTS, does not propose reopening any ML 1 roads, and does not allow cross country use. Implementation of Alternative 3 would prohibit public motorized vehicle use on all 1,148 miles of unauthorized routes and closed NFTS roads still receiving some motorized use. Alternative 3 has the lowest risk of weed introduction and spread which is a benefit for all sensitive/watchlist species.

Given all of the above information, implementation of the action alternatives could impact *Astragalus webberi, Calochortus clavatus* var. *avius, Clarkia biloba* ssp. *brandegeae, Fritillaria eastwoodiae, Lewisia kelloggii* ssp. *hutchisonii, Lewisia kelloggii* ssp. *kelloggii, Lupinus dalesiae, Penstemon personatus*, and *Phacelia stebbinsii,* but would not contribute to a trend for federally listing them as threatened or endangered. Implementation of the action alternatives could also impact the watchlist plants, *Lilium humboldtii* ssp. *humboldtii* and *Erigeron petrophyllus* var. *sierrensis* but those impacts are not expected to cause the loss of entire occurrences.

High elevation openings and rocky areas

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited (thereby reducing the mileage of routes available for motorized use) within high elevation openings/rocky areas.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact the sensitive/watchlist species dependent on high elevation openings and rocky areas. Over the long term (5 years plus) those impacts could be significant. Alternative 1 does not prohibit cross country travel on about 43,240 acres of high elevation openings and rocky areas (high elevation openings and rocky areas are generally considered accessible to motorized vehicles). Under implementation of Alternative 1 known and as yet undiscovered sensitive/watchlist species occurrences would be at risk. Over the long term, cross country use could damage at least some sensitive/watchlist species occurrences and it is reasonable to expect that some occurrences would be lost.

Direct/indirect impacts to sensitive/watchlist species from cross country use could be significant at least at the local, site specific level. The significance of direct/indirect impacts is dependent on many factors including the amount of disturbance, the sensitive/watchlist 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. Occurrences of *Erigeron miser* are known to be impacted by use of NFTS and proposed additions to the NFTS. Severe cross country impacts within these plant communities containing sensitive/watchlist species would be considered significant. Soils in these plant communities are considered highly erosive and growing conditions are considered harsh.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles open for motorized vehicles in these plant communities. Direct impacts to sensitive/watchlist species within high elevation openings/rocky areas from cross country travel would not occur under the action alternatives. Refer to Table 3.06-12. Alternatives 2, 5, 6, and 7 prohibit public motorized use on about 16 miles of the 18 miles of unauthorized routes and closed NFTS roads still receiving some motorized use in these plant communities or about 89 percent of them. Alternatives 3 and 4 prohibit public motorized use of all 18 miles of unauthorized routes and closed NFTS roads within high elevation opening and rocky areas and therefore provide the least risk to those plant communities.

Table 3.06-12. Miles of proposed additions to the NFTS within high elevation opening/rocky areas by alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross country travel (miles located within high elevation openings & rocky areas)		18	0	0	0	0	0	0
(acres located within high elevation openings & rocky areas)		43,240						
2. Additions to the NFTS	**Miles added within 100 feet of high elevation/ rocky opening areas**	N/A	2	0	0	2	2	2
3. Establishment of Motorized "Open Areas" (acres)		N/A	0	0	0	0	0	0
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	No Effect						
	b. Change in Class of Vehicles resulting from changes in maintenance levels	No Effect						
	c. Change in Season of Use	No Effect						
	d. Reopening Maintenance Level 1 Roads	0	0	0	0	0	0	0
5. Amendments to the Forest Plan		No Effect						
	Total Miles	**72**	**56**	**54**	**54**	**56**	**56**	**56**
	Total Acres	**43,240**	**0**	**0**	**0**	**0**	**0**	**0**

2. Additions to the NFTS and Reopening ML 1 Roads

Indicator(s) used to measure effects:

- Miles of proposed additions to the NFTS within high elevation openings/rocky areas.
- Sensitive/watchlist species occurrences (associated with high elevation openings/rocky areas) located within 100 feet of proposed additions. *Erigeron miser* was found within 100 feet of TKN-J4, TKN-J5 and YRS-F1 near Fordyce Creek. No weeds were found at any of these *Erigeron miser* sites.

No Action: Alternative 1 does not and an addition to the NFTS, but it also does not prohibit public motorized use on about 18 miles of unauthorized routes and closed NFTS roads. Implementation of Alternative 1 could impact sensitive/watchlist species directly/indirectly by continuing use of those unauthorized routes and closed NFTS roads especially TKN-J4, TKN-J5 and YRS-F1. Under implementation of Alternative 1, TKN-J4 and TKN-J5 would not be shortened and the *Erigeron miser* located at the end of these routes would continue to be impacted. Implementation of Alternative 1 could also directly impact sensitive/watchlist species through use of about 72 miles of NFTS routes located within these plant communities. Direct and indirect impacts could be significant at least at the local level.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles open for motorized vehicles in high elevation openings and rocky areas. Refer to Table 3.06-12 which shows the miles of proposed additions within these plant communities by alternative. Alternatives

2, 5, 6 and 7 propose the addition of about 2 miles to the NFTS located within high elevation rocky opening plant communities or about 11 percent. Alternatives 3 and 4 do not add miles in high elevation openings and rocky areas and would not directly/indirectly impact sensitive/watchlist species.

Impacts to known occurrences: *Erigeron miser* occurrences located at the "cement slab" at the end of TKN-J5, within 100 feet of TKN-J4, and along Fordyce Creek (YRS-F1) are currently being directly/indirectly impacted by unauthorized motorized vehicle use. Observations (by the author of this evaluation) have shown increased cross country motorized vehicle use within this plant community type on the TNF (compared to ten years ago). Mitigations were developed to reduce impacts to occurrences of *Erigeron miser* along TKN-J4 and TKN-J5. Both routes have been shortened to reduce resource impacts including impacts to this sensitive plant. No mitigations were developed for the *Erigeron miser* located along Fordyce Creek (YRS-F1) because current impacts are from dispersed camping versus motorized vehicle use. Refer to Appendix A (Site Specific Road, Trail and Open Area Information).

Impacts to potential habitat: Sensitive/watchlist species occurrences would have direct motorized vehicle impacts reduced and/or eliminated through implementation of mitigations for them. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur. However, if sensitive/watchlist species occur within 30 or 100 feet of the routes without current botanical surveys they would remain undetected and could continue to be directly/indirectly impacted. The significance of impacts to sensitive/watchlist species varies by such factors as type of species, amount of disturbance, and location.

3. Cumulative effects including reasonably foreseeable

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact high elevation openings and rocky areas and the sensitive/watchlist species that may occur within them, as well as the benefits from prohibiting motorized vehicle use of unauthorized routes and closed NFTS roads are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by frequently evaluating routes, implementing mitigations to reduce impacts to sensitive/watchlist species, and conducting early detection and treatment of weeds. Frequent route evaluation combined with rapid mitigation of resource damage avoids significant impacts to high elevation opening and rocky area plant communities and sensitive/watchlist species in the short and long term.

Past: These plant communities were historically grazed by livestock, timber was removed, roads/trails were built through them, and some of them were impacted by mining activities. Since the plant communities that occur at these sites have adapted to generally highly erosive and shallow soils, with harsh conditions and short growing seasons; those areas that were heavily disturbed may remain unvegetated. In addition, heavy snow years and unchecked erosion can limit plant establishment and stop the vegetative recovery process or push it back by several decades (Willard et al. 2007). Some of these high elevation openings/rocky areas have become infested with weeds such as Klamath weed. Historic management activities have reduced the amount of this type of plant community and/or the health of these types of plant communities on the TNF. These historic reductions could have negatively impacted: *Arabis*

rigidissima var. *demota, Claytonia megarhiza, Erigeron miser, Eriogonum umbellatum* var. *torreyanum, Lewisia longipetala, Tauschia howellii,* and *Tonestus eximius*. It is believed that the *Asplenium trichomanes-ramosum* occurrence located on the TNF is a disjunct occurrence and probably does not occur anywhere else on the TNF except in the limestone caves where it is currently known to occur. Historic management activities probably did not impact limestone caves on the TNF.

Current: Current management activities in these plant communities are primarily recreation related. *Erigeron miser* occurrences occur along and are negatively impacted by NFTS and proposed additions to the NFTS. *Erigeron miser* grows only on the TNF, in the crevices between granite rocks - a habitat type that is limited in distribution on the TNF. Known occurrences are being impacted by motorized vehicle use when users drive over granite slabs. Non-motorized recreation, primarily mountain bikes, is also impacting these plant communities.

Other ongoing projects on the Forest that impact these plant communities include: special uses projects such as utility corridor construction/maintenance that pass through and impact many different types of plant communities including high elevation openings and rocky areas; minerals operations that remove native vegetation and recontour the landscape; and livestock grazing. None of these ongoing projects impacts these plant communities significantly in the short term (5 years or less). However, they do increase the risk of weed introduction and spread especially over the long term.

Reasonably foreseeable: High elevation openings and rocky areas are cumulatively impacted when past and current impacts are added to the reasonably foreseeable future impacts. However, none of the actions identified in Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) are proposed in high elevation openings/rocky areas.

No action: Implementation of Alternative 1 adds to the cumulative impacts to sensitive/watchlist species dependent on high elevation openings/rocky areas through cross country travel and use of about 18 miles of unauthorized routes and closed NFTS roads still receiving some motorized use in these plant communities. Over the long term, continued and/or increased cross country motorized vehicle use within sensitive/watchlist occurrences could kill significant numbers of plants. Therefore, implementation of Alternative 1 may significantly impact *Arabis rigidissima* var. *demota, Claytonia megarhiza, Erigeron miser, Eriogonum umbellatum* var. *torreyanum, Lewisia longipetala, Tauschia howellii,* and *Tonestus eximius* significantly over the long term (5 years plus). It is believed that the *Asplenium trichomanes-ramosum* occurrence located on the TNF is a disjunct occurrence and probably does not occur anywhere else on the TNF except in the limestone caves where it is currently known to occur. These limestone cave areas are inaccessible by motorized vehicles.

Given the above information, the determination is that implementation of Alternative 1 could impact *Arabis rigidissima* var. *demota, Claytonia megarhiza, Erigeron miser, Eriogonum umbellatum* var. *torreyanum, Lewisia longipetala, Tauschia howellii,* and *Tonestus eximius* and could contribute to a trend for federally listing them as threatened or endangered over the long term. Implementation of Alternative 1 would not impact *Asplenium trichomanes-ramosum*.

Action alternatives: Implementation of the action alternatives could cumulatively impact sensitive/watchlist species dependent on high elevation openings/rocky areas. Those impacts are not

considered significant. In the past, motorized vehicle use was not expected to occur in these habitats because they are generally steep and highly erosive, rock outcrops, and/or very high elevation rocky openings. However, current technology has increased the ability of motorized vehicles to travel in these kinds of habitats. When motorized vehicle use occurs near or within these plant communities, resource damage (loss of vegetation and erosion) can be severe. In addition, the plants dependent on these plant communities do not appear to compete well with other vegetation. Therefore, weed introduction and/or spread could kill them over the long term. These plant communities are already subject to natural erosion and have a short growing period. Any disturbance increases erosion and causes significant impacts to the soil and water components of the habitat.

There are 16 unauthorized routes and closed NFTS roads still receiving some motorized use located in these plant communities. Ten (includes YRS-F1 and YRS-F1b) of the 16 routes are considered spurs that access dispersed camping sites. TKN-J4, TKN-J5, YRN-11, YRS-003b, YRS-G3, and YRS-G3w are also located in these plant communities. Surveys identified that TKN-J4, TKN-J5 and YRS-F1 have occurrences of *Erigeron miser* within 100 feet of them. Mitigations have been developed for TKN-J4 and TKN-J5 that reduces and/or eliminates impacts to *Erigeron miser* from motorized recreation. Refer to Appendix A (Site Specific Road, Trail and Open Area Information).

Alternatives 2, 5, 6 and 7: Cumulative impacts from implementation of Alternatives 2, 5, 6, and 7 are not considered significant. None of these alternatives allow cross country travel. All of these alternatives propose the addition of about 2 miles and prohibit public motorized use of about 89 percent of the unauthorized routes and closed NFTS roads still receiving some motorized use. Implementation of these alternatives carries less risk of negatively impacting sensitive/watchlist species dependent on these plant communities than Alternative 1. However, of the action alternatives, implementation of Alternatives 2, 5, 6, and 7 have the highest risk of negative indirect impacts to sensitive/watchlist species dependent on these plant communities since they have the most miles of motorized routes. Of the action alternatives, implementation of Alternatives 2, 5, 6 and 7 also have the highest risk of introducing and spreading weeds. Alternatives 2, 5, 6 and 7 continue the indirect impacts to *Erigeron miser* occurrences located along routes TKN-J4, TKN-J5, and YRS-F1.

Alternatives 3 and 4: Implementation of Alternatives 3 or 4 adds to the cumulative impacts of high elevation openings and rocky areas the least. Alternatives 3 and 4 do not allow cross country use or propose additions to the NFTS. Alternatives 3 and 4 do not indirectly impact *Erigeron miser* occurrences located along routes TKN-J4, TKN-J5, and the YRS-F1 near Fordyce Creek. Implementation of Alternatives 3 and 4 still add to cumulative impacts through the use of the NFTS and the associated risk of weed introduction and spread. However, of all of the alternatives, Alternatives 3 and 4 provide the greatest benefits to high elevation/rocky opening sensitive/watchlist species and watchlist plant communities.

Given the above information, implementation of the action alternatives could impact *Arabis rigidissima* var. *demota, Claytonia megarhiza, Erigeron miser, Eriogonum umbellatum* var. *torreyanum, Lewisia longipetala, Tauschia howellii*, and *Tonestus eximius*, but would not contribute to a trend for

federally listing them as threatened or endangered in the short or long term. Implementation of the action alternatives would not impact *Asplenium trichomanes-ramosum* in the short or long term.

Noxious Weeds

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited and the miles of unauthorized routes and closed NFTS roads that pass through noxious weeds.

No Action: Implementation of Alternative 1 carries the highest risk of introduction and spread of aggressive, non-native plants (weeds) since it allows motorized vehicle use on the most miles of unauthorized roads/trails/areas/closed NFTS roads, and allows cross country travel on most of the Forest (except for areas closed by the LRMP). Motorized vehicles could potentially spread weeds to all accessible areas. Under implementation of Alternative 1, the number of unauthorized motorized vehicle roads/trails/areas would increase through cross country use.

Motorized vehicle use of those routes that have weed infestations has a high risk of spreading weeds to new areas. Surveys to date have identified several routes that are infested with weeds. Refer to Table 3.06-13. The routes displayed in Table 3.06-13 have the highest short and long term risk of weed spread to new areas. Different weeds have different ecological impacts. Table 3.06-13 also provides an indication of the ecological impact of the type of weed that infests the route. Under implementation of Alternative 1, all of the routes identified in Table 3.06-13 would continue to be used and that use would spread weeds.

Action alternatives: None of the action alternatives allow cross country travel which reduces the risk of introduction and spread of weeds by reducing the amount of NFS lands available for motorized travel. Therefore, the risk of direct/indirect impacts to sensitive/watchlist species and native plant communities from weed introduction and/or spread is less under the action alternatives in the short and long term compared to the No Action Alternative. Weeds would continue to spread on the Forest, but it is believed the rate of spread would be slower than under the No Action Alternative primarily due to the prohibition of public motorized vehicle use of some unauthorized routes, closed NFTS roads and prohibiting cross country travel.

Table 3.06-13. Weed occurrences along proposed additions to the NFTS

Route ID	Weed occurrences known to occur within 100 feet of road/trail/area	Ecological impact rating (Cal IPC)	Route miles
ARM-5	Large patches of cheatgrass adjacent to the trail	High	.8
SV-P14	Musk thistle is within about 100 feet.	Moderate	.4
TKN-J9	Wooly mullein and cheatgrass	Cheatgrass - High Wooly mullein - Limited	1.4
TKN-J13	Musk thistle is adjacent to the trail.	Moderate	1.6
TKN-M1	Cheatgrass is located in and adjacent	High	3.6
TKN-M2	Patches of cheatgrass adjacent to the north end of the trail	High	3.4
TKS-M9	Small amounts of bull thistle and orchard grass adjacent.	Moderate	3.0
YRM-M3	Scotch broom adjacent	High	.4

Route ID	Weed occurrences known to occur within 100 feet of road/trail/area	Ecological impact rating (Cal IPC)	Route miles
YRM-M4	Scotch broom and cheatgrass	High	.4
YRN-008	Scotch broom	High	.3
YRN-509	Scotch/Spanish broom and cheatgrass	High	.5
YRN-M3b	Klamath weed	Moderate	2.4
YRS-SF6	Bull thistle and cheatgrass	Moderate	1.4
35-4-P (Cal Ida)	Cheatgrass and tumble mustard adjacent	High	.5

2. Additions to the NFTS and Reopening ML 1 Roads

Indicator(s) used to measure effects:

- Miles of proposed additions to the NFTS system with weed occurrences with 100 feet.
- Sensitive/watchlist species and/or watchlist plant communities located within 100 feet of proposed additions that also have weed occurrences within 100 feet of the route.
- Miles of ML 1 roads proposed to be reopened

No Action: Alternative 1 does not propose additions to the NFTS, but it does not prohibit public motorized vehicle use of unauthorized routes or ML 1 roads. Therefore, implementation of Alternative 1 has a high risk of negatively impacting native plant communities and sensitive/watchlist species through the introduction and/or spread of weeds. Refer to the discussion under effects of cross country use under the No Action Alternative above. Direct/indirect impacts could be significant if weed infestations displace native plant communities.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles open for public motorized vehicle use. This would reduce the risk of weed introduction/spread. None of the action alternatives allow cross country travel which also reduces the risk of introduction of weeds into new areas and the spread of weeds from one place to another. Therefore, the risk of direct/ indirect impacts to native plant communities and/or sensitive/watchlist species from weed introduction/spread is less under the action alternatives in the long term. Refer to the Weed Risk Assessment located in the project record.

Surveys to date have located weed occurrences within 100 feet of routes: ARM-5, SV-P14, TKN-J9, TKN-J13, TKN-M1, TKN-M2, TKS-M9, YRM-M3, YRM-M4, YRN-008, YRN-509, YRN-M3b, YRS-SF6, and 35-4_P of the Cal Ida network (about 20 miles of route). Those action alternatives that propose the addition of these routes to the NFTS have a high risk of introducing/spreading weeds in the short and long term. The weed risk is reduced primarily through preventative measures that focus on training of maintenance crews in weed identification and rapid treatment of newly established weed occurrences. The weed risk is also reduced through ongoing treatment of known weed occurrences. There are no cost effective methods known that could be used to check all vehicles for weeds and/or wash all vehicles before they enter NFS lands.

Motorized vehicle use of routes with weeds and rare species/plant communities have a high risk of negatively impacting sensitive/watchlist species and/or watchlist plant communities. TKN-M2 has an

occurrence of *Ivesia sericoleuca* that has cheatgrass within 100 feet of it. Motorized vehicle use of TKN-M2 increases the risk of weed introduction/spread into this sensitive species occurrence. Cheatgrass would compete for water and nutrients, taking those resources away from the sensitive plants. Over time, sensitive plants would be weakened and/or killed. Aspen plant communities were found along TKN-M2, and SV-P14. Motorized vehicle use of TKN-M2 and SV-P14 increases the risk of weeds being introduced and spreading within these aspen plant communities. The significance of impacts to the aspen from weed infestation is dependent on a number of factors including the type of weed.

Alternative 5: Of the action alternatives, Alternative 5 proposes the addition of the most miles of route known to have weed occurrences (all 20 miles, see Table 3.06-13) and proposes to reopen the most miles of ML 1 roads (about 93 miles) that do not have current weed surveys. Alternative 5 proposes the addition of TKN-M2 and SV-P14 also (routes known to have rare plants/plant communities and weeds). Therefore, of the action alternatives, Alternative 5 has the highest risk of weed introduction and/or spread and the greatest risk of negatively impacting native plant communities and/or sensitive/watchlist species.

Alternative 2: Alternative 2 proposes the addition of about 19 miles of route known to have weed occurrences, including the addition of TKN-M2 and SV-P14, but does not propose to reopen any ML 1 roads. Therefore, Alternative 2 has a high risk of introducing weeds to new areas from motorized vehicle use of routes known to have weeds. Alternative 2 could also spread weeds from weed sites that may occur along unauthorized routes that do not have current surveys. However, the risk of weed spread from undetected weed occurrences is much lower in Alternative 2 than in Alternative 5 since most proposed addition miles have been surveyed.

Alternatives 6 and 7: Alternative 6 proposes the addition of about 17 miles and Alternative 7 proposes the addition of about 15 miles of route known to have weed occurrences. Alternatives 6 and 7 both propose the addition of SV-P14. However, unlike Alternative 6, Alternative 7 does not propose the addition of TKN-M2. Alternative 6 reopens about 11 miles of ML 1 roads and Alternative 7 reopens about 1 mile. Therefore, Alternatives 6 and 7 have less risk of introducing weeds to new areas from motorized vehicle use of routes known to have weeds than Alternatives 2 and 5. However, Alternatives 6 and 7 have a higher risk of spreading weeds from weed sites that may occur along ML 1 roads than Alternative 2 but not as much risk as under Alternative 5.

Alternative 4: Alternative 4 proposes the addition of about 12 miles of route known to have weed occurrences and proposes the addition of SV-P14. Alternative 4 proposes to reopen only .1 mile of ML 1 roads. Therefore, Alternative 4 has less risk of spreading weeds along routes known to have weeds than Alternatives 5, 2, 6, and 7.

Alternative 3: Alternative 3 does not propose the addition of any route known to have weed occurrences, does not propose the addition of TKN-M2 or SV-P14, and does not propose to reopen any ML 1 roads.

3. Cumulative effects including reasonably foreseeable

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact TNF system lands and the sensitive/watchlist species that may occur within them, as

well as the benefits from prohibiting motor vehicle use on unauthorized routes and closed NFTS roads are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts from weed introduction/spread by frequently evaluating routes and conducting early detection and treatment of weeds. Frequent route evaluation to detect weeds combined with rapid treatment of those weeds avoids significant impacts to native plant communities and sensitive/watchlist species in the short and long term.

Past: Most of the TNF is considered relatively weed free. This relatively weed free state may indicate that a source of weed seed was not available when TNF native plant communities were disturbed in the last century. This is unknown but appears to be a reasonable assumption based on literature that documents the progression of various weed species across California and the nation. It is also possible that weeds have persisted at low levels in some areas for decades before spreading rapidly when favorable conditions developed (Shepperd et al 2006). Many of the weeds found in California forests today were introduced intentionally or unintentionally by European settlers beginning in the 18th century (Bossard et al 2000).

The lack of weed infestation in previously disturbed areas may also indicate less access onto the TNF by motorized vehicles. It is widely recognized that motorized vehicle use has increased over the last decade. It is also widely recognized that motorized use helps to spread weeds from place to place both by creating habitat along routes and by carrying seed/weed plant parts on vehicles. However weeds were introduced, it is known that they are spreading across California. Jepson (1925) listed 292 non-native (weed) plant species in California. By the end of the 20th century the estimate for non-native plant species in California has risen to 1,045 (Randall and others 1998 in Shepperd et al 2006).

Current: In general terms, most weed occurrences on the TNF are located along State/County/ Federal/NFS roads. An exception to this is the large infestation of musk thistle located in the Boca Hill area on the Truckee RD which is located along the Truckee River, in older plantations, and along roads and trails. Ongoing management actions such as utility corridor maintenance, mining operation, use of NFTS roads/trails, and livestock grazing continue to spread weeds from place to place across the Forest. As noted in other sections of this document, there are weed infestations competing with sensitive species for soil, water and nutrients in several locations. Sensitive species occurrences with known weed infestations (and/or weed occurrences within 100 feet) include occurrences of *Clarkia biloba* ssp. *Brandegeae* (yellow star thistle), *Cypripedium fasciculatum* (Himalayan blackberry), *Erigeron miser* (Klamath weed) and *Ivesia sericoleuca* (cheatgrass). Use of road/trails has been identified as a contributing source of weeds in all of these known rare plant occurrences except the Klamath weed in the *Erigeron miser* occurrence. Weeds do not occur within all occurrences of sensitive/watchlist plants, but where they do the rare plant occurrence is at risk of being lost over the long term. Efforts have been made to reduce/eliminate the yellow star thistle in known *Clarkia biloba* ssp. *Brandegeae* occurrences along Mosquito Ridge road.

Ongoing actions that create bare soil conditions and/or reduce native vegetation and/or soil cover all increase the risk that weeds will become established if weed seed is introduced. Utility corridor maintenance, mining operations, use of NFTS roads/trails, and livestock grazing are all ongoing actions that create bare soil conditions and reduce native vegetation and/or soil cover.

Reasonably foreseeable: Implementation of those projects identified in Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) may introduce weed seed and/or weed plant parts into new areas. Equipment that operates off roads while doing contracted work for the TNF must wash that equipment if it is coming from a weed infested area. This requirement and requiring the use of certified weed free plant materials for erosion control (when needed) both reduce the risk of weed introduction from reasonably foreseeable management actions. However, all of the projects listed in Appendix H involve travel on NFTS roads and could introduce weed seed into new areas from their vehicles. Ground disturbance favors weed spread if the weeds are already in or near the area being disturbed. Therefore, it is reasonable to expect that implementation of the reasonably foreseeable actions would introduce weeds into new areas and/or spread weeds from existing weed infestations over the long term.

No action: Implementation of Alternative 1 adds to the cumulative risk of weeds being introduced into new areas and spreading from existing weed sites. As identified in the Weed Risk Assessment for this project (refer to the project record) implementation of Alternative 1 has a high risk of introducing weeds into new areas and spreading weeds from areas that are already infested with weeds. The risk to native plant communities and/or sensitive/watchlist species from implementation of Alternative 1 is significant when added to past/current/reasonably foreseeable actions. Alternative 1 allows cross country use, does not prohibit motorized vehicle use of unauthorized routes, and does not prohibit use of closed NFTS roads. Therefore, it has the greatest risk of negative impacts to native plant communities and the sensitive/watchlist species, of any of the alternatives.

Action alternatives: Motorized vehicle use provides a continuous source of weed seed introduction and also provides disturbed areas within and adjacent to the motorized vehicle roads/trails/areas. Refer to the Weed Risk Assessment (in the project record) and the discussion under the No Action Alternative for more information. None of the action alternatives allow cross country use. Therefore, all of the action alternatives have less risk of introducing weeds into new areas than Alternative 1. In addition, some reduction of weed risk is expected from ongoing treatment of known weed occurrences. The risk of weed introduction and spread includes discussion of risk from using routes known to be infested and risk from use of routes that may be infested (routes without current surveys).

Alternative 5: Of the action alternatives, implementation of Alternative 5 has the greatest risk of weed introduction and spread and therefore the greatest risk of negative impacts to native plant communities and/or sensitive/watchlist species. Alternative 5 has the greatest weed risk of the action alternatives because it proposes the addition of the most miles of route known to have weed occurrences (all 20 miles) and proposes to reopen the most miles of ML 1 roads (about 93 miles) that do not have current weed surveys. Alternative 5 also proposes the addition of TKN-M2 and SV-P14 (routes known to have rare plants/plant communities and weeds). When current and reasonably foreseeable actions are added to the high risk that implementing Alternative 5 would introduce and spread weeds, the cumulative impacts could be significant. However, the assumption of frequent review of routes and rapid treatment of weeds reduces the significance of Alternative 5's contribution to cumulative impacts.

Since Alternative 5 does not allow cross country travel, it has less risk of spreading weeds into native plant communities and/or sensitive/watchlist species occurrences over the long term than implementation of Alternative 1.

Alternative 2: Alternative 2 proposes the addition of about 19 miles of route known to have weed occurrences, proposes the addition of TKN-M2 and SV-P14, but does not propose to reopen any ML 1 roads. Therefore, Alternative 2 has a high risk of introducing weeds to new areas from motorized vehicle use of routes known to have weeds. In addition, Alternative 2 adds shoreline access on dry soils in the Prosser/Boca/Stampede Reservoir areas and the Greenhorn area. Reservoir shoreline areas are known to have weed occurrences when the water level is low. For example, Canada thistle is known to occur along the low water line of French Meadows Reservoir and musk thistle and other weeds are known to occur along the Boca Reservoir low water line. Unvegetated areas provide sites where weeds can readily become established without competition from native vegetation. Prosser/Boca/Stampede Reservoir areas and the Greenhorn area have been surveyed and weeds are not currently present. In addition, weeds would have a harder time becoming established along the reservoirs when the water levels are high. When weed occurrences are covered with water, many of the weed seeds are killed. However, some of the weed seed floats to new areas. When water levels remain low for a period of time, weeds can become established and any motorized vehicle use in the areas where the weeds are located would spread the weeds to new areas.

The risk of weed spread from undetected weed occurrences is much lower in Alternative 2 than in Alternatives 1 and 5. When current and reasonably foreseeable actions are added to the risk that implementing Alternative 2 would introduce and spread weeds, there would be additions to cumulative impacts. However, since most of the risk is tied to use of routes with current surveys/known infestations, the risk is reduced by implementation of ongoing weed treatments. In addition, as mentioned above, the assumption of frequent review of routes and rapid treatment of newly established weeds reduces the significance of any action alternative's contribution to cumulative impacts.

Alternatives 6 and 7: Alternative 6 proposes the addition of about 17 miles and Alternative 7 proposes the addition of about 15 miles of route known to have weed occurrences. Alternatives 6 and 7 both propose the addition of SV-P14. However, Alternative 7 does not propose the addition of TKN-M2. Therefore the risk of spreading weeds from known infestations is high. Alternatives 6 and 7 do not propose "Open Areas." Therefore, Alternatives 6 and 7 have less risk of introducing weeds to new areas from motorized vehicle use of routes known to have weeds than Alternatives 2 and 5.

Alternative 6 reopens about 11 miles of ML 1 roads and Alternative 7 reopens about 1 mile. Alternative 6 has a higher risk of spreading weeds from weed infestations that may occur along these ML 1 roads than Alternative 7. Alternatives 6 and 7 have a higher risk of spreading weeds from weed sites that may occur along ML 1 roads than Alternatives 2 but not as much risk as under Alternative 5.

The above contributions to cumulative impacts are not considered significant due to the assumption of frequent review of routes with rapid treatment of newly established weeds.

Alternative 4: Alternative 4 proposes the addition of about 12 miles of route known to have weed occurrences and proposes the addition of SV-P14. Alternative 4 proposes to reopen only .1 mile of ML 1

roads and does not propose "Open Areas." Therefore, Alternative 4 has less risk of spreading weeds along routes known to have weeds than Alternatives 5, 2, 6, and 7. Alternative 4 contributions to cumulative impacts are not considered significant due to the assumption of frequent review of routes with rapid treatment of newly established weeds.

Alternative 3: Alternative 3 does not propose the addition of any route known to have weed occurrences, does not propose the addition of TKN-M2 or SV-P14, and does not propose to reopen any ML 1 roads. Therefore, Alternative 3 has the lowest weed risk of any of the alternatives and is the most beneficial to native plant communities and sensitive/watchlist species.

Native Plant Habitat Fragmentation

1. Prohibition of cross country travel

Indicator used to measure effects:

- Acres where cross country travel is prohibited (thereby reducing the mileage of routes available for motorized use within inventoried roadless areas (IRAs).

No action: Alternative 1 does not prohibit cross country motorized vehicle use of 98,304 acres of Inventoried Roadless Areas (IRAs). Under implementation of Alternative 1, 58 miles of unauthorized routes and closed NFTS roads still receiving some motorized use located within IRAs would be available for motorized vehicle use and accessible areas within those IRAs would be available for cross country travel. As discussed above, this increases the risk of weed introduction and spread within these areas – increasing the risk of negative impacts to native plants and sensitive/watchlist species. These negative impacts include reductions in native plant biodiversity and fragmentation of the native plant communities. Impacts could be significant over the long term.

Action alternatives: None of the action alternatives allow cross country travel within IRAs. Therefore there is less long term risk to native plant diversity from fragmentation of large blocks of native plant communities by weeds under implementation of the action alternatives (compared to the No Action Alternative). Of the action alternatives, Alternatives 2 and 5 prohibit public motorized use on the fewest miles of unauthorized routes and closed NFTS roads within IRAs and have the highest long term risk to native plant communities from fragmentation of large blocks of native plant communities via weeds. Alternatives 2 and 5 would prohibit public motorized use on about 4 miles of unauthorized routes and closed NFTS roads within these areas or about 33 percent. Alternative 7 would prohibit public motorized use on about 6 miles or about 46 percent. Alternative 6 would prohibit public motorized use on about 9 miles or about 69 percent. Alternatives 3 and 4 would prohibit public motorized use on all 13 miles of unauthorized routes and closed NFTS roads located within IRAs.

2. Additions to the NFTS and Reopening ML 1 Roads

Indicator used to measure effects:

- Miles proposed for addition to the NFTS that are located within IRAs.

No action: Alternative 1 does not prohibit public motorized use of the 58 miles of unauthorized routes and closed NFTS roads located in IRAs. It also allows cross country travel. Alternative 1 has the highest

long term risk to native plant communities from fragmentation of large blocks of native plant communities, of all the alternatives.

Action alternatives: Compared to Alternative 1, all of the action alternatives reduce the number of miles open for motorized vehicles in IRAs. Of the action alternatives, Alternatives 2 and 5 propose the addition of the most miles of unauthorized routes located in IRAs – about 8 and 10 miles respectively. Therefore, Alternatives 2 and 5 have the greatest long term risk of negatively impacting native plant and plant community diversity (from fragmentation of large blocks of native plant communities via weed infestation). Refer to Table 3.06-14. Alternative 7 adds about 6 miles and Alternative 6 adds about 4 miles. Alternatives 3 and 4 do not add miles within IRAs.

Table 3.06-14. Total miles of roads/trails/areas in inventoried roadless areas by alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross country travel (miles located within IRAs) (acres located within IRAs)		58 98,304	0	0	0	0	0	0
2. Additions to the NFTS	**Miles added within inventoried roadless areas**	N/A	8	0	0	10	4	6
3. Establishment of Motorized "Open Areas" (acres)		N/A	0	0	0	0	0	0
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	No Effect						
	b. Change in Class of Vehicles resulting from changes in maintenance levels	No Effect						
	c. Change in Season of Use	No Effect						
	d. Reopening Maintenance Level 1 Roads	N/A	0	0	0	2	0	0
5. Amendments to the Forest Plan		No Effect						
	Total Miles **Total Acres**	**207** **98,304**	**157** **0**	**0** **0**	**0** **0**	**161** **0**	**153** **0**	**155** **0**

3. Cumulative effects including reasonably foreseeable

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact IRAs, as well as the benefits from prohibiting public motorized use of unauthorized routes and closed NFTS roads are discussed. As stated previously, it is assumed that all of the action alternatives avoid long term cumulative impacts by frequently evaluating routes, implementing mitigations to reduce impacts to sensitive/watchlist species and/or watchlist plant communities, and conducting early detection and treatment of weeds. Frequent route evaluation to detect weeds combined with rapid treatment of those weeds avoids significant impacts to native plants and plant communities from weed infestation.

Since IRAs have not been surveyed, possible impacts to native plant biodiversity from fragmentation of large blocks of native plant communities are analyzed. It is recognized that sensitive/watchlist species

and/or watchlist plant communities add to native plant diversity and are considered important components of the native plant communities where they are located.

Past: Past actions that have impacted native plant communities in TNF IRAs include all of the past actions identified under the different plant communities in this report. IRAs were identified in the late 1970's during the Roadless Area Review and Evaluation (RARE I and RARE II). The character and amount of roads, private land, and motorized trails varies greatly by roadless area. Refer to Section 3.09. However, during the SNEP analysis, the East and West Yuba IRAs were identified as having some of the best remaining/largest concentrations of old growth forest in the Sierra Nevada.

Current: Current management activities that occur within TNF IRAs include use of NFTS roads/trails, activities on private land that are adjacent to NFS lands, livestock grazing and minerals operations. The amount of use of NFTS roads/trails, the types of private land activities, the amount and location of livestock grazing, and the minerals operations also vary by IRA. For example, the following unauthorized routes occur in the West Yuba IRA: YRN-M3b, YRN-M3a, YRN-7, and YRN-M2. All of these routes except YRN-7 were pioneered by miners to access mining claims. The East Yuba IRA also has active mining operations. YRN-001, YRN-M1, YRN-11, YRN 5a and 5c, YRN-9, YRN-007, and YRN-4 are all unauthorized routes that exist within the East Yuba IRA. Of these routes, YRN-M1, YRN-007, and YRN-4 were pioneered by miners. YRN-11, YRN 5a and 5c, YRN-9 and probably YRN-001 were pioneered by users. Routes used by miners to access their mining claims will remain available for their use regardless of the alternative selected. Refer to Section 3.09 for more information about current management activities within each IRA.

Reasonably foreseeable: Implementation of those projects identified in Appendix H (Reasonably Foreseeable Projects and Cumulative Effects) would not impact IRAs. None of those projects are located within IRAs.

No action: Implementing Alternative 1 has a greater risk of negative impacts to native plant diversity and a greater risk of negative impacts to native plant communities (and therefore the sensitive/watchlist species dependent on them) located within IRAs than the action alternatives. Alternative 1 has a higher risk of these negative impacts to plant diversity and connectivity primarily due to allowing cross country travel and allowing motorized use on unauthorized routes and closed NFTS roads within IRAs.

Motorized vehicle disturbance within IRAs can reduce native plant biodiversity. Loss of native plant biodiversity is dependent on the intensity of motorized vehicle use, but even a single vehicle pass can destroy or disrupt many types of plant communities. Plants with shallow root systems may be especially vulnerable (Wilshire 1983, Lacey et al. 1997). This loss of native vegetation increases the risk of soil loss due to wind and water erosion. Soil loss increases the decomposition of organic matter, weakens soil aggregate stability and can result in the formation of inorganic surface crusts. Inorganic surface crusts increase water runoff, inhibit germination and emergence of seedlings, and reduce water penetration into the soil. Natural soil stabilizers such as organic (lichen, fungal and algal) soil crusts are highly vulnerable to cross country motorized vehicle use. All of these impacts contribute to native plant community degradation and fragmentation.

Motorized vehicle use can fragment native plant communities and habitat for some sensitive/watchlist species. Those sensitive/watchlist plants with specific pollination and other habitat requirements are the most vulnerable to fragmentation impacts. For example, *Cypripedium fasciculatum* requires mycorrhizal connections underground and specific pollinators and is associated with older forests. Many of the TNF IRAs are considered older forest. During the SNEP analysis the East/West Yuba IRAs were identified as important older forest areas that provide connectivity across the crest of the Sierra Nevada. The East/West Yuba IRAs were also found to be important because they are located in a part of the Sierra Nevada that has less human presence. Cross country travel within these IRAs (and the others) would fragment the landscape and reduce ecological function within the older forest plant communities.

Motorized vehicle use, especially cross country use, is frequently identified as the cause of habitat fragmentation. Cross country motorized vehicle use has been shown to reduce perennial and annual plant cover, reduce plant density, and overall above-ground vegetative biomass (Hall 1989). In general terms, the degree of plant loss depends on the intensity of motorized vehicle use.

The density of NFTS motorized vehicle routes within the various IRAs is described in Section 3.09 (IRAs and Special Areas). Under Alternative 1, cross country use in IRAs could create high road/trail density over the long term with negative cumulative impacts to native plant communities. Several areas on the TNF have a high density of motorized vehicle roads/trails/areas – however none of the watersheds within IRAs are considered high risk watersheds. Refer to Section 3.02 (Soil and Watershed Resources). The IRAs on the TNF are considered relatively free of motorized vehicle routes and are assumed to provide quality habitat for native plants/fungi and plant communities. Over the long term severe cross country travel would reduce and/or eliminate habitat for some native plants/fungi.

Large blocks of unfragmented land play an important role in providing habitat for threatened, endangered, proposed (TEP), and sensitive plant species (USDA FS 2000). It is expected that TNF IRAs provide important biological strongholds for native plant species and communities just as they do across the nation. Native plant communities and sensitive/watchlist occurrences within TNF IRAs are less likely to be exposed to disruption by human activities such as collection, trampling, and other disturbance. Cross country travel increases the risk of collection, trampling and other disturbances to native plants/plant communities. This is especially true in the East/West Yuba IRAs. Within the Sierra Nevada, the East/West Yuba IRAs have been identified as having less human presence than any other old growth forests in the range. This lower level of human disruption increases the probability that the East/West IRAs are important references for understanding the natural composition and dynamics of native plant communities. Cross country travel within these IRAs increases the probability that native plant community composition and ecological function would be negatively impacted.

TNF IRAs are currently less likely to experience problems with nonnative invasive species (weeds) and are more likely to be able to maintain intact native plant communities. Native plants/plant communities are at increased risk of adverse cumulative effects from increased population growth and associated land uses, land conversions, and nonnative species invasions throughout the Sierra Nevada. Therefore, the value of relatively unfragmented blocks of land such as IRAs is likely to increase as native plant communities are degraded. Implementation of the No Action Alternative increases the risk of native

plant community loss and degradation. Native plant community loss and degradation from the invasion and/or encroachment of non-native plant species are increasing within the Sierra Nevada and implementation of the No Action Alternative could increase the rate of loss.

Action alternatives: All of the action alternatives reduce impacts to native plants/plant communities by reducing the number of unauthorized routes closed NFTS roads designated motorized vehicle use within IRAs and prohibiting cross country travel. The action alternatives that propose the addition of the most miles to the NFTS within IRAs have the greatest risk of negatively impacting native plant communities. The risk to native plants/plant communities is closely tied to the high risk of introducing and spreading weeds and generally increasing human presence in areas of large intact native plant communities (IRAs).

Alternative 5: Compared to the No Action Alternative, Alternative 5 reduces overall impacts to native plants/plant communities by reducing the number of unauthorized routes and closed NFTS roads still receiving some motorized use available to motorized vehicles within IRAs and prohibiting cross country travel. Of the action alternatives, implementation of Alternative 5 has the greatest risk of negative impacts to native plants/plant communities because it proposes the addition of the most miles of unauthorized routes located in IRAs (about 10 miles). These proposed additions are located primarily in the East/West Yuba IRAs; about 3 miles of unauthorized route within the East Yuba IRA, about 4 miles within the West Yuba IRA, about 1 mile in Castle Peak and about 1 mile in Grouse Lakes. In addition, Alternative 5 proposes to reopen about 2 miles of ML 1 within the West Yuba IRA. Therefore, of the action alternatives, implementation of Alternative 5 has the greatest risk of negatively impacting native plants/plant communities within the East/West Yuba IRAs. Refer to the discussion under the No Action Alternative. Over the long term these additions to cumulative impacts could be significant if native plant community composition and ecological function are severely impacted. Much is unknown regarding the amount of intact older forest plant community that is needed to maintain species composition and ecological function within the various types in the Sierra Nevada. However, as mentioned above, the East/West Yuba IRA areas have been identified as unique and important old forest areas (SNEP).

Alternatives 2 and 7: Compared to the No Action Alternative, Alternatives 2 and 7 reduces overall impacts to native plants/plant communities by reducing the number of unauthorized routes and closed NFTS roads available to motorized vehicles within IRAs and prohibiting cross country travel. Implementation of Alternatives 2 and 7 could also negatively impact native plants/plant communities within IRAs because they propose the addition of about 8 and 6 (respectively) miles of unauthorized routes in IRAs. These proposed additions are also located primarily in the East/West Yuba IRAs. Alternative 2 proposes about 2 miles of unauthorized routes within the East Yuba IRA, about 4 miles within the West Yuba IRA, 1 mile within Castle Peak and about 1 mile within Grouse Lakes. Alternative 7 proposes about 1 mile of unauthorized route within the East Yuba IRA, about 3 miles within the West Yuba IRA, about 1 mile in Castle Peak, and about 1 mile in Grouse Lakes. Alternatives 2 and 7 do not propose to reopen any ML 1 roads with in the IRAs. Therefore, the risk of negatively impacting native plants/plant communities within the East/West Yuba IRAs is not as high as under Alternative 5. However the risk is higher in Alternative 2 than in Alternative 7. Over the long term Alternatives 2 and 7 additions

to cumulative impacts could change native plant community composition and ecological function within IRAs. As discussed above, the significance of these possible impacts are unknown at this time.

Alternative 6: Compared to the No Action Alternative, Alternative 6 reduces overall impacts to native plants/plant communities by reducing the number of unauthorized routes and closed NFTS roads available to motorized vehicles within IRAs and prohibiting cross country travel. Implementation of Alternative 6 could also negatively impact native plants/plant communities within IRAs because it proposes the addition of about 4 miles of unauthorized routes in IRAs. These proposed additions are located in the East Yuba (2 miles), Castle Peak (1 mile) and the Grouse Lakes IRAs (1 mile). Alternative 6 does not reopen any ML 1 roads with in the IRAs. Implementation of Alternative 6 has less risk of negatively impacting native plants/plant communities within the East Yuba IRA than Alternatives 2, 5, and 7 and would not add to the cumulative impacts to the West Yuba IRA. The risk of negative impacts to native plants/plant communities within the Castle Peak and Grouse Lakes IRAs is about the same in Alternative 6 as it is in Alternatives 2, 5, and 7. The significance of these possible impacts is unknown.

Alternatives 3 and 4: Compared to the No Action Alternative, Alternatives 3 and 4 reduces overall impacts to native plants/plant communities by reducing the number of unauthorized routes and closed NFTS roads available to motorized vehicles within IRAs and prohibiting cross country travel. Implementation of Alternatives 3 and 4 have the least risk of negative impacts to native plants/plant communities within IRAs. Alternatives 3 and 4 do not propose additions to the NFTS or propose reopening ML 1 roads within IRAs. Implementation of Alternatives 3 and 4 would benefit sensitive/watchlist species (if they occur there)/native plants/plant communities by reducing the risk of weed introduction and spread by motorized vehicles. The value of large blocks of land such as IRAs in conserving sensitive/watchlist species and/or watchlist plant communities is likely to increase as native plant communities are lost and/or degraded throughout the Sierra Nevada region through development, climatic change, and weed infestation.

Summary of Effects Analysis across All Alternatives

Table 3.06-15 summarizes the effects analysis for botanical resources by ranking each alternative regarding how well it provides for each of the indicators. This summary is not meant to convey that the indicators are equal in importance. The following rankings were used: A score of 7 indicates the alternative has the least impact for native plants/plant communities to the indicator. A score of 1 indicates the alternative has the most impact for native plants/plant communities related to the indicator.

Table 3.06-15. Comparison of Effects to Plants/Plant Communities

Indicator	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres where cross country travel is prohibited thereby reducing the mileage of route available for motorized use within 100 feet of riparian vegetation	1	3	7	6	2	4	5
Number of perennial and intermittent water crossings	1	3	7	6	2	4	5
Aquatic/riparian dependent sensitive/watchlist species and/or watchlist plant communities within 0-100 feet of roads	1	3	7	6	2	4	5
Acres where cross country travel is prohibited thereby reducing the mileage of route available for motorized use that pass through serpentine (ultramafic) soils	1	3	7	5	2	6	4
Serpentine dependent sensitive/watchlist species within 0-100 feet of route	1	3	7	5	2	6	4
Acres where cross country travel is prohibited thereby reducing the mileage of route available for motorized use within older forest plant communities	1	3	7	6	2	4	5
Acres where cross country travel is prohibited thereby reducing the mileage of route available for motorized use within oak woodland plant communities	1	3	7	6	2	4	5
Acres where cross country travel is prohibited thereby reducing the mileage of route available for motorized use within forest edges/openings	1	3	7	6	2	4	5
Acres where cross country travel is prohibited thereby reducing the mileage of route available for motorized use within high elevation openings and rocky areas	1	3	7	6	2	4	5
High elevation opening dependent sensitive/ watchlist species located 0-100 feet of route	1	3	7	6	2	4	5
Sensitive/watchlist species and/or watchlist plant communities located within 0-100 feet of routes with weed occurrences within 0-100 feet of the route	1	3	7	6	2	4	5
Weed infestations within 0-100 feet of route	1	3	7	6	2	4	5
Acres where cross country travel is prohibited thereby reducing the mileage of route available for motorized use within IRAs	1	3	7	6	2	5	4
Average	1	3	7	5.8	2	4.4	4.8

Chapter 3.07

Recreation and Visual Resources

3.07. Recreation and Visual Resources

Recreation

Introduction

Nearly all Tahoe National Forest (TNF) visitors use roads and trails that make up the National Forest Transportation System (NFTS) to reach their destination. Changing the NFTS alters the diversity of motorized and non-motorized opportunities on the Forest. Visitors may be participating in motorized recreation, or using motor vehicles to access trailheads, facilities, destinations, or geographic areas used for non-motorized recreational activities. This section of the EIS examines how recreation opportunities would be affected by the Proposed Action and alternatives and how alternatives are consistent with direction established in the Tahoe National Forest Land and Resource Management Plan (LRMP) as amended in 2007, the Sierra Nevada Forest Plan Amendment, and the Travel Management (TM) Rule.

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

Regulatory direction relevant and specific to the each of the alternatives as it affects recreation resources includes:

National Forest Management Act (NFMA)

The NFMA sets forth requirements for development of Forest Plans. The Tahoe National Forest LRMP includes standards and guidelines for management of recreation including use of motor vehicles.

Sierra Nevada Forest Plan Amendment (SNFPA)

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

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

(Criteria that incorporated E.O. 11644 and E.O. 11989).

1. The responsible official shall consider the effects of designated roads, trails and areas on the provision of recreational opportunities, access needs, and conflicts among uses of National Forest System lands. 36 CFR 212.55 (a)
2. The responsible official shall consider effects on the following, with the objective of minimizing: conflicts between motor vehicle use and existing or proposed recreational uses of National Forest System lands or neighboring federal lands; conflicts among different classes of motor vehicle uses of National Forest System lands or neighboring federal lands; and the compatibility of motor vehicle uses with existing conditions in populated areas, taking into account sound, emissions, and other factors. 36 CFR 212.55 (b).

Tahoe National Forest LRMP

The LRMP provides goals for recreation management and requires a broad range of developed and dispersed recreation opportunities in balance with existing and future demand. For management purposes, combinations of activities, settings, and probable experience opportunities have been arranged along a spectrum, or continuum; this continuum is called the Recreation Opportunity Spectrum (ROS). The ROS is divided into six classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural and urban. Each class is defined in terms of its combination of activity, setting, and experience opportunities (ROS Users Guide USDA Forest Service, 1982). The intent is to use the ROS and its associated settings to provide recreation input into LRMPs which in turn may be incorporated into LRMP management prescriptions or used in project level planning beyond the programmatic planning used to develop the LRMP. For the purposes of travel management actions, "off-highway vehicles" is applied to public motor vehicle use (highway-legal and non-highway-legal). How the ROS applies to the LRMP depends on how (or if) it was integrated into the management prescriptions and associated standards and guidelines in the Forest LRMP. On the Tahoe National Forest, the ROS is integrated into management prescriptions and associated standards and guidelines in the LRMP to guide decisions and resource management activities.

The following Tahoe National Forest LRMP standards and guidelines are relevant to travel management:

- **Wheeled Vehicles and OHV Motorized Use -** Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle (OHV) use areas. Unless otherwise restricted by current forest plans or other specific area standards and guidelines, cross country travel by over-snow vehicles would continue.
- **OHV Motorized Use -** The final determination of designated routes will be made by a trail management plan to be completed within one year after the Forest Plan is approved.
  - Consider the following factors when addressing identified conflicts between non-motorized trail uses and motorized trail users (OHV): (1) Feasibility and capability of area to accept OHV use (minimal conflict with other resources or users), (2) Separation of the users is preferable, offering both types of users a satisfying recreational experience, (3) Historic use of the trail facility or area, (4) Safety of the users, (5) Protection of resources and trail improvements, (6) Cooperate with the California Department of Parks and Recreation to implement the Statewide Off Highway Motor Vehicle Recreational Trails Plan.
- **OHV - Trail Development -** Favor trail development over indiscriminate cross country use. Consider the following factors when developing trails; (1) Type of user, (2) Protection of the resource, (3) Safe access to point of interest or experience, (4) Enforcement and manageability, (5) Protection of private land integrity, and (6) Monitoring and evaluation capabilities.

In addition to the standards and guidelines listed above, each management area is assigned a ROS class or range of ROS classes to guide decisions and resource management activities. The Forest ROS map displays the ROS class assigned to Forest lands in the LRMP. This map was used to determine if

proposed additions to the NFTS, establishing "Open Areas," and reopening of Maintenance Level 1 roads would meet the ROS class allocated to the management area. See the LRMP for standards and guidelines specific to each management area (USDA Forest Service, 2007, as amended).

Effects Analysis Methodology

Impacts Relevant to Recreation Include:

- The compatibility of proposed changes to the NFTS with LRMP recreation and OHV management prescriptions and ROS.
- The impact of proposed changes to the NFTS on non-motorized (i.e., quiet) recreation (dust, noise, use conflicts).
- The amount and diversity of motorized recreation opportunity by alternative.
- The amount of motorized access to dispersed recreation by alternative.
- The impact of proposed changes to the NFTS on neighboring private and federal lands and wilderness areas (dust, noise, use conflicts).

Assumptions Specific to Recreation Analysis:

- The prohibition of cross country travel is not a change to ROS (semi-primitive motorized for example); it is simply a prohibition within that ROS "zone" to travel off of designated routes.
- The change from an open to cross country travel condition to a cross country travel prohibited condition will reduce the availability of acreage for both motorized recreation as well as motorized access to dispersed recreation activities.
- The change from an open to cross country travel condition to a cross country travel prohibited condition will increase the availability of acreage for non-motorized recreation as well as non-motorized access to dispersed recreation activities.
- Proposed additions to the NFTS will have a beneficial effect on motorized recreation opportunities by providing a variety of trail riding experiences and increasing the amount of developed motorized recreation opportunities (loops, connectors).
- Proposed changes and additions to the NFTS will have a beneficial effect on the amount of motorized access to dispersed recreation opportunities.
- The Forest's national visitor use monitoring (NVUM) report provides the best available information for both motorized and non-motorized recreation activities described in this analysis.
- Overall changes in the NFTS that require non-significant plan amendment(s) will result in corresponding changes in the net semi-primitive non-motorized ROS class acres available on the Forest.
- The area of influence (dust, noise) of motorized use on populated areas or "quiet recreation" opportunities is ½ mile from associated boundaries (e.g. wilderness, research natural area (RNA), property line, urban limit line).

- There has never been any use analysis of unauthorized routes and no data exists (traffic counts, etc). As a result it would be highly speculative to make assumptions of use levels on the unauthorized routes.

Data Sources:

- TNF LRMP for distribution of ROS classes as well as the ROS GIS data layer.
- The Forest's National Visitor Use Monitoring (NVUM) report for most popular non-motorized and motorized recreation activities.
- Recreation Facility Analysis for the Forest's recreation program niche.
- Recreation, law enforcement, and other resource staff observations.

Recreation Measurement Indicators

Measurement indicators are intended to address how each alternative as the sum total of its proposed actions conforms to the LRMP, addresses significant issues identified in scoping, and implements Subpart B of the TM Rule including: whether the motorized recreation opportunity has the potential to conflict with other recreation opportunities, specifically non-motorized opportunities; the proximity of motor vehicle use to populated areas or neighboring private and federal lands and wilderness areas; the quality of the motorized recreation experience; and the quality of motorized access to dispersed areas for both motorized and non-motorized uses. The indicators also respond to the amount of motorized access available on the unit. Conflicts with other resources (including air quality) are examined in other resource sections. Public safety is addressed in the transportation section.

Measurement indicators were used for analyzing: the prohibition of cross country travel, the addition of unauthorized roads or trails to the NFTS; the establishment of "Open Areas"; the changes to the NFTS by vehicle class, season of use, and reopening Maintenance Level 1 (ML 1) roads; and amendments to the Forest Plan. Mileage available for each class of vehicle is useful in analyzing the ability of Forest users to not only travel around the Forest and enjoy motorized recreation opportunities; but also to access non-motorized recreation opportunities such as trailheads and dispersed recreation sites for activities such as hunting, fishing and camping, which the forest has determined are important based on both NVUM data and public scoping for this project. Mileage for motorized recreation is an indicator of the number and types of experiences available for motorcycles, all-terrain vehicles (ATVs), and four-wheel drive vehicles (4WDs) in each alternative. The changes to motorized mileages can be used to interpret the level of change in opportunities for motorized and non-motorized users. The details of the proposed seasonal closure relate to both the months that motorized recreation will not be allowed to use designated roads, trails or areas and, conversely, the time of year that conflicts between motorized and non-motorized uses will be minimized. Also, the effect on non-motorized recreation activities that are accessed by native surface roads is considered. The number of acres located ½ mile away from roads, trails and boundaries is used to analyze the opportunity for non-motorized and "quiet" recreation on the Forest. The tables listed under each measurement indicator use mileage, acreage, and percentage to quantify the recreation opportunities for the effects analysis and are referred to throughout the analysis.

Measurement Indicator 1: Consistency with LRMP

Description: This measurement indicator looks at the impact of proposed changes to the NFTS. It uses the Tahoe National Forest LRMP in regard to the Recreation Opportunity Spectrum (ROS) and season of use.

Amendments to the LRMP: The number of required plan amendments by alternative in regard to both ROS and changes to the season of use is displayed in Table 3.07-1. No ROS plan amendments would be needed for any alternatives because all routes proposed for addition to the NFTS comply with the ROS class in the associated management area. No proposed route additions in the action alternatives would be located in primitive or semi-primitive non-motorized ROS classes. All proposed route additions would be located in semi-primitive motorized, roaded natural or rural ROS classes. The number of ROS acres in each class would remain the same in each alternative. However Alternatives 2, 5, and 6 would require a plan amendment because of a change in the season of use of Management Area 84 (Humbug Sailor) related to the lifting of the deer winter range seasonal restrictions (see Tables 3.07-1 and 6, and Measurement Indicator 3: Motorized recreation opportunity for more information).

ROS: The number of ROS acres are shown in each class by alternative in Table 3.07-2.

Table 3.07-1. Amendments to the Tahoe National Forest Land Resource Management Plan in regard to ROS, and Season of Use by alternative

	Amendments to the Tahoe NF LRMP						
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
ROS Amendments	0	0	0	0	0	0	0
Change in Season of Use Amendments	0	1	0	0	1	1	0

Table 3.07-2. ROS acres in each class for all alternatives

ROS Class	All Alternatives - Acreage	Percent of total Forest acres
Primitive	33,000	4%
Semi-Primitive Non-Motorized	48,975	6%
Semi-Primitive Motorized	89,994	11%
Roaded Natural/Rural [a,b]	664,122	79%
Total	**836,041**	**100%**

[a] Acres and percentage for both Roaded Natural and Rural ROS were combined into a single category.
[b] No Urban ROS designations have been made on the TNF.

Measurement Indicator 2: Non-motorized recreation opportunity

Description: This measurement indicator looks at the impact of proposed changes to the NFTS on non-motorized recreation (dust, noise, use conflicts). It also addresses the “quiet recreation” issue.

Method: The number of acres within ½ mile of an area where motorized use is allowed (designated roads, trails and areas in the NFTS in miles that would result under each alternative). This method was determined through a literature review of sound studies and reports (Martin, et al. 2005, Ouren, et al.

2007, and Turina, et al. 2006.) Areas where motorized use is allowed (proposed or designated roads, trails and areas) were buffered by a distance of ½ mile. Areas outside of this buffer would be considered available for quiet recreation and non-motorized activities without the potential for use conflicts with motorized vehicles. Table 3.07-3 displays the number of acres within the ½ mile buffer or the acres affected by motorized use.

Table 3.07-3. Acreage within ½ mile of routes proposed for public use under each alternative as a measurement indicator of acreage affected by motorized use where quiet recreation and non-motorized activities may have potential use conflicts with motorized vehicles

	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternative 5		Alternative 6		Alternative 7	
	Acres and % of Total Forest Acreage		Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Route Additions only	**38,869[a]**	**4.6[a]**	2,840	0.3	0	0	801	0.1	3,083	0.4	1,658	0.2	2,553	0.3
Reopening ML 1 roads	**0**	**0**	0	0	0	0	0	0	3,626	0.4	97	0.0	90	0.0
All motorized routes traveling through the Forest [b]	**733,316[a]**	**87.7**	697,281	83.4	694,447	83.1	695,242	83.2	701,062	83.9	696,193	83.3	697,078	83.4
Percent of Forest more than ½ mile from any public motorized use		**12.3**		16.6		16.9		16.8		16.1		16.7		16.6

[a] Alternative 1 proposes no unauthorized route additions, however cross country motorized travel would continue. Attempting to quantify where cross country motorized travel occurs is speculative since it is impossible to predict exactly where, when, or how cross country motorized use would occur. For consistency in comparing alternatives, the inventoried unauthorized OHV routes were used to determine the area potentially affected by cross country motorized use. The inventoried unauthorized routes are not proposed as additions under Alternative 1, but were used to display the minimum acreage affected by cross country motorized travel.

[b] Analysis of "All motorized routes traveling through the Forest" for Alternative 1 included the inventoried unauthorized OHV routes, existing NFTS, adjacent national forest roads, and state, county, and private roads. Analysis of "All motorized routes traveling through the Forest" for the remaining alternatives included proposed route and area additions, existing NFTS, adjacent national forest roads, and state, county, and private roads.

Totals may include slight errors due to rounding.

Measurement Indicator 3: Motorized recreation opportunity

Description: This measurement indicator looks at the impacts of proposed additions and changes to the NFTS to motorized recreation opportunities by alternative.

Roads: The number of miles available by vehicle class and the season of use are shown in Table 3.07-4. Table 3.07-5 shows road mileage by change of vehicle class resulting from a change in the maintenance level (ML) or mixed use. Table 3.07-6 shows the change in miles due to a change in the season of use on the existing NFTS.

Trails: The number of miles available by vehicle class and season of use is shown in Table 3.07-7.

Quality of Trail Experience: The number of miles by vehicle class and degree of difficulty is shown in Table 3.07-8.

Areas: The number of acres in "Open Areas" by vehicle class and season of use is shown in Table 3.07-9.

Table 3.07-4. NFTS road mileage open to the public by alternative (class of vehicle and season of use)

Class of Vehicle	Season of Use	Additional NFTS motorized opportunities (in miles)						
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Roads Added to the NFTS Open to All Vehicles	Apr 1 to Dec. 31	0.0	0.2	0.0	0.0	0.0	5.5	0.0
	May 1 to Dec 31	0.0	0.7	0.0	3.5	4.7	7.5	0.0
	May 1 to Nov 1	0.0	0.2	0.0	0.2	0.3	0.0	0.0
	May 1 to Sep 15	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	All Year	0.0	3.7	0.0	0.0	0.0	0.0	0.0
Subtotal Additions to NFTS		**0.0**	**5.0**	**0.0**	**3.7**	**5.0**	**13.1**	**0.0**
ML 1 Roads Reopened to All Vehicles	Apr 1 to Dec. 31	0.0	0.0	0.0	0.0	0.3	2.2	0.0
	May 1 to Dec 31	0.0	0.0	0.0	0.0	70.3	0.6	0.0
	May 1 to Nov 1	0.0	0.0	0.0	0.0	8.7	0.0	0.0
	All Year	0.0	0.0	0.0	0.0	0.0	0.0	0.9
Subtotal ML 1 Reopened		**0.0**	**0.0**	**0.0**	**0.0**	**79.3**	**2.7**	**0.9**
Total Mileage – proposed route additions and closed NFTS roads proposed as open		**0.0**	**5.0**	**0.0**	**3.7**	**84.3**	**15.8**	**0.9**
Total Motorized Mileage in each Alternative[a]		**2,067.6**	**2,072.6**	**2,067.6**	**2,071.3**	**2,152.0**	**2,083.4**	**2,068.5**

[a] Total Motorized Mileage in each alternative includes proposed additions to the NFTS, ML 1 reopenings, and NFTS operational maintenance levels (ML) 2-5.

Totals may include slight errors due to rounding.

Table 3.07-5. NFTS road mileage open to the public forestwide – total mileage of proposed mixed use by alternative (class of vehicle and season of use). Mixed use would occur on existing NFTS roads. Existing NFTS roads where mixed use is proposed or currently allowed would be available for use by all vehicle classes listed in Table 3.07-4

Class of Vehicle	Season of Use	NFTS Mileage Proposed for Mixed Use						
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Change in Class of Vehicles resulting from approval of mixed use [a]	Apr 1 to Sep 15	0.0	5.2	0.0	0.0	5.2	0.0	0.0
	Apr 1 to Dec 1	0.0	54.2	0.0	0.0	54.2	4.4	0.0
	May 1 to Dec 31	0.0	45.2	0.0	0.0	45.2	1.2	0.0
	May 1 to Nov 1	0.0	4.1	0.0	0.0	4.1	2.9	0.0
	Open to All Vehicles Sep 22 to Nov 4, Highway legal vehicles only Nov 5 to Sep 21	0.0	0.0	0.0	0.0	0.0	74.2	0.0
	Open to Highway legal vehicles only May 1 to Sep 21, All Vehicles Sep 22 to Nov 4, Highway legal vehicles only Nov 5 to Dec 31	0.0	0.0	0.0	0.0	0.0	43.3	0.0
	All Year	0.0	132.8	0.0	0.0	132.8	4.8	0.0
	Subtotal	**0.0**	**241.5**	**0.0**	**0.0**	**241.5**	**130.8**	**0.0**
Change in Class of Vehicles resulting from changes in maintenance levels	Apr 1 to Dec 1	0.0	2.5	0.0	0.0	2.5	39.7	0.0
	Apr 1 to Sep 15	0.0	0.0	0.0	0.0	0.0	5.2	0.0
	May 1 to Nov 1	0.0	1.4	0.0	0.0	1.4	1.4	0.0
	May 1 to Dec 31	0.0	75.9	0.0	3.4	153.3	75.6	0.0
	All Year	0.0	77.4	0.0	0.0	0.0	0.0	3.4
	Subtotal	**0.0**	**157.2**	**0.0**	**3.4**	**157.2**	**121.9**	**3.4**
Total Motorized Mileage available for mixed use in Alternative [b]		**0.0**	**398.7**	**0.0**	**3.4**	**398.7**	**252.7**	**3.4**

[a] Mileage proposed for mixed use where such use is currently prohibited

[b] Determined by adding the proposed mixed use mileage and mileage currently available for mixed use (Operational ML 2 on existing NFTS).

Totals may include slight errors due to rounding.

Table 3.07-6. Miles of NFTS routes with a proposed change in the season of use by alternative

Action type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Change in Season of Use [a]	0.0	10.5	0.0	1,312.1	1,396.7	1,369.5	0.0

[a] Change may be positive or negative, depending upon alternative

Table 3.07-7. NFTS Trail mileages open to the public forestwide by alternative

Action type	Class of Vehicle	Season of Use	Mileage Proposed to be Added to NFTS						
			Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorize Trail Additions to the NFTS	Trails Open to High-Clearance 4WD	Apr 1 to Dec 31	0.0	0.0	0.0	0.0	1.1	10.6	0.0
		May 1 to Dec 31	0.0	8.4	0.0	5.5	43.5	12.0	7.5
		May 1 to Sep 15	0.0	0.0	0.0	0.0	0.1	0.0	0.0
		All Year	0.0	15.9	0.0	0.0	0.0	0.0	9.4
	Trails Open to ATVs & Motorcycles	Apr 1 to Dec 31	0.0	0.0	0.0	0.0	0.0	3.8	0.0
		May 1 to Dec 31	0.0	0.9	0.0	2.9	4.7	0.9	0.0
		All Year	0.0	3.4	0.0	0.0	0.0	0.0	3.4
	Trails Open to Motorcycles	Apr 1 to Dec 31	0.0	0.0	0.0	1.1	12.3	11.1	0.0
		May 1 to Dec 31	0.0	9.9	0.0	13.0	13.7	9.9	6.5
		All Year	0.0	16.0	0.0	0.0	0.0	0.0	9.8
	Subtotal Additions to NFTS		**0.0**	**54.5**	**0.0**	**22.5**	**75.4**	**48.3**	**36.6**
Reopening ML 1 Roads to motorized trail use	Trails Open to ATVs & Motorcycles	Apr 1 to Dec 31	0.0	0.0	0.0	0.0	0.0	8.5	0.0
		May 1 to Dec 31	0.0	0.0	0.0	0.0	13.9	0.0	0.0
	Trails Open to Motorcycles	Apr 1 to Dec 31	0.0	0.0	0.0	0.1	0.1	0.1	0.0
		All Year	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Subtotal ML 1 Reopened		**0.0**	**0.0**	**0.0**	**0.1**	**14.0**	**8.6**	**0.1**
Total Additions to the NFTS			**0.0**	**54.5**	**0.0**	**22.6**	**89.4**	**56.9**	**36.7**
Total Trail Mileage Available			**328.2**	**382.7**	**328.2**	**350.9**	**417.6**	**385.1**	**365.0**

Totals may include slight errors due to rounding.

Table 3.07-8. NFTS Trail mileages open for public use forestwide by alternative by degree of difficulty

Class of Vehicle	Action type	Degree of Difficulty	Mileage Proposed to be Added to NFTS						
			Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Trails Open to High-clearance 4WD	Trail Additions to the NFTS	Easy	0.0	8.1	0.0	2.8	19.0	5.5	5.0
		Moderate		13.3		2.3	22.2	14.4	9.6
		Difficult		1.5		0.3	2.1	1.5	1.3
		Ext. Difficult		1.3		0.1	1.3	1.2	0.9
High-clearance 4WD Additions to NFTS			**0.0**	**24.3**	**0.0**	**5.6**	**44.7**	**22.5**	**16.9**
Trails Open to ATVs & Motorcycles	Trail Additions to the NFTS	Easy	0.0	4.4	0.0	2.9	4.8	4.8	3.4
		Moderate		0.0		0.0	0.0	0.0	0.0
		Difficult		0.0		0.0	0.0	0.0	0.0
		Ext. Difficult		0.0		0.0	0.0	0.0	0.0
	Reopening ML 1 Roads to motorized trail use	Easy	0.0	0.0	0.0	0.0	13.9	8.5	0.0
		Moderate					0.0	0.0	
		Difficult					0.0	0.0	
		Ext. Difficult					0.0	0.0	
ATV and Motorcycle Additions to NFTS			**0.0**	**4.4**	**0.0**	**2.9**	**18.7**	**13.3**	**3.4**
Trails Open to Motorcycles	Trail Additions to the NFTS	Easy	0.0	4.8	0.0	1.1	4.8	3.8	1.0
		Moderate		18.8		13.0	18.8	17.1	13.0
		Difficult		0.0		0.0	0.0	0.0	0.0
		Ext. Difficult		2.4		0.0	2.4	0.0	2.4
	Reopening ML1 Roads to motorized trail use	Easy	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		Moderate				0.1	0.1	0.1	0.1
		Difficult				0.0	0.0	0.0	0.0
		Ext. Difficult				0.0	0.0	0.0	0.0
Motorcycle Additions to NFTS			**0.0**	**25.9**	**0.0**	**14.2**	**26.1**	**21.0**	**16.5**
Total Additions to the NFTS			**0.0**	**54.6**	**0.0**	**22.7**	**89.5**	**56.8**	**36.8**

Totals may include slight errors due to rounding.

Table 3.07-9. "Open Area" acreage forestwide by alternative by vehicle class

Vehicle Class	Season of Use	Acreage Proposed to be Added to NFTS						
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Open to All Vehicles	**All year**	**754,066**	**2,649**	**0**	**0**	**0**	**0**	**0**
Total Open to Highway-legal Use	**All year**	**754,066**	**2,649**	**0**	**0**	**0**	**0**	**0**
	May 1 – December 31	**0**	**0**	**0**	**0**	**0**	**244**	**0**
Total Acreage in Alternative		**754,066[a]**	**2,649**	**0**	**0**	**0**	**244**	**0**

[a] "Open Area" acreage under Alternative 1 is open to both highway-legal and non-highway-legal use.

Measurement Indicator 4: Type of motorized access to dispersed recreation

Description: This measurement indicator looks at the impact of proposed changes to the NFTS to motorized access to dispersed recreation opportunities by alternative.

Quality of Road/Trail/Dispersed Recreation Experience: The number of proposed facilities (proposed road and trail additions and reopened ML 1 roads) that provide access to dispersed recreation sites were used for this indicator and is used to determine the number of dispersed sites accessed. One site per proposed road addition or reopened ML 1 road was used as a proxy. However, in some instances multiple sites are accessed via a single route addition.

The Tahoe NF has identified proposed road and trail additions that provide access to dispersed camping sites in each alternative. The number of dispersed recreation sites shown in Table 3.07-10 below represents the minimum number of dispersed recreation sites potentially accessed in each alternative.

Table 3.07-10. Number of dispersed recreation sites accessed by routes proposed for addition to the NFTS, or ML 1 roads reopened to motorized use under each alternative

Action type	Class of Vehicle	Number of Dispersed Sites Accessed						
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Additions to the NFTS	Roads Open to All Vehicles	N/A[a]	114	0	85	112	346	0
	Trails Open to High-Clearance 4WD	N/A[a]	62	0	18	64	80	23
	Trails Open to ATVs & Motorcycles	N/A[a]	2	0	1	2	2	2
	Trails Open to Motorcycles	N/A[a]	4	0	3	5	4	2
Reopening ML 1 roads to motorized use as roads or trails	Roads Open to All Vehicles	N/A[a]	0	0	0	3	3	1
	Trails Open to ATVs & Motorcycles	N/A[a]	0	0	0	1	1	0
	Trails Open to Motorcycles	N/A[a]	0	0	0	1	1	1
Total Sites Accessed in Alternative		**N/A[a]**	**182**	**0**	**107**	**188**	**437**	**29**

[a] Under Alternative 1, access to dispersed recreation sites would continue. The number of sites accessed is difficult to determine. With continued cross country motorized travel under Alternative 1, access to dispersed recreation sites would be available on lands open to cross country motorized travel. See Table 3.07-7 for "Open Area" acreage available under Alternative 1.

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

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

Method: Table 3.07-11 shows the number of miles of routes proposed for addition to the NFTS and ML 1 roads proposed for reopening within ½ mile of populated areas, neighboring federal land boundaries, wilderness boundaries, and private land boundaries. These miles act as a surrogate to indicate possible conflict between NFTS users and other land owners may occur by alternative. This method was determined through a literature review of sound studies and reports (Martin, et al. 2005, Ouren, et al. 2007, and Turina, et al. 2006).

Table 3.07-11. Number of miles of routes proposed for addition to the NFTS under each alternative within ½ mile of neighboring private and federal lands (includes roads and trails)

	Mileage Proposed to be Added to the NFTS						
	Alt 1	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Route Additions to the NFTS	0.0	33.7	0.0	13.8	43.6	36.8	19.1
Reopening ML 1 Roads to motorized use	0.0	0.0	0.0	0.0	19.7	1.7	0.0
Route Addition Subtotal	**0.0**	**33.7**	**0.0**	**13.8**	**63.3**	**38.5**	**19.1**
Total Mileage in Alternative – including NFTS	**2,317.0[a]**	**1,418.0**	**1,384.0**	**1,398.0**	**1,447.0**	**1,422.0**	**1,403.0**
Percent Change	0%	2%	0%	1%	4%	3%	1%

[a] For Alternative 1, Total Mileage in alternative includes the existing NFTS and the inventoried unauthorized OHV routes within ½ mile of neighboring private and federal lands and wilderness.

Totals may include slight errors due to rounding.

Recreation: Affected Environment

The Tahoe National Forest (TNF) is strategically located between the greater metropolitan areas of Sacramento and Reno linked by Interstate 80. The Forest is less than an hour drive from both cities and the San Francisco Bay Area is about a three-hour drive. The Forest offers high mountain scenery, attractive reservoirs and lakes, beautiful river canyons, and a wide range of campgrounds and trails for Forest visitors.

The combination of proximity to urban areas and attractive recreation opportunities results in high visitation levels. Over the years the TNF has ranked nationally in the top twenty of total Forest visitors. Based on the National Visitor Use Monitoring results, the TNF received an estimated 1,791,300 visits in 2005. Based on this survey, approximately 40 percent of visitors are primarily focused on winter sports, another 25 percent come to hike/walk or fish, and the remaining 35 percent is split between motorized and non-motorized activities (see Tables 3.07-12 and 13).

Recreational Experiences

The Forest offers a diverse range of motorized and non-motorized recreational experiences throughout the year. Motorized recreation involves the use of highway-licensed passenger cars, sport utility vehicles (SUVs), dual-sport motorcycles, off-highway vehicles (OHVs), four-wheel-drive-vehicles (4WDs), all-terrain vehicles (ATVs), dirt bikes, snowmobiles, and motorized boats. Non-motorized recreational activities include hiking, fishing, bicycling, cross country skiing, camping, swimming, horseback riding, hunting, snowshoeing, and backpacking (USDA Forest Service, 2005). Motorized access is the primary form of access to non-motorized recreation activity destinations on the Forest.

The Tahoe NF consists of about 836,000 acres available for public use. Approximately 82,000 acres, or about 10 percent of the Forest, is currently closed to motor vehicle use. Areas closed to motor vehicle use include: research natural areas, Granite Chief Wilderness, the North Fork American River Canyon, an Experimental Forest, the Grouse Ridge Vehicle closure area, and portions of Inventoried Roadless Areas.

Available lands outside of the management areas listed above results in about 733,316 acres of land currently open for cross country motorized travel.

Developed recreation facilities attract a large number of the motorized recreation users. The Forest provides 77 family campgrounds, 12 group campgrounds, 20 picnic grounds, 35 trailheads (this includes OHV trailheads), 16 boating sites, 158 recreation residences, 8 organization camps, and 4 resorts. All of these facilities can support general motor vehicle use and are used as a base for both motorized and non-motorized activities.

Dispersed recreation is outdoor recreation occurring over broad expanses of land or water and accounts for the majority of Forest recreation use. Dispersed recreation opportunities, especially dispersed camping opportunities, are highly valued by Forest visitors. Some dispersed sites have been used by several generations of visitors. Additionally, some dispersed recreation sites have a uniquely identifiable sense of place with vistas and scenery viewing opportunities.

Trails

The existing Forest trail system provides both the trail experience and access to additional dispersed recreational activities. Overall, the Forest trail system is 763 miles in length. That includes 329 miles of motorized trail, broken down by 169 miles for motorcycles only, 26 miles for motorcycles and ATVs, and 134 miles of high clearance 4WD trails for Class II vehicles, ATVs, and motorcycles. The non-motorized trail system includes 434 total miles, with 289 designated for pedestrians, equestrians, and mountain bikes, while an additional 145 has been designated for hikers and equestrians only.

The Forest trail system includes a number of notable segments and areas. For hikers and equestrians, the Pacific Crest Trail follows the Sierra Crest through the middle of the Forest. The non-motorized South Yuba National Recreation Trail follows the South Fork of the Yuba River. The Western States Trail is not only home to the famous Western States 100 run and the 100-mile Tevis Cup equestrian race, but portions provide for challenging motorcycle riding. The Fordyce 4WD trail provides some of the most challenging four-wheeling in the Sierra. Sugar Pine is the closest OHV opportunity for residents in the Sacramento metropolitan area on the TNF. Sugar Pine provides a substantial and diverse trail system for motorcycles and a more limited, moderate opportunity for ATV riders. The Truckee area motorized trails provide a flatter, more open vegetation experience largely for motorcycles and 4WD operators. The Burlington Ridge motorcycle trail system provides a moderate amount of tight singletrack trails winding through the trees, especially popular with local riders. The northern portion of the Yuba River Ranger District provides a difficult/extremely difficult singletrack motorcycle riding network in a remote, high-elevation setting, a rare opportunity in northern California. The Gold Valley area provides some moderate difficulty 4WD and motorcycle opportunities in a remote setting, and includes some excellent dispersed camping opportunities.

Table 3.07-12. Tahoe NF visitor activity participation as reported in NVUM result (2005)

Activity	Percent Participating	Percent as Main Activity
Viewing Natural Features	53.6	5.6
Relaxing	36.6	3.3
Hiking / Walking	32.4	14.6
Downhill Skiing	32.4	29.3
Viewing Wildlife	36.3	0.3
Driving for Pleasure	15.9	2.8
Other Non-motorized	11.1	3.9
Fishing	15.3	10.7
Developed Camping	5.6	1.1
OHV Use	3.9	1.5
Primitive Camping	1.6	0.6
Nature Study	3.7	0.1
Hunting	2.2	1.5
Gathering Forest Products	1.5	0.1
Non-motorized Water	3.1	1.6
Motorized Water Activities	6.2	1.8
Picnicking	9.3	0.6
Cross country Skiing	5.0	3.4
Bicycling	7.7	5.8
Visiting Historic Sites	4.9	0.2
Backpacking	0.7	0.4
Resort Use	1.6	0.2
Snowmobiling	7.6	6.7
Other Motorized Activity	3.3	1.5
Horseback Riding	0.2	0.1
Nature Center Activities	1.9	0.0
Sightseeing	0.0	0.0
No Activity Reported	2.5	2.3
	Total	**100.0**

Totals may include slight errors due to rounding

Travelways

The Yuba Donner National Forest Scenic Byway (YDSB) is a 170-mile motorized loop through three TNF ranger districts. This byway includes California State Highways 49, 89, and 20, Interstate 80, and a portion of old Highway 40 over Donner Pass. On the American River District, the Mosquito Ridge/Foresthill Drive loop showcases the same rich diversity of geology, history, plants, wildlife and rural communities found along the travelways of the rest of the Forest.

Based on the NVUM, there were 1,791,300 visits to NFS lands on the TNF during fiscal year 2005. This would mean that 284,817 visitors spent some time driving for pleasure, 69,861 used off-highway vehicles during their visit, and the primary activity for 26,686 visitors was off-highway vehicle use. Based on the 2005 year visits, when primary motorized uses are combined (including OHV use, driving for pleasure and other motorized activities), approximate visitor numbers equal 103,772. When primary non-motorized uses are combined, (including backpacking, fishing, hiking/walking, horseback riding,

bicycling and other non-motorized activities), approximate visitor numbers equal 635,462 (Table 3.07-13). Visitors seeking a quiet, non-motorized experience often utilize motorized vehicles to access trailheads, facilities, destinations, or geographic areas for non-motorized recreational activities.

Table 3.07-13. Approximate Tahoe NF visitors by type of main activity as reported in NVUM results (2005)

Type of Use	NVUM Categories	Percent as Main Activity	Approximate Visitors in 2005
Camping	Developed Camping Primitive Camping	1.7	30,022
Hunting	Hunting	1.5	26,686
Motorized Uses	OHV use Driving for Pleasure Other Motorized Activity	5.8	103,772
Non-motorized Uses	Backpacking Fishing Hiking/Walking Horseback Riding Bicycling Other Non-Motorized Activities	35.5	635,462
Other Activities	Resort Use Picnicking Viewing Natural Features Visiting Historic Sites Nature Center Activities Nature Study Relaxing Gathering Forest Products Viewing Wildlife	10.4	185,136
Water Sports	Motorized Water Activities Non-motorized Water	3.4	61,712
Winter Sports	Downhill Skiing; Cross country Skiing; Snowmobiling	39.4	707,179

Totals may include slight errors due to rounding

Recreation: Environmental Consequences

Considerations for all alternatives

This section discloses the environmental effects of each of the alternatives on recreation on the Forest. This analysis is focused on the effects of five management actions: (1) the prohibition of cross country motorized travel, (2) additions of unauthorized routes to the National Forest Transportation System (NFTS), (3) Establishment of motorized “Open Areas,” (4) changes to the existing NFTS, and (5) Amendments to the Forest Plan. These 5 management actions have indicators used to compare alternatives. The indicators were previously listed in the Recreation Measurement Indicators section under the Effects Analysis Methodology. Nearly all forest visitors, regardless of the purpose for their visit, use the motorized transportation system to reach their destination. Changes to traditionally accepted

Forest uses, such as cross country motorized travel, alters the diversity of motorized and non-motorized opportunities on the Forest.

Short-term timeframe: 1 year

Long-term timeframe: 20 years.

Spatial boundary: The Forest boundary of 836,000 acres is the unit of spatial analysis.

Rationale: The effects measurement indicators are based on NFMA and Travel Management Rule requirements as well as significant issues raised during internal and public scoping.

Direct and Indirect Effects

Alternative 1 – No Action

Under the No Action Alternative, the existing condition as described in the affected environment section would continue. The Travel Management Rule would not be implemented, and a motor vehicle use map would not be produced. Motor vehicle travel by the public would not be limited to designated routes. Unauthorized routes would continue to proliferate and have no status or authorization as NFTS facilities.

Prohibition of cross country wheeled motorized vehicle travel. Alternative 1 would not prohibit cross country motorized vehicle travel. Most of the cross country travel occurs on open terrain or on non-system routes and may appear to be rough roads, old trails, or old singletrack trails. It is anticipated that cross country motorized travel would continue, and probably increase throughout the Forest. This would occur immediately adjacent to known popular motorized areas, especially in areas of gentler terrain. Although consistent with LRMP guidance for ROS, cross country motorized travel may affect ROS class settings in the short and long term. Motorized use could inadvertently spread to non-motorized areas, changing areas with non-motorized ROS class settings, such as semi-primitive non-motorized, to ROS classes with motorized settings such as semi-primitive motorized, roaded natural, or rural (refer to Table 3.07-2).

The short-term and long-term effects of cross country motorized travel include the increased potential for conflicts with users seeking a “quiet” recreation experience, as well as increasing dust and noise on neighboring private and federal lands. Under Alternative 1, at least 4.6 percent of the Forest (area of potential effects) would be affected by the dust, odors, and noise typically associated with the motorized use of the inventoried unauthorized routes and cross country motorized travel (refer to Table 3.07-3). In the long term, visitors seeking a “quiet” recreation experience would likely be displaced to the Granite Chief Wilderness, other currently designated non-motorized areas (e.g. Grouse Ridge), or higher elevations of the Forest where steep topography naturally restricts cross country motorized travel. For the impacts of motorized use on Inventoried Roadless Area qualities, see the Inventoried Roadless Areas and Special Areas (Section 3.09) of the document.

Dispersed recreation is defined as outdoor recreation occurring over broad expanses of land or water and accounts for the majority of Forest recreation use. Access to dispersed recreation sites occurs on both the existing NFTS and unauthorized motorized routes. In Alternative 1, in both the short and long term, no change in motorized access to dispersed recreation activities would occur.

Under the No Action Alternative, motorized recreation opportunities on about 1,698 miles of unauthorized and/or closed routes would continue, and about 733,316 acres would continue to allow for unrestricted cross country motorized travel. The "Open Area" acreage and unauthorized motorized routes would not experience any changes or use restrictions. No net change in motorized recreation opportunities would occur, and as a result there would be no short or long term direct or indirect effects from any proposed new actions to motorized recreation opportunities.

Indicators referenced:

- **Measurement Indicator 1**: Consistency with LRMP
- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Adding facilities (presently unauthorized roads and trails) to the NFTS. No additions to the existing NFTS would be made under Alternative 1. No direct or indirect effects would result, as no change would be made from the current management situation.

Indicators referenced:

- **Measurement Indicator 3**: Motorized recreation opportunity

Establish motorized "Open Areas." No changes to the NFTS in regards to the establishment of motorized "Open Areas" would be made under this alternative. No direct or indirect effects would result, as no change would be made from the current management situation.

Indicators referenced:

- **Measurement Indicator 3**: Motorized recreation opportunity

Changes to the existing NFTS [changing the vehicle class, season of use, and reopening ML 1 roads]. No changes to the NFTS in regard to mixed use, maintenance level, or season of use would be made under this alternative. No Maintenance Level 1 (ML 1) roads are proposed to be reopened under Alternative 1, and no associated motorized access to dispersed recreation sites would be designated under this alternative (see Table 3.07-10). No direct or indirect effects would result, as no change would be made from the current management situation.

Indicators referenced:

- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation

Amending the Forest Plan. No changes to the Forest Plan would be made under this alternative. No direct or indirect effects would result, as no change would be made from the current management situation.

Indicators referenced:

- **Measurement Indicator 1**: Consistency with LRMP

Alternative 2 – Increased Motorized Recreation and Access Opportunities

Alternative 2 responds to the issue raised by the public during scoping of insufficient public motorized opportunities and motorized access for dispersed recreation in the Proposed Action. This alternative prohibits cross country travel, adds about 5 miles of road and 55 miles of motorized trail to the NFTS, establishes 2,649 acres (3 large reservoir areas and 1 play area) as motorized "Open Areas," allows 399 miles of mixed use, makes minor changes to route seasons of use, provides for motorized access to 182 dispersed sites, and makes one amendment to the Forest Plan.

Prohibition of cross country wheeled motorized vehicle travel. Under Alternative 2, cross country motorized vehicle travel would be prohibited. The prohibition of wheeled motor vehicle use off the NFTS would have a beneficial effect on non-motorized recreation opportunities and would reduce negative impacts to populated areas and neighboring lands of various ownerships in the short and long terms by reducing noise, dust and physical presence of motorized vehicles. Prohibiting cross country motorized travel would also curtail on-going negative effects to visitors and NFS lands from motorized vehicles such as noise, dust and physical presence in the short and long terms.

Compared to Alternative 1, prohibiting cross country motorized vehicle travel in Alternative 2 would result in a net loss of acreage available for motorized recreation. This prohibition of cross country travel will concentrate motorized use on designated roads and trails. The concentration of use resulting from prohibiting cross country travel in the action alternatives will outweigh any similar effects produced by differences between the action alternatives. This concentration of use is expected to increase the density of riders/drivers per mile of route, potentially changing the motorized experience on the Tahoe National Forest. Most OHV enthusiasts are expected to continue to return to the areas they currently visit, but will alter their expectations (and riding styles) to account for the increased density. Rider/driver adjustments may include changing the time or day of visit, adapting a more defensive riding style (slower speeds, more attentive to oncoming traffic), and improved riding etiquette (use of hand signals). A small percentage of users may be displaced to different areas on the TNF, or adjacent riding areas. The cross country prohibition would also reduce motorized access to dispersed recreation activities. However, this alternative establishes the greatest number of "Open Area" of any alternative (see "Open Area" effects below). Although motorized recreation opportunities on NFS lands would be greatly reduced, other motorized recreation opportunities would be available and the miles of NFTS would be increased.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Adding facilities (presently unauthorized roads and trails) to the NFTS. Adding unauthorized roads and trails may negatively affect (short and long term) non-motorized opportunities due to an increase in noise, dust, physical presence, possible use conflicts and displacement. Under Alternative 2, an additional 0.3 percent of the Forest would be affected by the dust, odors, and noise typically associated with the proposed route and area additions. Alternative 2 would also include two road additions that would cross the non-motorized Pacific Crest Trail, requiring the installation of vehicle barriers to prevent motorized use on the PCT. When compared to the other alternatives, the proposed route additions under this alternative would tie for the fourth highest impact on the Forest's "quiet" recreation opportunities (see Table 3.07-3). Alternative 2 proposes 33.7 miles of road and trail additions within ½ mile of neighboring lands, potentially having the fourth greatest noise, dust, and physical presence impacts on neighboring private and federal lands when compared to the other alternatives (see Table 3.07-11). Motorized roads, trails, and areas would be administratively defined and published on a motor vehicle use map (MVUM). Recreationists would be able to better plan recreational pursuits based on an individual's unique expectations. As a result, the frequency of user conflicts between non-motorized and motorized recreation users would likely decrease in the short and long terms.

Alternative 2 would provide the third highest amount of both road (5.0 miles) and motorized trail (54.6 miles) additions to the NFTS, presenting a beneficial effect on motorized recreation opportunities for a diversity of vehicle classes and access to dispersed recreation. Most (3.7 miles) of the road additions would be Open to All Vehicles year-round, or until snow prohibits access. The remaining 1.1 miles would be spread over three seasons varying from seven to nine months in length based on LRMP designations for the areas where these roads are added (see Table 3.07-4). A majority (35.3 miles) of the motorized trail additions would be open year-round, with 15.9 miles open to high-clearance 4WD, 3.4 miles open to ATVs and motorcycles, and 16.0 miles open to motorcycles. The remaining 19.2 miles would be open from May 1 to December 31 with 8.4 miles open to high-clearance 4WD, 0.9 miles open to ATVs and motorcycles, and 9.9 miles open to motorcycles (see Table 3.07-7).

Adding presently unauthorized roads and trails to the NFTS would have a beneficial effect on motorized opportunities by providing additional miles of recreation opportunities. The proposed trail additions in Alternative 2 contribute to a variety of experiences with easy-to-extremely difficult riding/driving experiences, especially for 4WD and motorcycle operators (see Table 3.07-8). The proposed route additions also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities, providing beneficial effects to motorized recreation opportunities. The season of use restrictions on proposed road and trail additions may have a negative effect in the short and long terms to motorized opportunities by reducing mileage of motorized opportunity during the closure and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure. As shown in Table 3.07-10, Alternative 2 provides motorized access to a total of 182 dispersed recreation sites, providing a beneficial effect to motorized recreation opportunities. Alternative 2 provides the fourth most motorized access to dispersed recreation sites when compared to the other alternatives.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Establish motorized "Open Areas." Alternative 2 proposes 4 motorized "Open Areas" consisting of 3 large reservoir areas at Stampede/ Prosser/Boca and 1 play area at Greenhorn, totaling 2,649 acres, for cross country motorized travel year-round (see Table 3.07-9). Establishment of presently unauthorized "Open Areas" may have a negative effect in both short and long term context for non-motorized opportunities due to an increase in noise, dust, physical presence, possible use conflicts and displacement. These "Open Areas" within ½ mile of neighboring private and federal lands, may also contribute to this alternative potentially having the fourth greatest noise, dust, and physical presence impacts on neighboring private and federal lands when compared to the other alternatives (see Table 3.07-3). This impact would be higher in the Greenhorn areas because of concerns from adjacent landowners, as opposed to the lands around the reservoirs that are largely managed by the Forest Service. In the reservoir areas, a likely indirect effect of the "Open Area" designation would be to spread the participation in numerous non-motorized sports including picnicking, swimming, and dog walking around the shoreline rather than concentrating those impacts at the terminus of routes leading to the water.

This is the only alternative to establish "Open Area" opportunities for operators of non-highway legal vehicles, and the greater of two alternatives to include "Open Area" opportunities to Open to Highway-legal use, providing a beneficial effect on motorized recreation opportunities for a diversity of vehicle classes and access to dispersed recreation beyond the existing Prosser Pits. Just north of Truckee, the Boca, Prosser, and Stampede reservoirs would provide 2,589 acres of motorized opportunity along the shoreline, below the high water mark, for access to camping, boating, and day-use activities. The Greenhorn area would provide 60 acres of "Open Area" opportunity in a hydraulically mined area just outside of Nevada City that is especially popular with local 4WD drivers.

Establishing "Open Areas" would have a beneficial effect on motorized opportunities and would contribute to a variety of motorized experiences found on the TNF. A possible indirect effect would be to decrease the density of users in the existing Prosser Pits OHV Open Area. In addition, these four "Open Areas" would serve as quasi-dispersed sites themselves accentuating the 182 dispersed sites proposed to be added in this alternative, contributing to Alternative 2 ranking as the fourth greatest alternative in regard to motorized access to dispersed recreation sites when compared to the other alternatives. Compared to the other alternatives, Alternative 2 would establish more acres of "Open Area" opportunities than any alternative (except Alternative 1 which would allow cross country travel).

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity

- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Changes to the existing NFTS [changing the vehicle class, season of use, and reopening ML 1 roads]. Proposals to change the vehicle class of NFTS routes to provide more mixed use would benefit motorized recreation by increasing the diversity of motorized opportunities (and looping opportunities). Changes in vehicle class that restrict motor vehicle types on NFTS routes would negatively affect motorized recreation diversity. A change in maintenance level through downgrading would increase the diversity of motorized opportunities (and looping opportunities); upgrading the road class would decrease the diversity of the motorized opportunities.

Alternative 2 proposes mixed use on about 398.7 miles of NFTS roads (refer to Table 3.07-5). Alternatives 2 and 5 are the alternatives that provide the most mixed use. Mixed use on NFTS roads would benefit motorized recreation by increasing the diversity of motorized opportunities. The proposed changes to the NFTS also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities for non-highway-legal vehicle operators, providing beneficial effects to motorized recreation opportunities. However, the authorization of mixed use on the NFTS could increase the likelihood that adjacent private lands would experience intrusion by and impacts from OHVs, an impact to the affected landowners who may currently experience high levels of trespass from unauthorized OHV use.

Season of use restrictions on proposed road and trail additions and changes in Maintenance Level may have a negative effect in the short and long terms to motorized opportunities by reducing mileage of motorized opportunity during the closure and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure**.** In Alternative 2, 10.5 miles of deer winter range seasonal restrictions are lifted (see Table 3.07-6), providing beneficial effects to motorized recreation opportunities in the Management Area 84 (Humbug-Sailor), requiring a Forest Plan amendment. This lifting of these restrictions would be especially beneficial to Sacramento-area riders who could access the Sugar Pine area quickly, during the winter season when the supply of regional motorized opportunities is greatly reduced due to deep snow.

No Maintenance Level 1 roads are proposed to be reopened under this alternative (see Tables 3.07-4 and 7). Dispersed recreation sites associated with reopening ML 1 roads would not be accessible to motorized use under Alternative 2 (refer to Table 3.07-10). No direct or indirect access effects would result, as no change would be made from the current management situation.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation

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

Amending the Forest Plan. Adding unauthorized roads and trails to the NFTS would be consistent with the ROS as allocated in the LRMP. All routes proposed for addition to the NFTS comply with the ROS class in the associated management area. All proposed route additions under this alternative would be located in semi-primitive motorized, roaded natural, or rural ROS classes. However, in regard to a change in season of use (see previous section), the lifting of the deer winter range seasonal restrictions would require a Forest Plan amendment to remove the November 1 to May 1 seasonal closure in the Sugar Pine area (Management Area 84, Humbug Sailor)(see Table 3.07-1).

Indicators referenced:

- **Measurement Indicator 1**: Consistency with LRMP

Alternative 3 – Cross country Travel Prohibition Only – No Changes to the Existing NFTS

Alternative 3 would prohibit cross country motorized travel and proposes no new additions or changes to the existing NFTS roads and trails. This alternative also provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS. None of the unauthorized roads, trails, or areas would be added to the NFTS. Alternative 3 responds to the issues of quiet recreation, and potential adverse impacts associated with motorized roads and trails. This alternative does not change mixed use areas and does not provide motorized access to any additional dispersed sites beyond the areas accessed by the existing NFTS. This alternative makes no amendments to the Forest Plan.

Prohibition of cross country wheeled motorized vehicle travel. Alternative 3 would prohibit cross country motorized travel with motorized recreation restricted to existing NFTS roads and trails. The prohibition of wheeled motor vehicle use off the NFTS would have a beneficial effect on non-motorized recreation opportunities and would reduce negative impacts to populated areas and neighboring lands of various ownerships in the short and long terms by reducing noise, dust and physical presence of motorized vehicles. Prohibiting cross country motorized travel would also curtail on-going negative effects from motorized vehicles such as noise, dust, and physical presence in the short and long terms.

Compared to Alternative 1, prohibiting cross country motorized vehicle travel in Alternative 3 would result in a loss of acreage available for motorized recreation. Alternative 3 would provide no opportunities for cross country motorized travel, resulting in a negative impact on motorized recreation opportunities. This prohibition of cross country travel will concentrate motorized use on designated roads and trails. The concentration of use resulting from prohibiting cross country travel in the action alternatives will outweigh any similar effects produced by differences between the action alternatives. This concentration of use is expected to increase the density of riders/drivers per mile of route, potentially changing the motorized experience on the Tahoe National Forest. Most OHV enthusiasts are expected to continue to return to the areas they currently visit, but will alter their expectations (and riding styles) to account for the increased density. Rider/driver adjustments may include changing the time or day of visit, adapting a more defensive riding style (slower speeds, more attentive to oncoming traffic), and improved riding

etiquette (use of hand signals). A small percentage of users may be displaced to different areas on the TNF, or adjacent riding areas. The cross country prohibition would also reduce looping opportunities and motorized access to dispersed recreation activities. Alternative 3 represents the current condition except for prohibiting cross country motorized travel. Motorized use would no longer occur on unauthorized routes and all currently unauthorized routes would naturally rehabilitate. Although motorized recreation opportunities on open acreage would not be provided, other motorized recreation opportunities would be available.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Adding facilities (presently unauthorized roads and trails) to the NFTS. No additions to the NFTS would be made under Alternative 3. No direct effects would result, as no change would be made from the current management situation. When compared to the other alternatives, this alternative provides the most "quiet" recreation opportunities (see Table 3.07-3) and provides the least risk of possible impact to neighboring private and Federals lands and wilderness areas in the short and long terms (see Table 3.07-11). Production of a motor vehicle use map (MVUM) would allow recreationists to better plan recreational pursuits. As a result, the frequency of user conflicts between non-motorized and motorized recreation users would likely decrease in the short and long terms.

Alternative 3 would provide an identical number of miles of designated motorized opportunity (existing NFTS) as the current condition (Alternative 1), and provides the least amount of motorized recreation opportunities when compared to the other action alternatives (see Tables 3.07-4 and 7). Dispersed recreation sites associated with additions to the NFTS would not be accessible to motorized use under Alternative 3 (refer to Table 3.07-10). Alternative 3 provides the least amount of motorized access to dispersed recreation sites of any alternative. Additionally, some dispersed sites with vistas and scenic viewing opportunities may no longer be easily accessible. An indirect effect would be a reduction in opportunities to combine roads and trails to make larger loops. Compared to all alternatives, Alternative 3 provides the least opportunities for motorized use and looping opportunities.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Establish motorized "Open Areas." Alternative 3 does not propose the establishment of new "Open Areas" (refer to Table 3.07-9). No direct effects would result, as no change would be made from the current management situation. However, a possible indirect effect would be to increase the density of users in the existing Prosser Pits OHV "Open Area." Compared to the other alternatives, Alternative 3 would provide fewer acres of designated "Open Area" opportunities than Alternatives 2 and 6, and an equal amount as Alternatives 1, 4, 5, and 7.

Indicators referenced:

- **Measurement Indicator 3**: Motorized recreation opportunity

Changes to the existing NFTS [changing the vehicle class, season of use, and reopening ML 1 roads]. No changes to the NFTS in regard to mixed use, maintenance level, or season of use would be made under Alternative 3. No Maintenance Level 1 roads are proposed to be reopened under this alternative (see Tables 3.07-4 and 7). Dispersed recreation sites associated with reopening ML 1 roads would not be accessible to motorized use under Alternative 3 (refer to Table 3.07-10). No direct or indirect access effects would result, as no change would be made from the current management situation.

Indicators referenced:

- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation

Amending the Forest Plan. No changes to the Forest Plan would be made under Alternative 3. No direct or indirect effect would result, as no change would be made from the current management situation.

Indicators referenced:

- **Measurement Indicator 1**: Consistency with LRMP

Alternative 4 – Increased Resource Protection

Alternative 4 prohibits cross country motorized travel and adds fewer routes to the NFTS than the Proposed Action. This alternative responds to the concerns of quiet recreation use, and natural resource impacts. This alternative prohibits cross country travel, adds about 4 miles of road and 23 miles of motorized trail to the NFTS, establishes no new acres as motorized "Open Areas," allows 3 miles of mixed use, makes 1,312 miles of changes in seasons of use, and provides for motorized access to 107 dispersed sites. This alternative makes no amendments to the Forest Plan.

Prohibition of cross country wheeled motorized vehicle travel. Under Alternative 4, cross country motorized vehicle travel would be prohibited. The prohibition of wheeled motor vehicle use off the NFTS would have a beneficial effect on non-motorized recreation opportunities and would reduce negative impacts to populated areas and neighboring lands of various ownerships in the short and long terms by reducing noise, dust and physical presence of motorized vehicles. Prohibiting cross country motorized travel would also curtail on-going negative effects from motorized vehicles such as noise, dust and physical presence in the short and long terms.

Compared to Alternative 1, prohibiting cross country motorized vehicle travel in Alternative 4 would result in a net loss of acreage available for motorized recreation. Alternative 4 would provide no opportunities for cross country motorized travel, resulting in a negative impact on motorized recreation opportunities. This prohibition of cross country travel will concentrate motorized use on designated roads and trails. The concentration of use resulting from prohibiting cross country travel in the action alternatives will outweigh any similar effects produced by differences between the action alternatives. This concentration of use is expected to increase the density of riders/drivers per mile of route, potentially changing the motorized experience on the Tahoe National Forest. Most OHV enthusiasts are expected to continue to return to the areas they currently visit, but will alter their expectations (and riding styles) to account for the increased density. Rider/driver adjustments may include changing the time or day of visit, adapting a more defensive riding style (slower speeds, more attentive to oncoming traffic), and improved riding etiquette (use of hand signals). A small percentage of users may be displaced to different areas on the TNF, or adjacent riding areas. The cross country prohibition would also reduce motorized access to dispersed recreation activities. The loss of available open acreage is somewhat offset, however, by the proposed addition of motorized routes to the NFTS. Although motorized recreation opportunities on open acreage would not be provided, other motorized recreation opportunities would be available and the NFTS would be increased.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Adding facilities (presently unauthorized roads and trails) to the NFTS. Adding unauthorized roads and trails may have a negative effect on (short and long term) non-motorized opportunities due to increases in noise, dust, physical presence, possible use conflicts and displacement. Under Alternative 4, about 0.1 percent of the Forest would be affected by the dust, odors, and noise typically associated with the proposed route additions. When compared to the other alternatives, the proposed route additions under Alternative 4 would have less impact on the Forest's "quiet" recreation opportunities than Alternatives 1, 2, 5, 6, and 7 and slightly more impact on the Forest's "quiet" recreation opportunities than Alternative 3 (see Table 3.07-3). Alternative 4 proposes 13.8 miles of road and trail route additions within ½ mile of neighboring private and federal lands, potentially increasing noise, dust, and physical presence impacts on neighboring private and federal lands. When compared to the other alternatives, Alternative 4 would have less impact on neighboring lands than Alternatives 1, 2, 5, 6 and 7 and more impact than Alternative 3 (see Table 3.07-11). Production of a motor vehicle use map (MVUM) would allow recreationists to better plan recreational pursuits. As a result, the frequency of user conflicts between non-motorized and motorized recreation users would likely decrease in the short and long terms.

Compared to the other alternatives, Alternative 4 would provide the fourth largest amount of road additions (3.7 miles) to the NFTS. Alternative 4 would add more miles of road than Alternative 7, but less than Alternatives 2, 5, and 6 (see Table 3.07-4). Alternative 4 would provide the third least amount of motorized trail (22.5 miles) additions to the NFTS. Alternatives 1 and 3 would not add any roads or trails to the system (see Table 3.07-7). These additions beneficially affect motorized recreation opportunities for a diversity of vehicle classes. All (3.7 miles) of the road additions would be Open to All Vehicles seasonally, with most of the mileage open May 1 to December 31, but 0.2 miles would be open May 1 to November 1. Most (21.4 miles) of the motorized trail additions would be open from May 1 to December 31, with the remaining 1.2 miles open April 1 to December 31. Of the 22.6 miles of total trail additions, 5.6 miles would be open to high-clearance 4WD, 2.9 miles would be open to ATVs and motorcycles, and 14.1 miles would be open to motorcycles.

Adding unauthorized roads and trails to the NFTS would have a beneficial effect on motorized opportunities by providing additional miles of recreation opportunities. The proposed trail additions in Alternative 4 contribute to a variety of experiences with easy-to-extremely difficult riding/driving experiences, especially for 4WD operators (see Table 3.07-8). The proposed route additions also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities, providing beneficial effects to motorized recreation opportunities. The season of use restrictions on proposed road and trail additions may have a negative effect in the short and long terms to motorized opportunities by reducing mileage of motorized opportunity during the closure and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure. As shown in Table 3.07-10, Alternative 4 provides motorized access to a total of 107 dispersed recreation sites, providing a beneficial effect to motorized recreation opportunities. When compared to the other alternatives, Alternative 4 provides less motorized access to dispersed recreation than Alternatives 1, 2, 5, and 6, but more motorized access than Alternatives 3 and 7.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Establish motorized "Open Areas." Alternative 4 does not propose the establishment of any new "Open Areas" to the NFTS (refer to Table 3.07-9). No direct effects would result, as no change would be made from the current management situation. However, a possible indirect effect would be to increase the density of users in the existing Prosser Pits OHV "Open Area." Compared to the other alternatives, Alternative 4 would provide fewer acres of "Open Area" motorized recreation opportunities than Alternatives 2 and 6, and an equal amount as Alternatives 1, 3, 5, and 7.

Indicators referenced:

- **Measurement Indicator 3**: Motorized recreation opportunity

Changes to the existing NFTS [changing the vehicle class, season of use, and reopening ML 1 roads]. Proposals to change the vehicle class of NFTS routes to provide more mixed use would benefit motorized recreation by increasing the diversity of motorized opportunities (and looping opportunities). Changes in vehicle class that restrict motor vehicle types on NFTS routes would negatively affect motorized recreation diversity. A change in maintenance level through downgrading would increase the diversity of motorized opportunities (and looping opportunities); upgrading the road class would decrease the diversity of the motorized opportunities.

Alternative 4 proposes mixed use on about 3.4 miles of NFTS roads (see Table 3.07-5). Alternatives 4 and 7 are tied for the third largest amount of mixed use of any alternative. Mixed use on NFTS roads would benefit motorized recreation by increasing the diversity of motorized opportunities. The proposed changes to the NFTS also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities for non-highway-legal vehicle operators, providing beneficial effects to motorized recreation opportunities. However, the authorization of mixed use on the NFTS could increase the likelihood that adjacent private lands would experience intrusion by and impacts from OHVs, an impact to the affected landowners who may experience high levels of trespass from unauthorized OHV use. Although Alternative 4 would provide less motorized recreation opportunity through mixed use when compared to Alternatives 1, 2, 5, and 6, it provides more motorized recreation opportunity on existing NFTS roads through mixed use when compared to Alternative 3, and equal to Alternative 7.

Season of use restrictions on proposed road and trail additions and changes in Maintenance Level may have a negative effect in the short and long terms to motorized opportunities by reducing mileage of motorized opportunity during the closure and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure**.** In Alternative 4, 1,312.1 miles of wet weather seasonal restrictions are added to minimize erosion and protect water quality (see Table 3.07-6), closing motorized opportunities from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails. In regard to season of use motorized opportunities, Alternative 4 has fewer miles of seasonal closure than Alternatives 5 and 6, but has more seasonal closures than Alternatives 1, 2, 3, and 7.

In Alternative 4, 0.1 miles of ML 1 road would be reopened as a motorcycle trail with a season of use of April 1 to December 31 (see Table 3.07-7). The season of use restriction on the proposed reopening of this ML 1 road to a motorized trail may have a minor negative effect in the short and long terms to motorized opportunities by reducing mileage of motorized opportunity during the closure and a minor beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure. Alternative 4 would reopen a total of 0.1 miles of ML 1, slightly more than Alternatives 1, 2 and 3, and less than Alternatives 5, 6, and 7. No motorized access to associated dispersed

recreation would be designated under this alternative (see Table 3.07-10). No direct or indirect access effects would result, as no change would be made from the current management situation.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Amending the Forest Plan. No changes to the Forest Plan would be made under Alternative 4. No direct or indirect effect would result, as no change would be made from the current management situation.

Indicators referenced:

- **Measurement Indicator 1**: Consistency with LRMP

Alternative 5 – Increased Motorized Recreation Access plus Reopening Maintenance Level 1 and Temporary Roads

Alternative 5 was developed to address the issue of providing sufficient wheeled motorized public access to TNF lands as well as public concerns about reduced motorized recreation opportunities. This alternative prohibits cross country travel, adds about 5 miles of road and 75 miles of motorized trail to the NFTS, establishes no new acres as motorized "Open Areas," allows 399 miles of mixed use, makes 1,397 miles of changes in season of use, provides for motorized access to 188 dispersed sites, and makes one amendment to the Forest Plan.

Prohibition of cross country wheeled motorized vehicle travel. Under Alternative 5, cross country motorized vehicle travel would be prohibited. The prohibition of wheeled motor vehicle use off the NFTS would have a beneficial effect on non-motorized recreation opportunities and would reduce negative impacts to populated areas and neighboring lands of various ownerships in the short and long terms by reducing noise, dust and physical presence of motorized vehicles. Prohibiting cross country motorized travel would also curtail on-going negative effects from motorized vehicles such as noise, dust and physical presence in the short and long terms.

Compared to Alternative 1, prohibiting cross country motorized vehicle travel in Alternative 5 would result in a net loss of acreage available for motorized recreation. Alternative 5 would provide no opportunities for cross country motorized travel, resulting in a negative impact on motorized recreation opportunities. This prohibition of cross country travel will concentrate motorized use on designated roads and trails. The concentration of use resulting from prohibiting cross country travel in the action alternatives will outweigh any similar effects produced by differences between the action alternatives. This concentration of use is expected to increase the density of riders/drivers per mile of route, potentially changing the motorized experience on the Tahoe National Forest. Most OHV enthusiasts are expected to continue to return to the areas they currently visit, but will alter their expectations (and riding styles) to

account for the increased density. Rider/driver adjustments may include changing the time or day of visit, adapting a more defensive riding style (slower speeds, more attentive to oncoming traffic), and improved riding etiquette (use of hand signals). A small percentage of users may be displaced to different areas on the TNF, or adjacent riding areas. The cross country prohibition would also reduce motorized access to dispersed recreation activities. The loss of available open acreage is somewhat offset, however, by the proposed addition of motorized routes to the NFTS. Although motorized recreation opportunities on open acreage would not be provided, other motorized recreation opportunities would be available and the NFTS would be increased.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Adding facilities (presently unauthorized roads and trails) to the NFTS. Adding unauthorized roads and trails may have a negative effect (short and long term) on non-motorized opportunities due to an increase in noise, dust, physical presence, possible use conflicts and displacement. Under Alternative 5, an additional 0.4 percent of the Forest acreage would be affected by the dust, odors, and noise associated with the proposed route additions. Alternative 5 would also include two road additions that would cross the non-motorized Pacific Crest Trail, requiring the installation of vehicle barriers to prevent motorized use on the PCT. When compared to the other alternatives, the proposed route additions under Alternative 5 would have the second most impact on the Forest's "quiet" recreation opportunities of any alternative, behind Alternative 1 (see Table 3.07-3). Alternative 5 proposes 63.3 miles of road and trail route additions within ½ mile of neighboring lands, potentially having some noise, dust, and physical presence impacts on neighboring private and federal lands. When compared to the other alternatives, Alternative 5 would have the largest percent change of any alternative (see Table 3.07-11). Production of a motor vehicle use map (MVUM) would allow recreationists to better plan recreational pursuits. As a result, the frequency of user conflicts between non-motorized and motorized recreation users would likely decrease in the short and long terms.

Compared to the other action alternatives, Alternative 5 would provide the second-largest amount of road additions (5.0 miles) to the NFTS, tied with Alternative 2. Alternative 5 would add more miles of road than Alternatives 1, 3, 4, and 7, but less than Alternative 6 (see Table 3.07-4). Alternative 5 would provide the largest amount of motorized trail (75.4 miles) additions to the NFTS (see Table 3.07-7). These additions beneficially affect motorized recreation opportunities for a diversity of vehicle classes. All of the road additions would be open to all vehicles seasonally, with most of the mileage open May 1 to December 31 (4.7 miles), but 0.3 miles would be open May 1 to November 1. Most (61.9 miles) of the motorized trail additions would be open from May 1 to December 31, with the remaining 13.4 miles open April 1 to December 31 and 0.1 miles open May 1 to September 15. Of the total 75.5 miles of trail

additions, 44.7 miles would be open to high-clearance 4WD, 4.8 miles would be open to ATVs and motorcycles, and 26.0 miles would be open to motorcycles (see Table 3.07-8).

Adding presently unauthorized roads and trails to the NFTS would have a beneficial effect on motorized opportunities by providing additional miles of recreation opportunities. The proposed trail additions in Alternative 5 contribute to a variety of experiences with easy-to-extremely difficult riding/driving experiences, especially for 4WD operators and motorcycle operators (see Table 3.07-8). The proposed route additions also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities, providing beneficial effects to motorized recreation opportunities. The season of use restrictions on proposed road and trail additions may have a negative effect in the short and long terms to motorized opportunities by reducing mileage of motorized opportunity during the closure and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure. As shown in Table 3.07-10, Alternative 5 provides motorized access to a total of 188 dispersed recreation sites, of which 183 are associated with an addition to the NFTS (see changes to the NFTS, ML 1 additions for the remainder) providing a beneficial effect to motorized recreation opportunities. When compared to the other alternatives, Alternative 5 provides the third most motorized access to dispersed recreation behind Alternatives 1 and 6.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Establish motorized "Open Areas." Alternative 5 does not propose the establishment of any new "Open Areas" to the NFTS (refer to Table 3.07-9). No direct effects would result, as no change would be made from the current management situation. However, a possible indirect effect would be to increase the density of users in the existing Prosser Pits OHV "Open Area." Compared to the other alternatives, Alternative 5 would provide fewer acres of "Open Area" opportunities than Alternatives 2 and 6, and an equal amount as Alternatives 1, 3, 4, and 7.

Indicators referenced:

- **Measurement Indicator 3**: Motorized recreation opportunity

Changes to the existing NFTS [changing the vehicle class, season of use, and reopening ML 1 roads]. Proposals to change the vehicle class of NFTS routes to provide more mixed use would benefit motorized recreation by increasing the diversity of motorized opportunities (and looping opportunities). Changes in vehicle class that restrict motor vehicle types on NFTS routes would negatively affect motorized recreation diversity. A change in maintenance level through downgrading would increase the

diversity of motorized opportunities (and looping opportunities); upgrading the road class would decrease the diversity of the motorized opportunities.

Alternative 5 proposes mixed use on about 398.7 miles of NFTS roads (see Table 3.07-5). Alternatives 5 and 2 are tied for the largest amount of mixed use. Mixed use on NFTS roads would benefit motorized recreation by increasing the diversity of motorized opportunities. The proposed changes to the NFTS also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities for non-highway-legal vehicle operators, providing beneficial effects to motorized recreation opportunities. However, the authorization of mixed use on the NFTS could increase the likelihood that adjacent private lands would experience increased levels of intrusion by and impacts from OHVs, an impact to the affected landowners who may experience high levels of trespass from unrestricted OHV use.

Season of use restrictions on existing USFS roads and trails may have a negative effect (short and long term) to motorized opportunities by reducing mileage of motorized opportunities during the closure and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure. In Alternative 5, 1,396.7 total miles of route would have changes in seasonal restrictions (see Table 3.07-6). Wet weather seasonal restrictions are added to minimize erosion and protect water quality, closing motorized opportunities from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails. While Alternative 5 includes the most miles of seasonal closure of any alternative (see Table 3.07-6), it also includes the lifting of the deer winter range seasonal restrictions from November 1 to May 1, providing beneficial effects to motorized recreation opportunities in the Management Area 84 (Humbug-Sailor), through a Forest Plan amendment (see Table 3.07-1, and next section). This lifting of these restrictions would be especially beneficial to Sacramento-area riders who would enjoy the Sugar Pine area later into the year.

In Alternative 5, 79.3 miles of Maintenance Level 1 would be reopened as open to all vehicles road addition to the NFTS (see Table 3.07-4). About 70.3 miles would be reopened for a season of May 1 to December 31, 8.7 miles would be reopened from May 1 to November 1, and 0.3 miles would be reopened from April 1 to December 31. About 14.0 miles of ML 1 road would be reopened as ATV and motorcycle trails seasonally (see Table 3.07-7). In addition 13.9 miles of ATV and motorcycle trail would be reopened May 1 to December 31, and an additional 0.1 miles of motorcycle trail would be reopened April 1 to December 31. The season of use restriction on the proposed reopening of these ML 1 roads to roads and motorized trails may have a negative effect in the short and long terms to motorized opportunities by reducing mileage of motorized opportunity during the closure and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure. Alternative 5 reopens a total of 93.4 miles of ML 1 roads (for roads open to all vehicles and for motorized trail use), substantially more than any other alternative. Alternative 5 would also provide motorized access to 5 additional dispersed sites accessed from reopened ML 1 roads, 3 of those roads would be reopened as Open to All Vehicles, another would be reopened as an ATV and motorcycle trail, and another would be

open to motorcycles only (see Table 3.07-10). Alternative 5 provides motorized access to the third highest number of dispersed sites behind Alternatives 1 and 6.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Amending the Forest Plan. Adding unauthorized roads and trails to the NFTS would be consistent with the ROS as allocated in the LRMP. All routes proposed for addition to the NFTS comply with the ROS class in the associated management area. All proposed route additions under this alternative would be located in semi-primitive motorized, roaded natural, or rural ROS classes. However, in regard to a change in season of use (see previous section), the lifting of the deer winter range seasonal restrictions would require a Forest Plan amendment to remove the November 1 to May 1 seasonal closure in the Sugar Pine area (Management Area 84, Humbug Sailor)(see Table 3.07-1).

Indicators referenced:

- **Measurement Indicator 1**: Consistency with LRMP

Alternative 6 – Preferred Alternative Motorized Access and Resource Protection

Alternative 6 is the Preferred Alternative. It responds to issues of providing motorized public access and recreation opportunities while minimizing impacts to natural resources. Alternative 6 would provide motorized access to dispersed recreation opportunities (including camping, hunting, fishing, hiking, and horseback riding) and a diversity of motorized recreation opportunities (including 4WD Vehicles, motorcycles, ATVs, and passenger vehicles). This alternative prohibits cross country travel, adds about 13 miles of road and 48 miles of motorized trail to the NFTS, establishes 244 acres as motorized “Open Areas,” allows 253 miles of mixed use, makes 1,370 miles of changes in season of use, provides for motorized access to 437 dispersed sites, and makes one amendment to the Forest Plan.

Prohibition of cross country wheeled motorized vehicle travel. Under Alternative 6, cross country motorized vehicle travel would be prohibited. The prohibition of wheeled motor vehicle use off the NFTS would have a beneficial effect on non-motorized recreation opportunities and would reduce negative impacts to populated areas and neighboring lands of various ownerships in the short and long terms by reducing noise, dust and physical presence of motorized vehicles. Prohibiting cross country motorized travel would also curtail on-going negative effects to visitors and NFS lands from motorized vehicles such as noise, dust and physical presence in the short and long terms.

Compared to Alternative 1, prohibiting cross country motorized vehicle travel in Alternative 6 would result in a net loss of acreage available for cross country motorized recreation, negatively impacting motorized recreation opportunities. This prohibition of cross country travel will concentrate motorized

use on designated roads and trails. The concentration of use resulting from prohibiting cross country travel in the action alternatives will outweigh any similar effects produced by differences between the action alternatives. This concentration of use is expected to increase the density of riders/drivers per mile of route, potentially changing the motorized experience on the Tahoe National Forest. Most OHV enthusiasts are expected to continue to return to the areas they currently visit, but will alter their expectations (and riding styles) to account for the increased density. Rider/driver adjustments may include changing the time or day of visit, adapting a more defensive riding style (slower speeds, more attentive to oncoming traffic), and improved riding etiquette (use of hand signals). A small percentage of users may be displaced to different areas on the TNF, or adjacent riding areas. The cross country prohibition would also reduce motorized access to dispersed recreation activities. However, this alternative has the most spur roads to dispersed recreation sites recommended by the public and it establishes three "Open Areas" (see "Open Area" effects below). Although motorized recreation opportunities on NFS lands would be greatly reduced, other motorized recreation opportunities would be available and the NFTS would be increased.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Adding facilities (presently unauthorized roads and trails) to the NFTS. Adding unauthorized roads and trails may have a negative effect (short and long term) on non-motorized opportunities due to an increase in noise, dust, physical presence, possible use conflicts and displacement. Under Alternative 6 about 0.2 percent of the Forest would have additional impacts from the dust, odors, and noise typically associated with the proposed route additions. Alternative 6 would also include one road addition that would cross the non-motorized Pacific Crest Trail, requiring the installation of vehicle barriers to prevent motorized use on the PCT. When compared to the other alternatives, the proposed route additions under Alternative 6 would have more impact on the Forest's "quiet" recreation opportunities than Alternatives 3 and 4, but less impact than Alternatives 1, 2, 5, and 7 (see Table 3.07-3). Alternative 6 proposes 38.5 miles of road and trail additions within ½ mile of neighboring private and federal lands, potentially having some noise, dust, and physical presence impacts on neighboring lands. When compared to the other alternatives, Alternative 6 would have the second largest percent change on neighboring private and federal lands of any alternative behind Alternative 5 (see Table 3.07-11). Production of a motor vehicle use map (MVUM) would allow recreationists to better plan recreational pursuits. As a result, the frequency of user conflicts between non-motorized and motorized recreation users would likely decrease in the short and long terms.

Compared to the other action alternatives, Alternative 6 would add the most miles (13.1 miles) to the NFTS of any alternative (see Table 3.07-4). Alternative 6 would provide the third most amount of

motorized trail (48.3 miles) additions to the NFTS (see Table 3.07-7). These additions beneficially affect motorized recreation opportunities for a diversity of vehicle classes. All of the road additions would be Open to All Vehicles seasonally, with a majority of the mileage open May 1 to December 31 (7.5 miles), but 5.5 miles would be open April 1 to December 31. More than half (25.5 miles) of the motorized trail additions would be open from open April 1 to December 31, with the remaining 22.8 miles open May 1 to December 31. Of the total 48.3 miles of trail additions, 22.5 miles would be open to high-clearance 4WD, 4.8 miles would be open to ATVs and motorcycles, and 20.9 miles would be open to motorcycles (see Table 3.07-8).

Adding unauthorized roads and trails to the NFTS would have a beneficial effect on motorized opportunities by providing additional miles of recreation opportunities. The proposed trail additions in Alternative 6 contribute to a variety of experiences with easy-to-extremely difficult riding/driving experiences, especially for 4WD operators and motorcycle riders (see Table 3.07-8). The proposed route additions also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities, providing beneficial effects to motorized recreation opportunities. The season of use restrictions on proposed road and trail additions may have a negative effect in the short and long terms to motorized opportunities by reducing mileage of motorized opportunity during the closure and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure. As shown in Table 3.07-10, Alternative 6 provides motorized access to a total of 437 dispersed recreation sites, of which 432 are associated with an addition to the NFTS (see changes to the NFTS, and ML 1 additions for the remainder) providing a beneficial effect to motorized recreation opportunities. When compared to the other alternatives, Alternative 6 provides the second most motorized access to dispersed recreation of any alternative, behind Alternative 1.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Establish motorized "Open Areas." Alternative 6 proposes establishing 3 new motorized "Open Areas" totaling 244 acres, allowing cross country motorized travel in the Stampede/Prosser/Boca reservoir areas seasonally from May 1 to December 31 (see Table 3.07-9). The establishment of these previously unauthorized "Open Areas" may have a negative effect (short and long term) on non-motorized opportunities due to an increase in noise, dust, physical presence, possible use conflicts and displacement. These "Open Areas" within ½ mile of neighboring private and federal lands, may also contribute to this alternative potentially having the fourth greatest noise, dust, and physical presence impacts on neighboring lands when compared to the other alternatives (see Table 3.07-3). Because lands around the reservoirs are largely managed by the Forest Service, this effect would be minimal. In the

reservoir areas, a likely indirect effect of the "Open Area" establishment would concentrate the participation in, and the impact of, numerous non-motorized sports including picnicking, swimming, and dog walking around the shoreline adjacent to these established "Open Areas."

Alternative 6 would limit the "Open Area" opportunities to operators of highway legal vehicles including pickups, jeeps, SUVs, and sedans. Compared to the other alternatives, only Alternatives 6 and 2 provide for additional "Open Area" opportunities. However Alternative 6 is the only one with a seasonal "Open Area" to Highway-legal only addition, providing a beneficial effect on motorized recreation opportunities with a moderate diversity of vehicle classes and access to dispersed recreation. Just north of Truckee, the Boca, Prosser, and Stampede reservoirs would provide 244 acres of motorized opportunity along the shoreline, below the high water mark, for camping, boating, and other day-use activities.

Establishing previously unauthorized "Open Areas" would have a beneficial effect on motorized opportunities and would contribute to the variety of motorized experiences found on the TNF. In addition, this "Open Area" would serve as a quasi-dispersed site itself, accentuating the 437 dispersed sites proposed to be added in this alternative, contributing to Alternative 6 ranking as the second best alternative in regard to motorized access to dispersed recreation sites when compared to the other alternatives (behind Alternative 1). Alternative 6 would provide the second-most acres of "Open Area" opportunities of the action alternatives (behind Alternative 2).

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Changes to the existing NFTS [changing the vehicle class, season of use, and reopening ML 1 roads]. Proposals to change the vehicle class of NFTS routes to provide more mixed use would benefit motorized recreation by increasing the diversity of motorized opportunities (and looping opportunities). Changes in vehicle class that restrict motor vehicle types on NFTS routes would negatively affect motorized recreation diversity. A change in maintenance level through downgrading would increase the diversity of motorized opportunities (and looping opportunities); upgrading the road class would decrease the diversity of the motorized opportunities.

Alternative 6 proposes mixed use on about 252.7 miles of NFTS roads (see Table 3.07-5). Alternatives 6 would provide more mixed use than Alternatives 1, 3, 4, and 7, but less than Alternatives 2 and 5. Mixed use on NFTS roads would benefit motorized recreation by increasing the diversity of motorized opportunities. The proposed changes to the NFTS also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities for non-highway-legal vehicle operators, providing beneficial effects to motorized recreation opportunities. However, the authorization of mixed use on the NFTS could increase the likelihood that adjacent private lands would experience

increased levels of intrusion by and impacts from OHVs, an impact to the affected landowners who may experience high levels of trespass from unrestricted OHV use.

Season of use restrictions on existing NFTS roads and trails may have a negative effect (short and long term) to motorized opportunities by reducing miles available for motorized opportunities during the closure and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure**.** In Alternative 6, 1,369.5 total miles of route would have changes in seasonal restrictions (see Table 3.07-6). Wet weather seasonal restrictions are added to minimize erosion and protect water quality, closing motorized opportunities from January 1 to May 31 in the Burlington area and January 1 to April 30 on the remainder of the Forest on native surface roads and motorized trails. While Alternative 6 includes the second-largest amount of miles of seasonal closure of any alternative (behind Alternative 5), it also includes the lifting of the deer winter range seasonal restrictions from November 1 to May 1, providing beneficial effects to motorized recreation opportunities in the Management Area 84 (Humbug-Sailor), requiring a Forest Plan amendment (see Table 3.07-1, and next section). This lifting of these restrictions would be especially beneficial to Sacramento-area riders who would enjoy the Sugar Pine area later into the year. In addition, over the snow travel would be permitted on 3.6 miles of the Fordyce Jeep trail when 15 inches of snow is present on the ground.

In Alternative 6, 2.8 miles of Maintenance Level 1 roads would be reopened with an Open to All Vehicles status (see Table 3.07-4). About 2.2 miles would be reopened from April 1 to December 31, and 0.6 miles would be reopened for a season of May 1 to December 31. About 8.6 miles of ML 1 roads would be reopened as ATV and motorcycle trails seasonally (see Table 3.07-7) and 8.5 miles of ATV and motorcycle trail and 0.1 miles of motorcycle trail would be reopened April 1 to December 31. The season of use restriction on the proposed reopening of these ML 1 routes may have a negative effect (short and long term) to motorized opportunities by reducing mileage of motorized opportunity during the closure and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure. Alternative 6 reopens a total of 11.3 miles of ML 1, substantially less than Alternative 5, but substantially more than any of the other alternatives. Alternative 6 would also provide motorized access to 5 additional dispersed sites accessed from reopened ML 1 roads, 3 of those roads would be reopened as Open to All Vehicles, while another would be reopened as a ATV and motorcycle trail, and another would be open to motorcycles only (see Table 3.07-10). When compared to the rest of the alternatives, Alternative 6 provides motorized access to the second most number of dispersed sites of any alternative, behind Alternative 1.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Amending the Forest Plan. Adding unauthorized roads and trails to the NFTS would be consistent with the ROS as allocated in the LRMP. All routes proposed for addition to the NFTS comply with the ROS class in the associated management area. All proposed route additions under this alternative would be located in semi-primitive motorized, roaded natural, or rural ROS classes. However, in regard to a change in season of use (see previous section), the lifting of the deer winter range seasonal restrictions would require a Forest Plan amendment to remove the November 1 to May 1 seasonal closure in the Sugar Pine area (Management Area 84, Humbug Sailor)(see Table 3.07-1).

Indicators referenced:

- **Measurement Indicator 1**: Consistency with LRMP

Alternative 7 – Proposed Action as identified in the Notice of Intent (NOI)

Alternative 7 is the Proposed Action as published in the Notice of Intent in the Federal Register. This alternative prohibits cross country travel, adds 37 miles of motorized trail to the NFTS (but no roads), establishes no new acres as motorized "Open Areas," allows 3 miles of mixed use, makes no changes in season of use, and provides for motorized access to 29 dispersed sites. This alternative makes no amendments to the Forest Plan.

Prohibition of cross country wheeled motorized vehicle travel. Under Alternative 7, cross country motorized vehicle travel would be prohibited. The prohibition of wheeled motor vehicle use off the NFTS would have a beneficial effect on non-motorized recreation opportunities and would reduce negative impacts to populated areas and neighboring lands of various ownerships in the short and long terms by reducing noise, dust and physical presence of motorized vehicles. Prohibiting cross country motorized travel would also curtail on-going negative effects to visitors and NFS lands from motorized vehicles such as noise, dust and physical presence in the short and long terms.

Compared to Alternative 1, prohibiting cross country motorized vehicle travel in Alternative 7 would result in a net loss of acreage available for motorized recreation. Alternative 7 would provide no opportunities for cross country motorized travel, resulting in a negative impact on motorized recreation opportunities. This prohibition of cross country travel will concentrate motorized use on designated roads and trails. The concentration of use resulting from prohibiting cross country travel in the action alternatives will outweigh any similar effects produced by differences between the action alternatives. This concentration of use is expected to increase the density of riders/drivers per mile of route, potentially changing the motorized experience on the Tahoe National Forest. Most OHV enthusiasts are expected to continue to return to the areas they currently visit, but will alter their expectations (and riding styles) to account for the increased density. Rider/driver adjustments may include changing the time or day of visit, adapting a more defensive riding style (slower speeds, more attentive to oncoming traffic), and improved riding etiquette (use of hand signals). A small percentage of users may be displaced to different areas on the TNF, or adjacent riding areas. The cross country prohibition would also reduce motorized access to dispersed recreation activities. The loss of available "Open Area" acreage is somewhat offset, however, by the proposed addition of motorized routes to the NFTS. Although motorized recreation opportunities on

"Open Areas" would not be provided, other motorized recreation opportunities would be available and the NFTS would be increased.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Adding facilities (presently unauthorized roads and trails) to the NFTS. Adding unauthorized roads and trails may have a negative effect (short and long term) on non-motorized opportunities due to an increase in noise, dust, physical presence, possible use conflicts and displacement. Under Alternative 7 about 0.3 percent of the Forest would have additional impacts from the dust, odors, and noise associated with the proposed route additions. Alternative 7 also adds one road to the NFTS that crosses the non-motorized Pacific Crest Trail, requiring the installation of vehicle barriers to prevent motorized use on the PCT. When compared to the other alternatives, the proposed route additions under Alternative 7 would have more impact on the Forest's "quiet" recreation opportunities than Alternatives 3, 4, and 6, less impact than Alternatives 1 and 5, and the same amount of impact as Alternative 2 (see Table 3.07-3). Alternative 7 proposes 19.1 miles of trail route additions within ½ mile of neighboring private and federal lands, potentially having some noise, dust, and physical presence impacts on neighboring private and federal lands. When compared to the other alternatives, Alternative 7 would have the fourth most impact on neighboring private and federal lands of any alternative behind Alternatives 1, 5 and 6 (see Table 3.07-11). Production of a motor vehicle use map (MVUM) would allow recreationists to better plan recreational pursuits. As a result, the frequency of user conflicts between non-motorized and motorized recreation users would likely decrease in the short and long terms.

Compared to the other alternatives, Alternatives 7, 1, and 3 would provide the least amount of road additions (0.0 miles) to the NFTS (see Table 3.07-4). Alternative 7 would provide the fourth highest amount of motorized trail (36.6 miles) additions to the NFTS (see Table 3.07-7). These additions beneficially affect motorized recreation opportunities for a diversity of vehicle classes. More than half (22.6 miles) of the motorized trail additions would be open year-round, with the remaining 14.0 miles open May 1 to December 31. Of the total 36.6 miles of trail additions, 16.9 miles would be open to high-clearance 4WD, 3.4 miles would be open to ATVs and motorcycles, and 16.4 miles would be open to motorcycles (see Table 3.07-8).

Adding unauthorized roads and trails to the NFTS would have a beneficial effect on motorized opportunities by providing additional miles of opportunities. The proposed trail additions in Alternative 7 contribute to a variety of experiences with easy-to-extremely difficult riding/driving experiences, especially for 4WD operators and motorcycle riders (see Table 3.07-8). The proposed route additions also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities,

providing beneficial effects to motorized recreation opportunities. The season of use restrictions on proposed trail additions may have a negative effect in the short and long terms to motorized opportunities by reducing mileage of motorized opportunity during the closure and a beneficial effect to non-motorized opportunities by increasing the acreage available for non-motorized activities during the closure. As shown in Table 3.07-10, Alternative 7 provides motorized access to a total of 29 dispersed recreation sites, of which 27 are associated with an addition to the NFTS and 2 are associated with reopening of ML 1 roads. These routes and associated dispersed recreation sites provide a beneficial effect to motorized recreation opportunities. When compared to the other alternatives, Alternative 7 provides the second smallest amount of motorized access to dispersed recreation of any alternative, behind Alternative 3.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Establish motorized "Open Areas." Alternative 7 does not establish any new "Open Areas" (refer to Table 3.07-9). No direct effects would result, as no change would be made from the current management situation. However, a possible indirect effect would be to increase the density of users in the existing Prosser Pits OHV "Open Area." Compared to the other alternatives, Alternative 7 would provide fewer acres of "Open Area" opportunities than Alternatives 2 and 6, and an equal amount as Alternatives 1, 3, 4, and 5.

Indicators referenced:

- **Measurement Indicator 3**: Motorized recreation opportunity

Changes to the existing NFTS [changing the vehicle class, season of use, and reopening ML 1 roads]. Proposals to change the vehicle class of NFTS routes to provide more mixed use would benefit motorized recreation by increasing the diversity of motorized opportunities (and looping opportunities). Changes in vehicle class that restrict motor vehicle types on NFTS routes would negatively affect motorized recreation diversity. A change in maintenance level through downgrading would increase the diversity of motorized opportunities (and looping opportunities); upgrading the road class would decrease the diversity of the motorized opportunities.

Alternative 7 proposes mixed use on about 3.4 miles of NFTS roads (see Table 3.07-5). Alternatives 7 and 4 are tied for the third most mixed use of any alternative. Mixed use on NFTS roads would benefit motorized recreation by increasing the diversity of motorized opportunities. The proposed changes to the NFTS also contribute to the continuity of the motor-touring opportunities by reducing dead-end routes, increasing loop and connector opportunities, and providing access to a diversity of dispersed recreation activities for non-highway-legal vehicle operators, providing beneficial effects to motorized recreation

opportunities. However, the authorization of mixed use on the NFTS could increase the likelihood that adjacent private lands would experience increased levels of intrusion by and impacts from OHVs, an impact to the affected landowners who may experience high levels of trespass from unrestricted OHV use. Although Alternative 7 provides less motorized recreation opportunity through mixed use when compared to Alternatives 2, 5, and 6, it provides more motorized recreation opportunity on existing NFTS roads through mixed use when compared to Alternatives 1 and 3, and equal to Alternative 4.

No changes to the NFTS in regard to season of use would be made under Alternative 7. No direct or indirect effects from changes to the season of use would result, as no change would be made from the current management situation.

In Alternative 7, 0.9 miles of Maintenance Level 1 would be reopened year-round as a road addition to the NFTS with an Open to All Vehicles status (see Table 3.07-4). About 0.1 miles of ML 1 road would be reopened year-round as a motorcycle trail (see Table 3.07-7). Alternative 7 reopens a total of 1.0 mile of ML 1 roads, which is less than Alternatives 5 and 6, but more than Alternatives 1, 2, 3 and 4. Alternative 7 would also provide motorized access to 2 additional dispersed sites accessed from reopened ML 1 roads, one of those roads would be reopened as Open to All Vehicles, and the other would be open to motorcycles only (see Table 3.07-10). When compared to the rest of the alternatives, Alternative 7 provides motorized access to the second lowest number of dispersed sites of any alternative; only Alternative 3 would provide fewer.

Indicators referenced:

- **Measurement Indicator 2**: Non-motorized recreation opportunity
- **Measurement Indicator 3**: Motorized recreation opportunity
- **Measurement Indicator 4**: Type of motorized access to dispersed recreation
- **Measurement Indicator 5**: Impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts).

Amending the Forest Plan. No changes to the Forest Plan would be made under Alternative 7. No direct or indirect effect would result, as no change would be made from the current management situation.

Indicators referenced:

- **Measurement Indicator 1**: Consistency with LRMP

Cumulative Effects

The cumulative effects analysis for recreation considers the impact of the alternatives when combined with past, present, and foreseeable future actions and events. The spatial boundary (Forest-wide) of the cumulative effects analysis was selected because impacts to the recreation system in one area of the Forest can affect the continuity of the system and public access opportunities in other parts of the Forest. The temporal scope of 20 years was selected because impacts to recreation and public access from present and reasonably foreseeable future activities may occur over this timeframe. In analyzing cumulative effects of Motorized Travel Management, the TNF considered effects from all present and reasonably

foreseeable future actions that have the potential for affecting motorized and non-motorized recreation opportunities. The actions affecting the recreation resource include road and trail construction, rerouting trails, restoring unauthorized routes, reclaiming road spurs, and decommissioning roads. For a full list of the present and reasonably foreseeable future actions considered in this analysis, see Appendix H (Reasonably Foreseeable Projects and Cumulative Effects). Projects with the most likely potential for affecting motorized and non-motorized opportunities are listed below in Table 3.07-14.

The changes associated with these projects have been incorporated into the recreation opportunity by alternative listed in Table 3.07-15. It is anticipated that the effects of the present and reasonably foreseeable future actions would meet ROS classifications for the management area in which they occur. The past activities, including the existing NFTS, have shaped the recreation opportunities and ROS settings available on the Forest. The effects of the present and reasonably foreseeable future activities listed in Table 3.07-14 would continue to shape the recreation opportunities and ROS settings available on the Forest.

Table 3.07-14. Reasonably foreseeable projects with possible cumulative effects to recreation

Project	Description
Hawley and Fordyce Meadows Rehab Project	Reroute ¾ mile of existing trail in Hawley Mdw, reroute ½ mile existing trail on Fordyce Jeep Trail.
Reclamation of Abandoned Mine Features at the Dredge and Eaglebird Mines	Remediate public safety hazards, reclaim degraded slopes and road spurs, and remove abandoned equipment.
Canyon Forest Health	Reduce fuels, thin forest stands, decommission roads.
Stockrest Springs Restoration	Restore floodplain function and reroute a trail in Stockrest Springs Watershed.
Little Truckee Wildlife Habitat Improvement project	Improve sensitive nesting, stream and riparian habitats and water quality by obliterating and restoring two illegal trails/hill climbs that run perpendicular to the Little Truckee River.
Legacy Trail	Construct non-motorized multiple use trail from private land in the town of Truckee to Glenshire subdivision.
South Lincoln Creek Coop road segment	Construct 1200’ of road to the Sierra Pacific property line.
Little Truckee River Trail	Construct about 1 miles of multiple use trail between Highway 89 north and FS road #450-10-20 – connect to Upper Little Truckee River campground.
Brumby	Mechanically thin 530 acres, group select 30 acres, remove conifers from 3 acres of aspen, construct 1.3 miles of new permanent road, and about 1 mile of temporary road.

Decreased access to recreation opportunities and increased dust, noise and physical presence of motorized machinery may occur during road reconstruction activities (short term impacts). Road decommissioning would benefit non-motorized opportunities by eliminating noise, dust, and physical presence of motorized vehicles on neighboring private and federal lands and wilderness areas when located within ½ mile from these areas, but may negatively affect motorized recreation by decreasing the mileage available for motorized recreation opportunities. Road decommissioning may also increase the

amount of forest available for "quiet" recreation opportunities. In the present and reasonably foreseeable future, about 125.7 miles of currently open NFTS roads would be decommissioned.

Measurement indicators 1, 2, 3, 4, and 5 were used in the cumulative effects analysis. Measurement indicator 1 looked at the impact of proposed changes to the NFTS on the TNF Forest Plan in regard to the Recreation Opportunity Spectrum and season of use. No ROS plan amendments would be needed for any alternatives because all routes proposed for addition to the NFTS comply with the ROS class in the associated management area. No proposed route additions in the action alternatives would be located in primitive or semi-primitive non-motorized ROS classes. All proposed route additions would be located in semi-primitive motorized, roaded natural, or rural ROS classes. All action alternatives would be consistent with ROS. Therefore, no cumulative effects on ROS are anticipated for the action alternatives. For potential cumulative effects on ROS for the No Action Alternative, see the cumulative effects section for the No Action Alternative, Alternative 1, below. Season of use plan amendments would be required in Alternatives 2, 5, and 6 to lift the seasonal deer winter range restrictions in Management Area 84, Humbug Sailor (see Table 3.07-1). This removal of the existing November 1 to May 1 seasonal closure would extend the riding season in the Sugar Pine area, an increase in motorized opportunities. The cumulative effects of these proposed plan amendments may have impacts to both motorized or non-motorized recreation opportunities, and are taken into account in summary Tables 3.07-15, 16, and 17 and the discussion of the four other recreation measurement indicators.

Measurement indicator 2 looks at the impact of proposed changes to the NFTS on non-motorized recreation (dust, noise, use conflicts). It also addresses the "quiet" recreation issue. Quiet recreation is defined by measurement indicator 2 as the acres outside ½ mile of an area where motorized use is allowed. For cumulative effects analysis, quiet recreation acreage for the No Action Alternative was determined using the existing NFTS, other state, county, or private roads traveling through the Forest, and the currently identified unauthorized routes. Quiet recreation acreage for the action alternatives was determined using the existing NFTS, other state, county, or private roads traveling through the Forest, and any proposed route and area additions. See Table 3.07-3 for a full comparison of alternatives regarding this indicator.

Measurement indicator 3 looks at the impact of proposed changes to the NFTS to motorized recreation opportunities by alternative by analyzing roads, motorized trails, and "Open Areas" added to the NFTS. This indicator includes any effects associated with existing or proposed direction in regard to mixed use, maintenance levels, season of use, and reopening ML 1 roads to motorized use. The total motorized mileage in an alternative includes proposed route additions and motorized NFTS routes, including operational ML 2-5 and all motorized trails. See Tables 3.07-4 through 9 and Table 3.07-15 for a full comparison of alternatives regarding this indicator.

Table 3.07-15. Motorized Recreation Opportunities Cumulative Effects – Recreation Measurement Indicator 3

		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
NFTS Roads	Year round	1395.4	1409.6	1395.4	348.1	274.0	234.8	1396.3
	Seasonally	672.2	662.9	672.9	1723.2	1878.0	1848.6	672.2
NFTS Trails	Year round	265.7	301.0	265.7	0.0	0.0	0.0	288.5
	Seasonally	62.5	81.7	62.5	350.9	417.6	385.1	76.5
State, County or other jurisdiction roads	Year round	868.2	868.2	868.2	868.2	868.2	868.2	868.2
Private Roads	Year round	1,816.5	1,816.5	1,816.5	1,816.5	1,816.5	1,816.5	1,816.5
Unauthorized routes & closed NFTS roads receiving public motorized use	Year round	1698.3	0	0	0	0	0	0
Total	**Year round**	**6044.1**	**4395.3**	**4345.8**	**3032.8**	**2958.7**	**2919.5**	**4369.5**
	Seasonally	**734.7**	**744.6**	**735.4**	**2074.1**	**2295.6**	**2233.7**	**748.7**
	Grand Total	**6778.8**	**5139.9**	**5081.2**	**5106.9**	**5254.3**	**5153.2**	**5118.2**

Measurement indicator 4 looked at the impact of proposed changes to the NFTS to motorized access to dispersed recreation opportunities by alternative by analyzing the type of access and the number of dispersed sites accessed as a result of the additions identified in Measurement indicator 3. See Table 3.07-10 for a full comparison of alternatives regarding this indicator.

Measurement indicator 5 looks at the impact of proposed changes to the NFTS on neighboring private and federal lands by alternative by analyzing the number of miles that occur within ½ mile of neighboring lands. For Alternative 1, routes considered were open roads on the existing NFTS and inventoried unauthorized routes. For the action alternatives routes considered were open roads on the existing NFTS and any proposed route and area additions. See Table 3.07-11 for a full comparison of alternatives regarding this indicator.

The identified present and reasonably foreseeable future actions were used to determine the cumulative effect on NFTS roads open to motorized recreation opportunities. NFTS roads considered open to motorized travel include MLs 2 through 5. The cumulative effects analysis includes the direct and indirect effects of the five management actions discussed in the environmental consequences section: (1) the prohibition of cross country motorized travel, (2) additions of currently unauthorized routes to the NFTS, (3) establishment of motorized “Open Areas,” (4) changes to the existing NFTS, and (5) amendments to the Forest Plan.

Alternative 1 – No Action

Unrestricted cross country motorized travel under Alternative 1 has the potential to create resource issues in the future and a proliferation of user created dead-end routes that may reduce the quality of the motorized recreation experience.

Although consistent with LRMP guidance for ROS, cross country motorized travel may affect ROS class settings. Motorized use could inadvertently spread to non-motorized areas, changing areas with non-

motorized ROS class settings, such as semi-primitive non-motorized, to ROS classes with motorized settings such as semi-primitive motorized, roaded natural, or rural.

Alternative 1 has the greatest potential to negatively alter non-motorized recreation settings, but it is difficult to predict where future cross country motorized use would occur. Dust, noise, and motorized vehicle presence may impact non-motorized recreationists seeking a "quiet" recreation experience. Cumulatively under this alternative, 87.7 percent of the TNF would be affected by motorized use and would not be available for "quiet" recreation, the greatest amount of all the alternatives (see Table 3.07-3). This alternative also has the greatest impact on neighboring private and federal lands and wilderness areas, as determined using measurement indicator 5, with about 2,317 miles of NFTS open roads and unauthorized motorized routes occurring within ½ mile of neighboring private and federal lands (see Table 3.07-11), the highest amount when compared to all the alternatives. Overall, Alternative 1 has the highest potential cumulative impact on non-motorized recreation opportunities and neighboring Federal and private lands and wilderness areas.

With no proposed additions or changes to the use of existing NFTS roads or trails and no prohibition of cross country motorized travel, Alternative 1 results in no change to the existing motorized recreation opportunities. Under Alternative 1, at least 6,779 miles of motorized route (including the unauthorized routes) would be available to the public, the most of any alternative (see Table 3.07-15). Without prohibition of cross country motorized travel, Alternative 1 provides the greatest access to dispersed recreation of any alternative. Since there are no direct or indirect effects to motorized recreation and no change from the current management situation, no cumulative effects to motorized recreation would result. Overall, Alternative 1 would provide the greatest amount of motorized opportunity.

Alternative 2 – Increased Motorized Recreation and Access Opportunities

Alternative 2 has the potential to negatively alter non-motorized recreation settings when considering the proposed route additions, the existing NFTS, and other roads traveling through the Forest. Dust, noise, and motorized vehicle presence may impact non-motorized recreationists seeking a "quiet" recreation experience. Cumulatively under this alternative, 83.4 percent of the TNF would be affected by motorized use and would not be available for "quiet" recreation, less than the No Action Alternative and Alternative 5, but more than Alternatives 3, 4, and 6, and about equal to Alternative 7 (see Table 3.07-3). This alternative, combined with the past, present and reasonably foreseeable future actions, also has the potential to impact neighboring private and federal lands and wilderness areas. About 1,418 miles of NFTS open roads and proposed route additions would occur within ½ mile of neighboring private and federal lands and wilderness areas, more than Alternatives 3, 4, and 7, about equal to Alternative 6, but less than Alternatives 1 and 5 (see Table 3.07-11). The proposed route additions would add about two percent to the number of NFTS route miles occurring within ½ mile of neighboring private and federal lands. Overall, Alternative 2 would provide more beneficial cumulative effects to non-motorized recreation than the Alternatives 1 and 5, but less than the rest of the alternatives.

Alternative 2 would have beneficial cumulative effects to motorized recreation by increasing NFTS mileage available for motorized recreation. Proposed route additions contribute to a variety of riding

experiences as well as the continuity of the motor-touring opportunities. The route additions also provide loops, connectors, and access to a diversity of dispersed recreation activities which can benefit both motorized and non-motorized recreation opportunities by providing access to trailheads, dispersed campsites etc. As shown in Table 3.07-15, proposed road and trail additions and open NFTS roads would provide about 5,139.9 miles of motorized recreation opportunity. This alternative also establish 4 additional motorized "Open Areas" totaling 2,649 acres, providing positive direct, indirect and cumulative impacts to motorized recreation opportunities (see Table 3.07-9). Compared to the other alternatives, Alternative 2 provides fewer miles of opportunity than Alternatives 1 and 5, more than Alternatives 3, 4, and 7, and about the same as Alternative 6 (see Table 3.07-15). Alternative 2 would provide motorized access to a total of 182 dispersed recreation sites, providing a beneficial effect to motorized recreation opportunities. This alternative would provide the fourth most motorized access to dispersed recreation sites when compared to the other alternatives, behind Alternatives 1, 5 and 6 (see Table 3.07-10). Overall, compared to the other alternatives, Alternative 2 would provide more beneficial cumulative effects to motorized recreation than Alternatives 3, 4, and 7, and less than Alternatives 1, 5, and 6.

Alternative 3 – Cross Country Travel Prohibition Only –No Changes to the Existing NFTS

Alternative 3 has the potential to alter non-motorized recreation settings. Dust, noise, and motorized vehicle presence may impact non-motorized recreationists seeking a "quiet" recreation experience. Cumulatively under this alternative, 83.1 percent of the TNF would be affected by motorized use and would not be available for "quiet" recreation, less than any other alternative (see Table 3.07-3). This alternative, combined with the past, present and reasonably foreseeable future actions, also has the potential to impact neighboring private and federal lands and wilderness areas. About 1,384 miles of NFTS open roads occur within ½ mile of neighboring private and federal lands and wilderness areas, the fewest of any alternative (see Table 3.07-11). As this alternative proposes no new additions or changes to the existing NFTS, there is no increase from the current condition of open NFTS roads occurring within ½ mile of neighboring private and federal lands and wilderness areas. Overall, Alternative 3 would provide more beneficial cumulative effects to non-motorized recreation opportunities than any alternative, although Alternative 4 is quite similar.

Alternative 3 NFTS roads would provide about 5,081.2 miles of motorized recreation opportunity. No establishment of additional motorized "Open Areas" would be made under this alternative (see Table 3.07-9). Since there are no new "Open Areas" established (no change from the current management situation), there would be no direct, indirect, or cumulative effects to motorized recreation. Compared to the other alternatives, Alternative 3 would provide fewer miles of opportunities than any alternative (see Table 3.07-15). Alternative 3 would provide motorized access to no additional dispersed recreation sites (the least of any alternative), providing no beneficial effect to motorized recreation opportunities (see Table 3.07-10). Overall, Alternative 3 would provide the fewest miles of motorized opportunity, and it would not provide for motorized access to any additional dispersed sites beyond the existing condition.

Alternative 4 – Increased Resource Protection

Alternative 4 has the potential to alter non-motorized recreation settings when considering the proposed route additions, the existing NFTS, and other roads traveling through the Forest. Dust, noise, and motorized vehicle presence may impact non-motorized recreationists seeking a "quiet" recreation experience. Cumulatively under this alternative, 83.2 percent of the Tahoe NF would be affected by motorized use and would not be available for "quiet" recreation, less than any other alternative except Alternative 3 (see Table 3.07-3). Alternative 4, combined with the past, present and reasonably foreseeable future actions, also has the potential to impact neighboring private and federal lands and wilderness areas. About 1,398 miles of NFTS open roads and proposed route additions would occur within ½ mile of neighboring private and federal lands and wilderness areas, more than Alternative 3, about equal to Alternative 7, but less than rest of the alternatives (see Table 3.07-11). The proposed route additions would add about a one percent to the amount of open NFTS route miles occurring within ½ mile of neighboring private and federal lands. Overall, Alternative 4 would provide more beneficial cumulative effects to non-motorized recreation than any other alternative except Alternative 3, which has about the same amount.

Alternative 4 would have moderate beneficial cumulative effects to motorized recreation by increasing NFTS mileage available for motorized recreation. Proposed route additions contribute to a variety of riding experiences as well as the continuity of the motor-touring opportunities. The route additions also provide loops, connectors, and access to a diversity of dispersed recreation activities which can benefit both motorized and non-motorized recreation opportunities by providing access to trailheads, dispersed campsites etc. Proposed road additions and existing open NFTS roads would provide about 5106.9 miles of motorized recreation opportunity. No changes to the NFTS in regards to the establishment of motorized "Open Areas" would be made under this alternative (see Table 3.07-9). Since there are no new "Open Areas" established (no change from the current management situation), there would be no direct, indirect, or cumulative effects to motorized recreation. Compared to the other alternatives, Alternative 4 would provide the second least number of miles of any alternative (see Table 3.07-15), only Alternative 3 would provide fewer. Alternative 4 would provide motorized access to a total of 107 dispersed recreation sites, providing a beneficial effect to motorized recreation opportunities. This alternative would provide the third most limited motorized access to dispersed recreation sites when compared to the other action alternatives, only Alternatives 3 and 7 would provide fewer (see Table 3.07-10). Compared to the other alternatives, overall, Alternative 4 ties with Alternative 7 for the second-least potential beneficial cumulative impact on motorized users, only Alternative 3 provides less.

Alternative 5 – Increased Motorized Recreation Access plus Reopening Maintenance Level 1 and Temporary Roads

Alternative 5 has the potential to negatively alter non-motorized recreation settings when considering the proposed route additions, the existing NFTS, and other roads traveling through the Forest. Dust, noise, and motorized vehicle presence may impact non-motorized recreationists seeking a "quiet" recreation experience. Cumulatively under this alternative, 83.9 percent of the TNF would be affected by motorized

use and would not be available for "quiet" recreation, more than any other alternative, except the no action (see Table 3.07-3). This alternative, combined with the past, present and reasonably foreseeable future actions, also has the potential to impact neighboring private and federal lands and wilderness areas. About 1,447 miles of NFTS open roads and proposed route additions would occur within ½ mile of neighboring private and federal lands and wilderness areas, more than any alternative except the no-action alternative (including unauthorized routes) (see Table 3.07-11). The proposed route additions would provide for a four percent increase in the number of open NFTS route miles occurring within ½ mile of neighboring private and federal lands. Overall, when compared to the other action alternatives, Alternative 5 would provide more beneficial cumulative effects to non-motorized recreation than Alternative 1, but less than any of the rest of the alternatives.

Alternative 5 would have moderate beneficial cumulative effects to motorized recreation by increasing NFTS mileage available for motorized recreation. Proposed route additions contribute to a variety of riding experiences as well as the continuity of the motor-touring opportunities. The route additions also provide loops, connectors, and access to a diversity of dispersed recreation activities which can benefit both motorized and non-motorized recreation opportunities by providing access to trailheads, dispersed campsites etc. Proposed road additions and open NFTS roads would provide about 5,254.3 miles of motorized recreation opportunity. No additional motorized "Open Areas" would be established under this alternative (see Table 3.07-9). Since there are no new "Open Areas" established (no change from the current management situation), there would be no direct, indirect, or cumulative effects to motorized recreation. Compared to the other action alternatives, Alternative 5 would provide the second most number of miles of any alternative; only Alternative 1 would provide more (see Table 3.07-15). Alternative 5 would provide motorized access to a total of 188 dispersed recreation sites, providing a beneficial effect to motorized recreation opportunities. This alternative would provide the third most motorized access to dispersed recreation sites when compared to the other alternatives, only Alternatives 1 and 6 would provide more (see Table 3.07-10). Overall, compared to the other alternatives, Alternative 5 has more potential beneficial cumulative impact on motorized users than Alternatives 2, 3, 4, and 7, less than Alternative 1, and about equal potential as Alternative 6.

Alternative 6 – Preferred Alternative Motorized Access and Resource Protection

Alternative 6 has the potential to negatively alter non-motorized recreation settings through the use of proposed route additions, the existing NFTS, and other roads traveling through the Forest. Dust, noise, and motorized vehicle presence may impact non-motorized recreationists seeking a "quiet" recreation experience. Cumulatively under this alternative, 83.3 percent of the TNF would be affected by motorized use and would not be available for "quiet" recreation, more than Alternatives 3 and 4, but less than Alternatives 1, 2, 5, and 7 when compared to the other action alternatives (see Table 3.07-3). This alternative, combined with the past, present and reasonably foreseeable future actions, also has the potential to impact neighboring private and federal lands and wilderness areas. About 1,422 miles of NFTS open roads and proposed route additions would occur within ½ mile of neighboring private and federal lands and wilderness areas, which is more than Alternatives 3, 4, and 7, about equal to Alternative

2, but less than Alternatives 1 and 5 (see Table 3.07-11). The proposed route additions would provide for a three percent increase in the number of open NFTS route miles occurring within ½ mile of neighboring private and federal lands. Overall, Alternative 6 would provide more beneficial cumulative effects to non-motorized recreation than Alternatives 1, 2, and 5, less than Alternatives 3 and 4, and about an equal amount of beneficial effect as Alternative 7.

Alternative 6 would have moderate beneficial cumulative effects to motorized recreation by increasing NFTS mileage available for motorized recreation. Proposed route additions contribute to a variety of riding experiences as well as the continuity of the motor-touring opportunities. The route additions also provide loops, connectors, and access to a diversity of dispersed recreation activities which can benefit both motorized and non-motorized recreation opportunities by providing access to trailheads, dispersed campsites etc. Proposed road additions and open NFTS roads would provide about 5,153.2 miles of motorized recreation opportunity. This alternative also establishes 3 new motorized "Open Areas" totaling 244 acres, providing positive direct, indirect and cumulative impacts to motorized recreation opportunities (see Table 3.07-9). Compared to the other alternatives, Alternative 6 would provide the third most number of miles than any alternative, behind Alternatives 1 and 5 (see Table 3.07-15). Alternative 6 would provide motorized access to a total of 437 dispersed recreation sites, providing a substantial beneficial effect to motorized recreation opportunities. This alternative would provide the most motorized access to dispersed recreation sites behind Alternative 1 (see Table 3.07-10). Overall, compared to the other alternatives, Alternative 6 provides more potential beneficial cumulative impacts to motorized users than Alternatives 2, 3, 4, and 7, less than Alternative 1, and about equal potential as Alternative 5.

Alternative 7 – Proposed Action as identified in the Notice of Intent (NOI)

Alternative 7 has the potential to negatively alter non-motorized recreation settings through the use of proposed route additions, the existing NFTS, and other roads traveling through the Forest. Dust, noise, and motorized vehicle presence may impact non-motorized recreationists seeking a "quiet" recreation experience. Cumulatively under this alternative, 83.4 percent of the TNF would be affected by motorized use and would not be available for "quiet" recreation, which is more than Alternatives 3 and 4, but less than Alternatives 1, 5, and 6, and about equal to Alternative 2 when compared to the other alternatives (see Table 3.07-3). This alternative, combined with the past, present and reasonably foreseeable future actions, also has the potential to impact neighboring private and federal lands and wilderness areas. About 1,403 miles of NFTS open roads and proposed route additions would occur within ½ mile of neighboring private and federal lands and wilderness areas, more than Alternative 3, about equal to Alternative 4, but less than rest of the alternatives (see Table 3.07-11). The proposed route additions would provide for a one percent increase in the number of open NFTS route miles occurring within ½ mile of neighboring private and federal lands. Overall, Alternative 7 would provide more beneficial cumulative effects to non-motorized recreation than Alternatives 1, 2, and 5, less than Alternatives 3 and 4, and about an equal amount of beneficial effect as Alternative 6.

Alternative 7 would have moderate beneficial cumulative effects to motorized recreation by increasing NFTS mileage available for motorized recreation. Proposed route additions contribute to a

variety of riding experiences as well as the continuity of the motor-touring opportunities. The route additions also provide loops, connectors, and access to a diversity of dispersed recreation activities which can benefit both motorized and non-motorized recreation opportunities by providing access to trailheads, dispersed campsites etc. Proposed road additions and open NFTS roads would provide about 5118.2 miles of motorized recreation opportunity. No additional "Open Areas" would be established under this alternative (see Table 3.07-9). Since there are no new "Open Areas" established (no change from the current management situation), there would be no direct, indirect, or cumulative effects to motorized recreation. Compared to the other action alternatives, Alternative 7 would provide the third least number of miles of any alternative, only Alternatives 3 and 4 would provide fewer (see Table 3.07-15). Alternative 7 would provide motorized access to a total of 29 dispersed recreation sites, providing a beneficial effect to motorized recreation opportunities. Compared to the other alternatives, this alternative would provide the second least motorized access to dispersed recreation sites, only better than Alternative 3 (see Table 3.07-10). Overall, compared to the other alternatives, Alternative 7 holds more potential beneficial cumulative impact on motorized users than Alternative 3, about equal potential as Alternative 4, and less than the rest of the alternatives.

Compliance with the Forest Plan and Other Direction

Tahoe NF Land and Resource Management Plan

Alternative 1 implements the TNF LRMP, which allows cross country motorized travel on most land allocations. However, the LRMP, as written, is not in compliance with the Travel Management Rule. No motor vehicle use map would be produced.

No ROS plan amendments would be needed for any alternatives because all routes proposed for addition to the NFTS comply with the ROS class in the associated management area. No proposed route additions in the action alternatives would be located in primitive or semi-primitive non-motorized ROS classes. All proposed route additions would be located in semi-primitive motorized, roaded natural, or rural ROS classes.

Alternatives 2, 5, and 6 would require a Forest Plan amendment to lift the seasonal deer winter range restrictions in Management Area 84, Humbug Sailor. Alternative 2 increases the duration of all motorized activity on ML 2 native surface roads and trails in MA 84 by seven months. Alternatives 5 and 6 increase the duration of use by two and three months respectively since these areas are also limited by wet weather restrictions. The action alternatives comply with all other Forest Plan standards and guidelines, as well as any state or Federal regulatory direction identified in the regulatory framework section.

Visual Resources

Introduction

This section of the Motorized Travel Management EIS examines the extent to which alternatives respond to visual resources management direction established in the TNF Land and Resource Management Plan

(LRMP) and the Travel Management (TM) Rule. The LRMP visual resources direction was established under the implementing regulations of the National Forest Management Act (NFMA).

During development of the Tahoe National Forest's LRMP, the Forest's visual resources were inventoried to determine the landscape's scenic attractiveness (variety class inventory) and the public's visual expectations (sensitivity level inventory). Based upon these inventories, visual quality objectives (VQOs) were established for all Forest land areas. The VQOs establish minimum acceptable thresholds for landscape alterations from an otherwise natural-appearing forest landscape. For example, areas with a retention VQO are expected to retain a natural appearance; areas with a partial retention VQO may have some alterations, but they remain subordinate to the characteristic landscape; areas with a modification VQO can have alterations that do not look natural appearing.

Roads and trails create linear alterations in landscapes that can be mitigated through sound design. Unmitigated, they present uncharacteristic line qualities in forest landscapes. Landscapes with a dense canopy cover have the capability of masking these linear alterations; sparsely covered landscapes have less capability. The proliferation of unauthorized routes, particularly in sparsely covered landscapes, can adversely affect the Forest's visual resources.

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

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

National Forest Management Act: The NFMA, and its implementing regulations, required the inventory and evaluation of the Forest's visual resource, addressing the landscape's visual attractiveness and the public's visual expectations. Management prescriptions for definitive lands areas of the forest are to include visual quality objectives.

Travel Management Rule: The TM Rule does not cite aesthetics specifically, but in the designation of trails or areas, the responsible official shall consider effects on forest resources, with the objective of minimizing effects of motor vehicle use.

Tahoe NF LRMP: The LRMP contains direction for visual resource management. On page V-7 , the LRMP states: Maintain visual quality at the VQO level specified in each management area, as a minimum, but maintain higher visual quality wherever practical and compatible with other goals. The TNF LRMP also contains specific management area direction for visual resources. For the full list of Forestwide standards and guidelines for visual resource management, see the LRMP, page V-24 and V-25.

In addition to the above forestwide standards and guidelines, each management area is assigned a VQO or a range of VQOs to guide decisions and resource management activities. The Forest VQO map, shown in the following figure, was used in the effects analysis for this project. See the LRMP for standards and guidelines specific to each management area. Refer to Figure 3.07-1 for a map of the VQOs of the area.

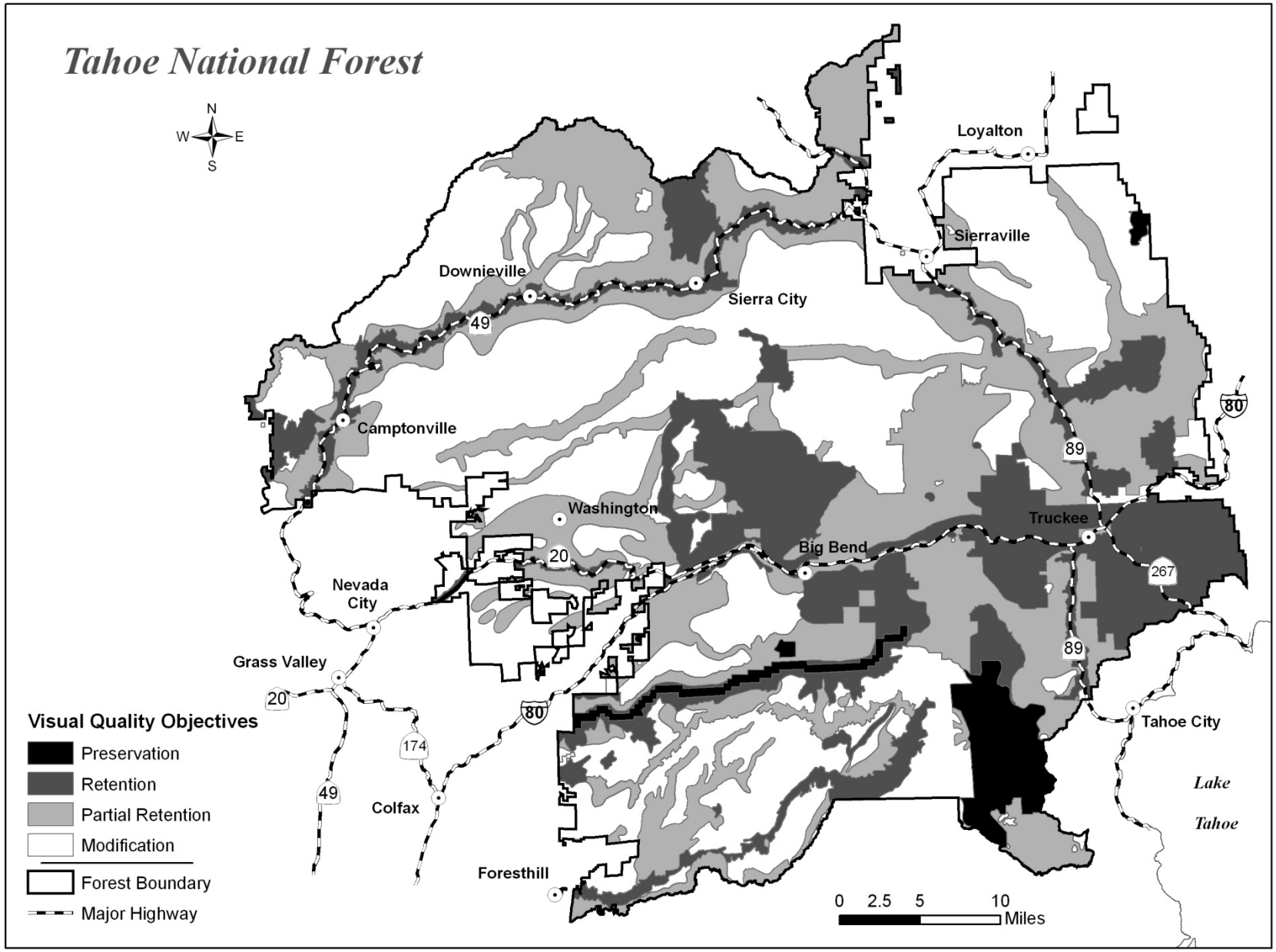

Figure 3.07-1. Tahoe National Forest Visual Quality Objectives

Effects Analysis Methodology

This analysis was completed using the framework outlined in USDA Forest Service Handbook: The Visual Management System (USDA Forest Service, 1974). Non-characteristic line quality created by trail routes is the greatest impact to the visual resources from the proposed alternatives. Roads and trails can create changes to a naturally appearing landscape by introducing noticeable deviations to the characteristic form, line, color or texture of a landscape. The location and design of these routes can significantly reduce their visual impact.

The proposed alternatives have the potential to affect the visual resource. VQO compliance was based on map review and on-the-ground knowledge of topography and vegetation of the area. Representative route addition samples were also field checked to verify VQO compliance. VQO compliance of proposed unauthorized route additions is documented in the project record. The "Assumptions specific to visual resources analysis" section lists assumptions used to determine VQO compliance. To determine the visual effects of the alternatives overall, geographic information system (GIS) was used to analyze the alternatives in regards to key viewshed locations and VQOs assigned to the area. Effects to key viewsheds and compliance with retention and partial retention VQOs are measurement indicators for this analysis.

VQOs provide direction for visual resources to determine the level of acceptable change for the landscape and are established in the TNF LRMP. This analysis uses VQOs to determine if the alternatives meet Forest Plan standards and guidelines by comparing the degree of alterations from an otherwise natural-appearing forest landscape. The TNF LRMP and Agriculture Handbook Number 462 provide definitions for the VQOs used for the visual management of lands administered by the TNF NF:

Preservation VQO – This VQO provides for ecological changes only. Management activities, except for very low visual impact recreation facilities, are prohibited.

Retention VQO – Activities are not evident to the casual forest visitor. This VQO provides for management activities that are not visually evident. Under retention, activities may only repeat form, line, color, and texture which are frequently found in the characteristic landscape.

Partial Retention VQO – Activities may be evident but must remain 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 they should remain subordinate to the visual strength of the characteristic landscape.

Modification VQO – Activities may dominate, but must utilize naturally-established form and texture. These areas should appear natural when viewed in foreground or middleground situations.

Maximum Modification VQO – Activities may dominate, but should appear as a natural occurrence when viewed in background situations.

Assumptions specific to visual resources analysis:

- Based upon the review of Tahoe LRMP, the basic measurement indicator for the visual resources is compliance with the retention and partial retention VQOs.
- As stated in the LRMP EIS, the TNF exhibits diverse and distinctive landscape qualities suited to scenic appreciation. An indication of these scenic qualities is the inclusion by California of all four

major roads that traverse the Forest – State Highways 20, 49, 89 and Interstate 80 – in the Master Plan of State Highways Eligible for Official Scenic Highway Designation. Currently, California has designated portions of Highway 20 and 49 as State Scenic Highways. These routes will be used as Key Viewsheds for this analysis.

- The preservation VQO occurs only in the designated (Granite Chief) Wilderness Area and along the North Fork of the American Wild and Scenic River; motorized access is not authorized in either area.
- NFTS additions are generally low impact roads or trails, which easily meet the modification and/or maximum modification VQO. These VQOs allow for activities, such as roads and trails, which dominate the characteristic landscape but utilize naturally-established form and texture.
- The visual resource would benefit from the elimination of dead-end routes.
- The prohibition of cross country travel would have a beneficial effect on scenery. Travel routes would naturally rehabilitate over time as uncharacteristic linear features and lighter colored soils would become less visible.
- Changing the road use, season of use, or vehicle class on existing NFTS roads would have no effect on scenery. The uncharacteristic linear feature or contrast is the potential visual impact, not the type or season of use.

Data Sources

- Tahoe National Forest LRMP for distribution of VQOs and identification of scenic viewsheds
- Forest's National Visitor Use Monitoring (NVUM) report to determine the popularity of viewing scenery or driving for pleasure.
- Recreation Facility Analysis for deriving recreation program niche
- Forest Service Handbook 462 – The Visual Management System

Visual Resources Indicators

Measurement Indicator 1: The extent to which the proposed NFTS additions fall within the retention and partial retention VQOs (number of miles traversing landscapes that are to remain natural to near-natural appearing in character).

Measurement Indicator 2: Number of key viewsheds that are or have the potential to be affected by motorized vehicle travel. Retention and partial retention VQOs are generally assigned to key viewsheds. For each alternative determine if proposed NFTS additions are in compliance with VQOs assigned to the key viewsheds.

Visual Resources Methodology by Management Action

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

2. Direct/indirect effects of adding facilities (presently unauthorized roads, trails, and "Open Areas") to the NFTS.

Short-term timeframe: 1 year

Long-term timeframe: 20 years, the approximate length of time for natural rehabilitation of unauthorized routes.

Spatial boundary: The "viewshed" is the unit of spatial analysis when considering effects associated with changes in the NFTS or season of use. Viewsheds encompass lands generally seen from a travel route or use point such as a campground. The following travel routes and their associated viewsheds have been identified as key viewsheds for this analysis: State Highways 20, 49, 89 and Interstate 80.

Indicator(s): The extent to which the proposed NFTS addition 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: VQO compliance was based on map review and on-the-ground knowledge of topography and vegetation of the area. Representative samples were also field checked to verify VQO compliance. GIS analysis of added routes in relation to retention and partial retention VQOs was also completed.

Rationale: Compliance with the retention and partial retention visual quality objectives (VQOs).

3. Direct/indirect effects of changes to the existing NFTS [including vehicle class, season of use, or reopening Maintenance Level 1 (ML 1) roads, and amendments to the Forest Plan].

Short-term timeframe: 1 year

Long-term timeframe: 20 years, the approximate length of time for natural rehabilitation of unauthorized routes.

Spatial boundary: The "viewshed" is the unit of spatial analysis when considering effects associated with changes in the NFTS or season of use. Viewsheds encompass lands generally seen from a travel route or use point such as a campground. The following travel routes and their associated viewsheds have been identified as key viewsheds for this analysis: State Highways 20, 49, 89 and Interstate 80.

Indicator(s): 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). Changing the road use, season of use, or vehicle class on existing NFTS roads would have no effect on scenery.

Methodology: VQO compliance was based on map review and on-the-ground knowledge of topography and vegetation of the area. Representative samples were also field checked to verify VQO compliance. GIS analysis of added routes in relation to retention and partial retention VQOs was also completed.

Rationale: Compliance with the retention and partial retention visual quality objectives (VQOs).

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, the approximate length of time for natural rehabilitation of unauthorized routes.

Spatial boundary: The "viewshed" is the unit of spatial analysis for determining cumulative effects. Viewsheds encompass lands generally seen from a travel route or use point such as a campground.

Indicator(s): 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). The following travel routes and their associated viewsheds have been identified as key viewsheds for this analysis: State Highways 20, 49, 89 and Interstate 80. Identify whether any of these key viewsheds are or have the potential to be affected by motor vehicle travel.

Rationale: Compliance with the retention and partial retention visual quality objectives (VQOs). Retention and partial retention VQOs are generally assigned to key forest viewsheds.

Visual Resources: Affected Environment

Americans highly value scenery, or visual quality, within the National Forests. Natural appearing forests offer scenes, which are valued as recreational settings and living environments. Such settings contribute to the well-being of many individuals in today's complex and fast-paced society. Conservation of the naturally established scenic character of these settings is the primary goal of visual management on all National Forests.

The Tahoe National Forest's 836,000 acre expanses of winding river canyons include the 38.3-mile North Fork American Wild and Scenic River, and the Granite Chief Wilderness area. The Forest scenery is known for its diversity, ruggedness, and semi-primitive character. An abundance of scenic river canyons and mountain crests offer high-quality settings for a growing number of recreation pursuits. Such pursuits include camping, picnicking, sightseeing from motor vehicles, river running and hiking.

Much of the Forest is visible from areas where users have a high concern for scenic values. Most of these areas have been assigned retention and partial retention VQOs but may have other VQOs also assigned. The Forest has a high portion of lands with steep to moderately steep slopes and soil colors that can sharply contrast with its green forests and other more subtle vegetative patterns. Thus, its overall capability to retain a natural appearance when altered is relatively low. Although roads and trails cause visual contrasts noticeable on the landscape, as described above, they often provide the platform for viewing scenery and other natural features. The top participating activity by Forest visitors based on 2005 National Visitor Use Monitoring Data (NVUM) was: viewing natural features with approximately 54 percent participating. Viewing natural features was the main activity for approximately 6 percent of visitors. Other popular activities included: relaxing, hiking-walking, viewing wildlife, and driving for pleasure. Driving for pleasure was the sixth most popular activity with about 16 percent of Forest visitors reporting participation in this activity. Extensive motorized vehicle use occurs forestwide on the existing road system.

Visual impacts from motorized off-highway vehicle use include unimproved roads and trails, which often create linear alterations on the landscape that have the potential to be viewed by Forest visitors looking from other locations or by Forest visitors traveling on the route itself. Roads and trails, when viewed from another location, have the potential to create negative visual impacts by introducing non-

characteristic linear features on a non-linear landscape with color contrasts from exposed soils on the routes and high use areas. Due to topographic and vegetative screening, seen during field review, these deviations are not noticeable in key viewsheds from the travel routes identified in this analysis. In most cases, the visual impact is a short duration view of a low impact unimproved road or trail intersecting the road or highway. These low impact intersections are generally not evident to the casual Forest visitor, or, if they are evident, they remain subordinate to the characteristic landscape. The deviations from the characteristic landscape caused by motorized off-highway vehicle use are most noticeable to the person riding on the road or trail. No unauthorized inventoried routes are identified in key viewsheds and the routes will meet the allocated VQO when viewed from the unauthorized route itself.

Key Viewsheds

Four highways traversing the Forest were identified by the State of California as eligible State Scenic Highways; namely Highways 20, 49, 89, and Interstate 80. As designated in the LRMP, the foreground distance zones of these routes are generally managed with a retention VQO in the foreground and partial retention for middle-ground viewing distances.

Visual Quality Objectives (VQOs)

Table 3.07-16 shows the acreage distribution of the retention and partial retention VQOs on the TNF. These objectives are used to define the amount of acceptable landscape alteration for a particular project.

Table 3.07-16. Forest acres and mileage of inventoried unauthorized routes and closed NFTS roads still receiving motorized use by retention and partial retention visual quality objectives (National Forest System lands only)

Visual Quality Objective	Acres	Percent of total Forest acres	Mileage of inventoried unauthorized and closed NFTS motorized routes still receiving motorized use
Retention	142,587	17	236.5
Partial Retention	316,438	38	545.3
Totals	**+/-836,000**	**100**	**1698.3**

Acreages may vary from Forest Plan totals due to National Forest land ownership changes

Visual Resources: Environmental Consequences

See the effects methodology section above regarding how this analysis was conducted. Vehicle class, season of use, and the amendment to the TNF LRMP will not be addressed in the discussion of environmental consequences by alternative since they do not affect the visual quality of the Forest. The alternatives will discuss the affects on visual resources based on the methodology listed previously. Table 3.07-17 compares the mileage of proposed unauthorized road and trail route additions in retention and partial retention VQOs by alternative. Also shown is the mileage of ML 1 roads proposed to be reopened in retention and partial retention VQOs by alternative. Mileage of roads with proposed mixed use is not included in this table. All other proposed unauthorized route additions are located in modification VQO.

Table 3.07-17. Miles of route added to the NFTS in retention and partial retention VQO

Action type	Indicator - Visual Resources	Miles of Unauthorized Routes Added to the NFTS/ Re-opened ML1 Roads						
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Additions to the NFTS	Retention VQO	N/A[a]	9.9	0.0	5.3	11.0	9.4	6.7
	Partial Retention VQO	N/A[a]	35.7	0.0	14.2	43.0	37.8	21.5
Reopening ML 1 Roads to motorized use	Retention VQO	N/A[a]	0.0	0.0	0.1	2.5	0.1	0.1
	Partial Retention VQO	N/A[a]	0.0	0.0	0.0	16.0	0.8	0.0
Subtotal Mileage of routes added to the NFTS in Retention or Partial Retention VQO		**N/A[a]**	**45.6**	**0**	**19.6**	**72.5**	**48.0**	**28.3**

[a] Under Alternative 1 no changes or additions to the NFTS would be made, but unauthorized routes would continue to be used and cross country motorized vehicle travel would continue.

Totals may include slight errors due to rounding.

Direct and indirect effects

Alternative 1 – No Action

Under the No Action Alternative, the existing condition as described in the affected environment section would continue. It provides a baseline for comparing other alternatives while no changes would be made to the NFTS. Motor vehicle travel by the public would not be limited to designated routes.

Prohibition of cross country wheeled motorized vehicle travel. Under Alternative 1, cross country motorized vehicle travel would not be prohibited. Approximately 1,698.3 miles of unauthorized routes and closed NFTS roads still receiving some motorized use (236.5 miles within Retention VQO and 545.3 miles within Partial Retention VQO) would continue to be used and would not naturally rehabilitate over time. Attempting to quantify effects associated with potential future cross country travel is speculative because it is impossible to predict exactly where, when, or how cross country motorized use would occur. Cross country travel has the potential to impact retention and partial retention VQO areas, which are managed as natural to near-natural appearing in character. In the short-term, due to topographic and vegetative screening, the uncharacteristic linear and color effects typically associated with cross country motorized travel would not be noticeable in the key viewsheds identified for this analysis. However visual impacts from cross country motorized use may be noticeable in areas outside of these viewsheds which are assigned retention or partial retention VQO. In the long term, the potential of new motorized cross country routes developing in key viewsheds would increase. Cross country motorized travel in areas with sparse vegetation would be more visible to Forest visitors and the uncharacteristic linear features and lighter colored exposed soils would have a negative effect on the visual resource. In most cases, uncharacteristic linear features seen on the landscape would not meet retention or partial retention VQO. In the long-term, the public would notice more impacts to visual resources from cross country motorized travel and anticipated development of additional unauthorized routes. User-created routes would continue to be used by all motorized vehicles. Cross country motor vehicle travel would continue, therefore

Alternative 1 has the greatest visual impact to the natural-appearing landscape when compared to the other alternatives.

Adding facilities (presently unauthorized roads, trails, and "Open Areas") to the NFTS and changes to the NFTS. No additions or changes to the existing NFTS would be made under Alternative 1 so there would be no direct or indirect effects to scenery from these actions.

Alternative 2 – Increased Motorized Recreation and Access Opportunities

Alternative 2 adds 59.6 miles of unauthorized routes to the NFTS, establishes four new "Open Areas" totaling 2,649 acres, and prohibits cross country motorized travel. In this alternative, no Maintenance Level 1 (ML 1) roads would be reopened to motorized use.

Prohibition of cross country wheeled motorized vehicle travel. The prohibition of cross country motorized vehicles would not be noticeable in the short-term as the natural rehabilitation of unauthorized routes would take longer than one year. The visual impact from unauthorized routes may be noticeable until these areas naturally rehabilitate. Most unauthorized routes and their associated visual impacts are not noticeable in key viewsheds due to topographic and vegetative screening. If unauthorized motorized routes intersect the road or highway, a short duration view of a low impact, unimproved road or trail may be noticeable until the route naturally rehabilitates. In the long term, unauthorized motorized vehicle routes and impact areas would naturally rehabilitate.

The effects of this action on visual resources would result in a more natural-appearing landscape. Compared to the No Action Alternative (Alternative 1), the landscape would, overall, have higher scenic integrity than currently exists with less evidence of human activity over time.

Adding facilities (presently unauthorized roads, trails, and "Open Areas") to the NFTS. Alternative 2 proposes about 9.9 miles of unauthorized route additions in retention VQO and about 35.7 miles in the partial retention VQO. Where proposed route additions intersect the road or highway in key viewsheds, views of a low impact, unimproved road or trail may occur for short durations, but these intersections generally would not be noticeable to the casual Forest visitor. The visual effects from these proposed route additions meet the retention and partial retention VQOs. The key viewsheds identified for this analysis would not be affected by the proposed unauthorized route additions under this alternative.

Alternative 2 establishes 2,649 acres of new motorized "Open Areas" areas in the Greenhorn area (60 acres) and Prosser, Boca, Stampede Reservoir areas (2,589 acres). The Greenhorn area is located in partial retention VQO area when seen in the middleground of Highway 20 and Interstate 80. Prosser, Boca and Stampede areas would be seen in the foreground of the reservoirs and fall within potential middleground views from Highway 89 and Interstate 80. The "Open Areas" at Boca, Prosser and Stampede Reservoirs would allow motorized travel below the high water mark resulting in temporary uncharacteristic linear effects which may be noticeable from within the reservoirs and nearby access roads; however, the OHV areas would not be visible in the identified key viewsheds because of topographic and vegetative screening. Since the trails and OHV use in these areas would not be noticeable in the key viewsheds identified for this analysis, the VQOs assigned to these proposed areas would be met.

Changes to the NFTS. This action would cause no change in effects for visual resources as it is assumed that existing NFTS roads, with road template, are already in place. Changing the road use, season of use, or vehicle class allowed to access the route would have no effect on scenery. In Alternative 2, no ML 1 roads (or road segments) would be reopened to motorized use.

Alternative 3 – Cross country Motorized Travel Prohibition Only – No Changes to the Current NFTS

Alternative 3 prohibits cross country motorized travel and proposes no additions to the existing system of roads and trails.

Prohibition of cross country wheeled motorized vehicle travel. The prohibition of cross country motorized vehicles would not be noticeable in the short-term as the natural rehabilitation of unauthorized routes would take longer than one year. The visual impact from unauthorized routes may be noticeable until these areas naturally rehabilitate. Most unauthorized routes and their associated visual impacts are not noticeable in key viewsheds due to topographic and vegetative screening. If unauthorized motorized routes intersect the road or highway, a short duration view of a low impact, unimproved road or trail may be noticeable until the route naturally rehabilitates. In the long term, unauthorized motorized vehicle routes and impacted areas would naturally rehabilitate. Alternative 3, when compared to the other alternatives, would have the least impact to visual resources as most unauthorized motorized routes would naturally rehabilitate over time, resulting in a more natural-appearing landscape.

Adding facilities (presently unauthorized roads, trails, and "Open Areas") to the NFTS and changes to the NFTS. Alternative 3 proposes no additions or changes to the existing NFTS. In the long term the landscape viewed from existing system roads and trails would be more natural-appearing.

Alternative 4 – Increased Resource Protection

Alternative 4 adds about 26.3 miles of unauthorized routes as roads or trails and reopens one ML 1 road (0.1 miles). No motorized "Open Areas" would be established.

Prohibition of cross country wheeled motorized vehicle travel. The effects on visual resources from the prohibition of cross country motorized vehicles under Alternative 4 would be the same as those described for Alternative 2. See the direct and indirect effects of the prohibition of cross country motorized vehicle travel section under Alternative 2. The effects of this action on visual resources would result in a more natural-appearing landscape. Compared to the No Action Alternative (Alternative 1), the landscape would, overall, have higher scenic integrity than currently exists with less evidence of human activity over time.

Adding facilities (presently unauthorized roads, trails, and "Open Areas") to the NFTS. Alternative 4 proposes 5.3 miles of unauthorized route additions in the retention VQO and 14.2 miles in the partial retention VQO. The visual effects from these proposed unauthorized route additions would achieve the retention and partial retention VQOs. Where proposed route additions would intersect a road or highway, views of a low impact, unimproved road or trail may occur for short durations, but these intersections generally would not be noticeable to the casual Forest visitor. The key viewsheds identified for this analysis would not be affected by the proposed unauthorized route additions under this alternative.

The addition of unauthorized roads and trails under this alternative would have similar effects as those described under Alternative 2, but to a more beneficial degree due to fewer miles of additions to the NFTS and no "Open Areas" would be established in retention and partial retention VQO.

Changes to the NFTS. The effects on visual resources from this action would be the same as those described for Alternative 2 except that 0.1 mile of ML 1 road would be reopened within the retention VQO. Where this ML 1 Road would intersect a road or highway, views of a low impact, unimproved road or trail may occur for short durations, but would not be noticeable to the casual Forest visitor. The key viewsheds identified for this analysis would not be affected by this proposed change to the existing NFTS. The changes to the existing NFTS under Alternative 4 would have similar effects as those described under Alternative 2, only slightly greater.

Alternative 5 – Increased Motorized Recreation Plus Reopening Maintenance Level 1 and Temporary Roads

Alternative 5 prohibits cross country motorized travel, adds 80.4 miles of unauthorized routes as roads or trails, and reopens portions of 113 ML 1 roads (93.4 total miles). No new motorized "Open Areas" would be established.

Prohibition of cross country wheeled motorized vehicle travel. The effects on visual resources from the prohibition of cross country motorized vehicles under Alternative 5 would be the same as those described for Alternative 2. See the direct and indirect effects of the prohibition of cross country motorized vehicle travel section under Alternative 2. The effects of this action on visual resources would result in a more natural-appearing landscape.

Adding facilities (presently unauthorized roads, trails, and "Open Areas") to the NFTS. Alternative 5 proposes about 11 miles of unauthorized route additions in the retention VQO and about 43 miles in the partial retention VQO. The addition of unauthorized roads and trails under Alternative 5 would have similar impacts to the visual resource as those described under Alternative 2 but the negative impact to the visual resource would be slightly greater. See the direct and indirect effects of adding facilities to the NFTS section under Alternative 2. The visual effects from these proposed route additions would achieve the retention and partial retention VQOs. The key viewsheds identified for this analysis would not be affected by the proposed unauthorized route additions under this alternative.

Changes to the NFTS. The effects on visual resources from implementing Alternative 5 would be similar to those described for Alternative 2; however, Alternative 5 proposes to reopen 2.5 miles of ML 1 roads within the retention VQO and 16 miles of ML 1 roads within the partial retention VQO. The visual effects from these proposed changes to the NFTS would achieve the retention and partial retention VQOs. The key viewsheds identified for this analysis would not be affected by the proposed unauthorized route additions under this alternative. The addition of reopening ML 1 roads and trails under this alternative would have similar effects as those described under Alternative 2, but the negative impact to the visual resource would be greater.

Alternative 6 – Preferred Alternative – Motorized Access and Resource Protection

Alternative 6 prohibits cross country motorized travel, adds 61.4 miles of unauthorized routes to the NFTS, establishes 244 acres of new motorized "Open Areas" in the Boca, Prosser, and Stampede area, and reopens thirteen ML 1 roads totaling 11.4 miles.

Prohibition of cross country wheeled motorized vehicle travel. The effects on visual resources from the prohibition of cross country motorized vehicles under Alternative 6 would be the same as those described for Alternative 2. See the direct and indirect effects of the prohibition of cross country motorized vehicle travel section under Alternative 2. The effects of this action on visual resources would result in a more natural-appearing landscape.

Adding facilities (presently unauthorized roads, trails, and "Open Areas") to the NFTS. The addition of unauthorized roads, trails, and areas under Alternative 6 would have similar effects as those described under Alternative 2 but to a slightly greater degree. See the direct and indirect effects of adding facilities to the NFTS section under Alternative 2.

Alternative 6 proposes about 9.3 miles of unauthorized route additions in the retention VQO and about 37.8 miles in the partial retention VQO. The visual effects from these proposed route additions would achieve the retention and partial retention VQOs. The key viewsheds identified for this analysis would not be affected by the proposed unauthorized route additions under this alternative.

Alternative 6 also establishes about 244 acres of new off-highway vehicle (OHV) motorized "Open Areas" areas in the Prosser, Boca, Stampede Reservoir areas. Prosser, Boca and Stampede areas would be seen from the foreground of the reservoirs and fall in potential middleground views from Highway 89 and Interstate 80. These proposed "shoreline" "Open Areas" would allow motorized travel below the high water mark in the reservoir resulting in minor-temporary uncharacteristic linear and color effects which may be noticeable from within the reservoirs and nearby access roads; however, the OHV "Open Areas" would not be visible in the identified key viewsheds because of topographic and vegetative screening. Since the motorized use in these areas would not be noticeable in the key viewsheds identified for this analysis, the VQOs assigned to these proposed areas would be met.

Changes to the NFTS. The effects on visual resources from this action would be the similar as those described for Alternative 2. However, 0.1 miles of ML 1 roads are proposed to be reopened within the retention VQO and 0.8 miles within the partial retention VQO. The visual effects from these proposed changes to the NFTS would achieve the retention and partial retention VQOs. The key viewsheds identified for this analysis would not be affected by the proposed unauthorized route additions under this alternative. The addition of reopening ML 1 routes under this alternative would have similar effects as those described under Alternative 2 but the impacts to the visual resource would be slightly greater.

Alternative 7 – Proposed Action as Identified in the Notice of Intent (NOI)

Alternative 7 prohibits cross country motorized travel, adds 36.7 miles of unauthorized routes as motorized trails, and reopens 1.1 miles of ML 1 road on two roads. No new motorized "Open Areas" would be established.

Prohibition of cross country wheeled motorized vehicle travel. The effects on visual resources from the prohibition of cross country motorized vehicles under Alternative 7 would be the same as those described for Alternative 2. See the direct and indirect effects of the prohibition of cross country motorized vehicle travel section under Alternative 2. The effects of this action on visual resources would result in a more natural-appearing landscape than Alternative 1.

Adding facilities (presently unauthorized roads, trails, and "Open Areas") to the NFTS. Alternative 7 proposes approximately 6.7 miles of unauthorized route additions (motorized trails) in the retention VQO and about 21.5 miles in the partial retention VQO. The visual effects from these proposed additions would achieve the retention and partial retention VQOs. Where proposed route additions intersect a road or highway, views of a low impact, unimproved road or trail may occur for short durations, but these intersections generally would not be noticeable to the casual Forest visitor. The key viewsheds identified for this analysis would not be affected by the proposed additions under this alternative. The addition of unauthorized roads and trails and under this alternative would have similar effects as those described under Alternative 2.

Changes to the NFTS. The effects on visual resources from this action would be similar to those described for Alternative 4 since both alternatives reopen 0.1 miles of ML 1 road within the retention VQO. The visual effects from these proposed changes to the NFTS would achieve the retention and partial retention VQOs.

Cumulative Effects

Alternative 1 – No Action

The cumulative effects analysis for scenery considers the impact of the alternatives when combined with past, present, and reasonably foreseeable future actions and events. The following travel routes and their associated viewsheds have been identified as key viewsheds for this analysis: State Highways 20, 49, 89 and Interstate 80. Retention and partial retention VQOs are assigned to these key viewsheds. In analyzing cumulative effects of Motorized Travel Management, the TNF considered effects from all present and reasonably foreseeable future actions that have potential for changing road density within the analysis area. These actions affecting the visual resource include: new road construction, reconstruction, decommissioning and/or adding roads to the Forest transportation system. Impacts from human activities are primarily the result of past logging, road building, and, to a lesser extent, mining activity. Most of the Forest has a natural appearance, while the remainder appears altered. Most of the strong visual contrasts occur either in the background distance zone or out of sight of major highways, trails, or recreation areas.

Since cross country motorized travel would continue under Alternative 1, the unpredictable proliferation of user-created routes would continue. The present and reasonably foreseeable future activities would continue to form the landscape aesthetics and recreation opportunities. Recreation activities and developments and travel management activities, including the NFTS, most often form the viewing platform and opportunities for viewing scenery. Any new road construction, reconstruction, decommissioning and/or adding roads to the Forest transportation system are expected to meet the VQOs assigned to the management area in which they occur. Abandoning, closing or decommissioning roads

generally results in a more naturally appearing landscape. Most of the strong visual contrasts would continue to occur either in the background distance zone, in areas not assigned retention or partial retention VQO, or out of sight of major highways, trails, or recreation areas. Although the majority of the Forest would continue to have a natural appearance, it is anticipated that the No Action Alternative along with the past, present, and reasonably foreseeable future actions would result in an increase in Forest lands which appear altered.

Action Alternatives

See the cumulative effects section under Alternative 1 for the past, present, and reasonably foreseeable future actions considered and other information on how the cumulative effects analysis was conducted.

Alternatives 2, 4, 5, 6, and 7. The present and reasonably foreseeable future activities would continue to form the landscape aesthetics and recreation opportunities. Recreation activities and developments and travel management activities, including the NFTS, most often form the viewing platform and opportunities for viewing scenery. Any new road construction, reconstruction, decommissioning and/or adding routes to the Forest transportation system are expected to meet the VQOs assigned to the management area in which they occur. Abandoning, closing or decommissioning roads generally results in a more naturally appearing landscape.

The majority of the Forest would continue to have a natural appearance. Areas visually impacted by unauthorized motorized routes would continue to rehabilitate over time resulting in a more natural-appearing landscape. It is anticipated that implementation of this alternative along with the past, present, and reasonably foreseeable future actions would result in no cumulative effects to visual resources. With cross country motorized travel prohibited, the unpredictable proliferation and concentration of unauthorized routes would end. The landscapes viewed in the key viewsheds identified for this analysis would have more natural-appearing characteristics. Overall, the landscape would have higher scenic integrity than currently exists with less evidence of human activity over time. The cumulative effects of Alternatives 2, 4, 5, 6, and 7 would be the same.

Alternative 3. The cumulative effects of Alternative 3 would be slightly less impacting to visual quality compared to the cumulative effects described for Alternatives 2, 4, 5, 6, and 7 due to the lack of additions to the NFTS.

Compliance with the Forest Plan and Other Direction

Alternative 1 allows cross country motorized travel, putting visual resources at risk and promotes changes to the landscape in key viewsheds that may not comply with Forest Plan prescribed retention and partial retention VQOs in the long term. All action alternatives would meet the visual resource standards and guidelines outlined in the Forest Plan. All action alternatives have been designed to meet the retention and partial retention VQOs as viewed from the travel routes identified as key viewsheds for this analysis.

Summary of Effects Analysis across All Alternatives for Recreation and Visual Resources

This section summarizes the effects analysis by discussing how well each alternative addresses the recreation and visual resources for each measurement indicator. The following ranks were used in Tables 3.07-18, 19, and 20: A score of 7 indicates the alternative has the least impact for recreation or visual resource measurement indicators. A score of 1 indicates the alternative has the most impact for recreation and visual resource measurement indicator.

Table 3.07-18. Non-motorized Recreation Summary

Indicator	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Non-motorized recreation opportunity	1	3	7	6	2	5	4
Impact of proposed changes on the NFTS on neighboring private and federal lands	1	4	7	6	2	3	5
Non-motorized overall ranking	1	3	7	6	2	4	5

Table 3.07-19. Motorized Recreation Summary

Indicator	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized recreation opportunity	7	5	1	2	6	4	3
Motorized access to dispersed recreation	7	4	1	3	5	6	2
Motorized overall ranking	7	4	1	2	6	5	3

Table 3.07-20 Visual Resources Summary

Indicator	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Relative benefit to visual resources	1	4	7	6	2	3	5

In Table 3.07-18, non-motorized recreation measurement indicators summarized include: non-motorized recreation opportunity and impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts). Alternative 1 would have the most impact on non-motorized recreation opportunity and the most impact on neighboring private and federal lands and wilderness areas (dust, noise, use conflicts) in that continued cross country motorized travel would have the most impacts on these measurement indicators in the long term. Alternatives 3 and 4 would have the least impact regarding these measurement indicators by providing the most non-motorized recreation opportunity and reducing the impact of proposed changes to the NFTS on neighboring private and federal lands (dust, noise, use conflicts). Alternatives 6 and 7 are about equal in providing the next least reduction in the beneficial effects to non-motorized recreation and impacts on neighboring private and federal lands. Alternatives 2 and 5 would also provide beneficial effects to non-motorized recreation and reduce impacts on neighboring private and federal lands and wilderness areas by prohibiting cross country motorized travel, but less beneficial effects regarding these measurement indicators when compared to the other alternatives

In Table 3.07-19, motorized recreation measurement indicators summarized include: motorized recreation opportunity and amount of motorized access to dispersed recreation. Alternative 1, which would continue to allow cross country motorized travel, would have the least impact regarding these measurement indicators by providing the most motorized recreation opportunity and the most motorized access to dispersed recreation of any alternative. With no route additions or mixed use roads proposed in Alternative 3, this alternative would have the most impacts on these measurement indicators. Alternatives 4 and 7 are tied for second most impact to the motorized indicators, these alternatives would provide moderate additions and access to dispersed recreation. Alternative 2 would impact the motorized indicators less than Alternatives 4 and 7 with additional additions to the NFTS, establishing the greatest amount of "Open Areas," and increased motorized access to dispersed recreation. Finally Alternatives 5 and 6 are relatively equal in regard to motorized recreation and motorized access to dispersed recreation, behind Alternative 1. However Alternative 6 includes the second greatest establishment of "Open Area" acreage, providing this alternative a slight edge when compared to Alternative 5.

Alternative 1 is the worst for addressing compliance with the retention and partial retention VQOs and key viewsheds affected by the proposed NFTS in that continued cross country motorized travel would likely impact retention and partial retention VQOs and the key viewsheds identified for this analysis in the long term. All action alternatives would be beneficial to visual resources in varying degrees by prohibiting cross country motorized travel. All action alternatives would meet retention and partial retention VQOs. Key viewsheds identified for this analysis would not be affected by the proposed NFTS in any action alternative.

Chapter 3.08

Transportation

3.08. Transportation

Affected Environment

Introduction

This section of the environmental analysis examines the extent to which alternatives respond to transportation facilities direction established in the Tahoe National Forest Land and Resource Management Plan (LRMP). The LRMP transportation facilities direction was established under the implementing regulations of the National Forest Management Act (NFMA) and the National Forest Roads and Trails Act (FRTA). The National Forest Transportation System (NFTS) consists of roads and trails. The NFTS provides for protection, development, management, and utilization of resources on the National Forests.

There are other roads and trails existing on the Forest that are not currently part of the NFTS. Transportation facilities considered in this analysis include roads and trails that are suitable for motor vehicle use. This analysis considers changes needed to the NFTS to meet the purpose and need of this analysis. Decisions regarding changes to the transportation facilities must consider: 1) providing for adequate public safety, and 2) providing adequate maintenance of the roads and trails that would be designated for public use. The analysis in this section primarily focuses on these two aspects of the NFTS.

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

Direction relevant and specific to the proposed action as it affects transportation facilities includes:

Transportation Rule (36 CFR 212, 251, 261 and 295): The alternatives in this EIS are designed specifically to implement the requirements of the November 9, 2005, rule for travel management; *Designated Routes and Areas for Motor Vehicle Use*. Title 36, Code of Federal Regulations, Part 212 (36 CFR 212) is the implementing regulation for the National Forest Roads and Trails Act (FRTA), and it includes portions of the Travel Management Rule published in the Federal Register on November 9, 2005. Part 212 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.

The Tahoe National Forest Land and Resource Management Plan (LRMP) goals call for providing a broad spectrum of recreational opportunities in accordance with need, demand, and type of use (LRMP page 97). Additionally, the Forest Plan calls for closures where obvious conflicts exist (LRMP page 97). Furthermore, the Forest Plan calls for providing safe recreational access (LRMP page 100).

Forest Service Manual Sections 2350 and 7700 contain agency policy for management of the National Forest Transportation System. 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 7709.59, Road System Operation and Maintenance Handbook, describes the maintenance management

system the Forest Service uses and the maintenance standards needed to meet RMOs for the road system and includes considerations for public safety.

Regional Forester's Letters. Direction related to motorized mixed use is contained in Regional Forester's letters, file code 7700/2350, dated 08/26/06, 06/20/07, and 1/13/09. These letters provide procedures National Forests in the Pacific Southwest Region will use to evaluate safety aspects of public travel on roads when proposed changes to the NFTS will allow both highway-legal and non-highway-legal traffic on a road (motorized mixed use).

The California Vehicle Code (CVC). The 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.

Background

A majority of Tahoe National Forest (TNF) visitors travel on NFTS roads. Roads have opened the TNF to millions of national and international visitors. Forest roads are also an integral part of the transportation system for rural counties. They provide access for research, fish and wildlife habitat management, grazing, timber harvesting, fire protection, mining, insect and disease control, and private land use in addition to recreation opportunities.

Roads in the NFTS are not public roads in the same sense as roads that are under the jurisdiction of State and county road agencies. NFTS roads are not intended to meet the transportation needs of the public at large. Instead, they are authorized only for the use and administration of National Forest System lands. Although generally open and available for public use, that use is at the discretion of the Secretary of Agriculture. Through authorities delegated by the Secretary, the Forest Service may restrict or control traffic to meet specific management direction (USDA Forest Service, Forest Service Manual 7731).

The TNF has approximately 2,900 miles of NFTS roads. Roads are defined as motor vehicle travelways over 50 inches wide, except those designated and managed as a trail. Trails, including off-highway vehicle (OHV) trails, are covered further in the recreation section (Chapter 3.07) of this EIS.

Some roads and trails are present on the acres where the decision to prohibit cross country travel may be made. These routes are not currently authorized for motor vehicle use by the public. There are also closed NFTS roads in these areas which are still receiving unauthorized motor vehicle use. These routes would continue experiencing use in the No Action Alternative, while some would be added to the NFTS in the action alternatives as roads or trails designated for motor vehicle use.

NFTS roads are each maintained in one of three categories: Maintenance Level 1 roads closed to motor vehicles in long term storage (closed roads), Maintenance Level 2 roads maintained for high-clearance vehicles only (high clearance roads), and Maintenance Level 3 to 5 roads maintained for standard four-wheel passenger cars (passenger car roads). Those roads maintained for standard passenger cars are subject to the Highway Safety Act and are considered by the Forest Service to be highways for purposes of the California Vehicle Code (CVC).

Costs and Funding for Road Maintenance

Need for Maintenance and Administration

NFTS roads must be maintained to avoid problems that can arise when they fall into disrepair. Each year, the TNF prepares a road maintenance plan, which lines out the road work for the year. Resource protection and public safety are the maintenance priorities. The Travel Management Rule (36 CFR 212.55) requires consideration of the need for maintenance and administration of the designated NFTS. Costs associated with administration of NFTS facilities 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). Routine maintenance includes items like the repair of drainage features such as water bars and the repair and/or replacement of signage. Administration needs include database management as well as permit issuances.

In recent years, annual road maintenance budgets have not been sufficient to maintain the entire road system to standard. This has led to an increase in deferred maintenance. Deferred maintenance is work that can be deferred without loss of serviceability. In past decades, commercial users (typically timber purchasers) maintained a substantial portion of the NFTS roads on the TNF during timber sale activities. With the decrease in timber sales, however, fewer roads are being fully maintained (meaning deferred maintenance needs increased). An estimated 28 percent of the TNF road system was fully maintained in 2007. Table 3.08-1 presents average annual maintenance costs for the TNF.

Table 3.08-1. Average Costs for Annual Road and Trail Maintenance in the Tahoe National Forest

Maintenance Class	Existing Miles	Cost per Mile	Annual Cost
Closed Roads, ML 1	567.1	$225	$127,597
High Clearance Roads, ML 2	1,492.8	$1,143	$1,706,270
Passenger Car, ML 3	522.4	$10,870	$5,678,488
Passenger Car, ML 4&5	196.0	$14,107	$2,764,972
Trail Open to All Trail Vehicles	133.9	$1,350	$180,765
Trail Open to ATVs	25.5	$1,275	$32,512
Trail Open to Motorcycles Only	168.8	$1,500	$253,200

Sources: National Road Maintenance Cost Guide adjusted for the Forest averages. Trails: Tahoe.

Availability of Resources

The Federal budget currently exceeds revenues. Revenues are expected to increase, but mandatory spending will increase at a faster rate. As a result, federal discretionary spending will decrease, likely leading the Forest Service to experience declining budgets through 2017. Figure 3.08-1 shows a graph of economic growth and mandatory program spending. The GDP is projected to increase, but Medicare/Medicaid and Social Security outlays are projected to increase at faster rates.

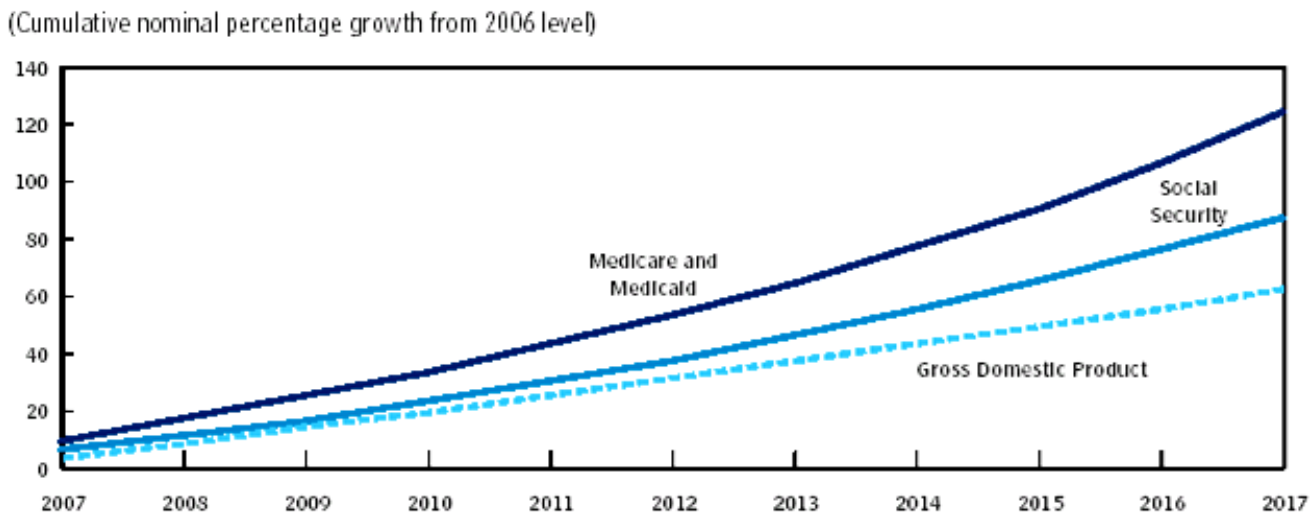

Figure 3.08-1. Congressional Budget Office's Projected Growth of the U.S. Economy and Federal Spending for Major Mandatory Programs, 2007-2017

Source: Congressional Budget Office. The Budget and Economic Outlook: Fiscal Years 2008-2017. January 2007.

Forest Service funding for road maintenance and administration has generally decreased over the last five years. Collections from commercial users can only be spent on roads where collections were made. Maintenance performed by non-Forest Service funds varies greatly from year to year and tends to be work associated with timber haul. For example, the purchaser may blade a road before hauling timber on it. Refer to Table 3.08-2.

Table 3.08-2. Tahoe National Forest's Past Years' Road Budgets (in nominal dollars)

	Fiscal Year				
Source:	**2003**	**2004**	**2005**	**2006**	**2007**
Base Allocation	1,075,644	903,000	751,000	719,000	924,300
Collections from Cooperative Agreements	1,006,629	535,324	187,728	226,260	310,373
Maintenance Performed by Non-Forest Service Funds	642,000	223,204	25,000	129,500	*

*Fiscal Year 2007 data was not required to be submitted.

Public Safety

Public safety affects the selection of geometric elements and design speed of roads, requires the examination of possible hazards and corrective actions needed, and identifies the needs for traffic control and maintenance activities (USDA Forest Service Handbook 7709.56).

Conflicts among Different Classes of Motor Vehicle Uses - Motorized Mixed Use

NFTS roads are designed primarily for use by highway-legal vehicles (motor vehicles that are licensed or certified for general operation on public roads within the State), such as passenger cars or log trucks. Some NFTS roads also provide recreational access for all-terrain vehicles and other non-highway-legal

motor vehicles. Motorized mixed use (MMU) is defined as designation of an NFS road for use by both highway-legal and non-highway-legal motor vehicles (USDA Forest Service, Engineering Publication EM-7700-30). Designating NFTS roads for motorized mixed use involves safety and engineering considerations.

The California Vehicle Code (CVC) requires motor vehicles operated on highways be highway-legal and be operated by licensed drivers. The CVC allows the operation of non-highway-legal vehicles operated by unlicensed drivers on roughly graded roads. The Forest Service considers roads maintained for high clearance vehicles (Maintenance Level 2) as roughly graded and considers operation of OHVs on these roads as consistent with state law.

The policy of Region 5 is to conduct a motorized mixed use analysis on all roads maintained for passenger cars where mixed use is proposed and on any high clearance roads that have a crash history or where mixed use was not allowed in the past. The baseline for the analysis will be Forest Service regulations and directives and applicable State and local laws. The qualified engineer determines how detailed the analysis is to be and may choose to do an evaluation based on factors in EM-7700-30 or other factors. *Qualified Engineer* is defined as "An engineer who by experience, certification, education, or license is technically trained and experienced to perform the engineering tasks specified and is designated by the Director of Engineering, Regional Office" (FSM 7705). The qualified engineer determines the factors to be considered for the specific road, road segment, or road system being analyzed. Based on the analysis conducted, the qualified engineer will determine the probability of a crash occurring and the severity of the crash. He or she may also provide mitigation measures that would tend to reduce the probability or severity of a crash. Under certain conditions, the qualified engineer may document engineering judgment without preparing a full engineering report. Otherwise, when issues are more complex, the qualified engineer will prepare a detailed engineering report.

Speed, Volume, Composition, and Distribution of Traffic

Roads on the TNF are used by a variety of vehicles, including logging trucks, wood chip vans, passenger cars, pick-up trucks, recreation vehicles and OHV's. Traffic volumes change depending on the time of year and activities occurring along the road. Forest roads experience the highest vehicle use when recreationists, logging trucks, wood chip vans, and agency personnel all need the same road at the same time, often in the summer.

Compatibility of Vehicle Class with Road Geometry and Road Surfacing

Roads are designed based on design vehicles (vehicles with representative weight, physical dimensions, and operating characteristics). Design vehicles are selected based on the largest vehicle likely to use the facility or facilities accessed by the proposed road. For example, if a new road is planned for a fuels project on the TNF, the design vehicle would be a wood chip van or logging truck.

Additionally, the volume, composition, distribution, and whether the road is subject to the Highway Safety Act are elements of traffic criteria used in the design of turnouts, road widths, surfacing, safety features, and traffic control. Roads designed and maintained for high clearance vehicles are not subject to

the Highway Safety Act. The applicability of the Highway Safety Act is determined during transportation system planning.

As stated, forest roads were designed primarily for highway-legal vehicles. Since some non-highway-legal vehicle classes differ from highway-legal vehicles, the qualified engineer considered how those different classes can be expected to function depending on the road characteristics.

Effects Analysis Methodology

Transportation Specific Assumptions

- Any motor vehicle use authorized by state law is occurring on the NFTS unless there are Forest specific prohibitions.
- Motor vehicle use by special use permit or other permitted activities are outside the scope of this decision (for example, fuelwood gathering, motorized SUP events, recreation residences, etc.)
- Eligible motorized trail vehicle classes are high clearance trail vehicles (4WD, etc.), ATVs, and motorcycles. Low clearance highway legal vehicles are not prohibited on trails but would not be found using trails.
- There is some cost for maintenance that will have to be borne by the Forest Service for any route open to motor vehicle use by the public.
- State law regulating motor vehicle drivers sets the standard of care for the safety of drivers themselves and other users of the NFTS.

Transportation Sources of Information

Information on individual roads and trails can be found in Appendix A (Site Specific Road, Trail and Open Area Information) and Appendix J (Roads Analyzed for Motorized Mixed Use). Additional information including the INFRA Database and previous NEPA decisions is part of the project record.

Measurement Indicators

Measurement Indicators are intended to address how each action individually (via direct and indirect effects) and each alternative as the sum total of its proposed actions (via cumulative effects) respond to the need for a safe and affordable NFTS. Direct effects of this decision are due to additions to the NFTS and changes in class of vehicle allowed on NFTS roads and trails. Conflicts with other resources are examined in other sections.

The measurement indicators used to display differences between the effects of the alternatives on NFTS roads and trails are: 1) Public Safety, and 2) Affordability.

Public Safety

36 CFR 212.55 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 their effects on public safety. Refer to Appendix A (Site Specific Road, Trail and Open Area Information) for specific information on each road or trail considered to be added to the NFTS.

Affordability

36 CFR 212.55 requires consideration of the need for maintenance and administration of the designated NFTS. NFTS expenses include needed maintenance work that has not been completed (deferred maintenance) and costs of routine maintenance to maintain the facility at its current standard (annual maintenance). Proposed changes to the NFTS may have additional implementation costs such as sign installation and resource improvements.

A current estimate of road deferred maintenance on the TNF is $115,000,000. This value is based on a random sample of deferred maintenance needs taken nationally 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.

Environmental Consequences

Forest Plan and Other Regulatory Direction

All the action alternatives comply with the Forest Plan and the Transportation Rule. Additionally, roads analyzed for motorized mixed use were assessed for compliance with the California Vehicle Code (see Appendix J – Roads Analyzed for Motorized Mixed Use).

Public Safety

Direct and Indirect Effects

Prohibiting Cross Country Travel. Alternative 1 would continue to have unauthorized cross country travel on 754,066 acres. This would affect public safety of the off road traveler in that those risks and hazards of unknown situations continue to exist. All of the action alternatives prohibit cross country travel on 833,392 to 836,000 acres. Motorized travel would occur only on designated routes, NFTS roads and trails, receiving periodic maintenance. The periodic maintenance includes the identification and remediation of known hazards. It is common for the users of the designated routes to identify or remove hazards such a fallen trees and rocks from the traveled way. Designated routes also have either been engineered and constructed utilizing safety standards or, at a minimum, have been reviewed for safety before having been added to the transportation system.

Additions to the NFTS. The new roads and trails proposed in Alternatives 2, 4, 5, 6, and 7 were evaluated for safety and compliance with design standards (see Appendix A, “Site Specific Road, Trail and Open Area Information,” for specific routes). None of the roads or trails was found to present an unacceptable safety risk. Likewise, none of the Maintenance Level 1 Roads reopened for motorized mixed use present an unacceptable safety risk, or does changing the season of use on roads or the prohibition on cross country travel. All roads proposed for additions would be managed as Maintenance Level 2 and as such not subject to the Highway Safety Act. Refer to Table 3.08-3 for a summary comparison of alternatives with respect to safety.

Table 3.08-3. Summary comparison of alternatives with respect to public safety

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of passenger car roads (Maintenance Level 3-5) changed to high clearance roads (Maintenance Level 2)	0	157.2	0	3.4	157.2	122.0	3.4
Additions to the NFTS	0	54.6	0	22.6	75.4	48.3	36.7
Maintenance Level 1 Roads Reopened to Motor Vehicles	0	0	0	0.1	93.4	11.4	1.1
Miles of Passenger Car Road with Change in Allowed Classes of Vehicles from "Highway Legal Only" to "All Vehicles" - By Approving Motorized Mixed Use (MMU)	0	241.5	0	3.4	241.5	130.8	3.4
Miles of passenger car roads with high crash severity Motorized Mixed Use (MMU)	0	174.1	0	0	174.1	4.1	0
Miles of passenger car roads with high crash probability Motorized Mixed Use (MMU)	0	32.0	0	0	32.0	0	0
Number of MMU roads consistent with California Vehicle Code Division 16.5, Combined Use	0	56	0	1	56	53	1
Number of MMU roads not consistent with California Vehicle Code Division 16.5, Combined Use	0	28	0	0	28	10	0

Establishment of motorized "Open Areas": The establishment of 2,649 or 2,589 acres of "Open Areas" in Alternative 2 or 6 respectively would affect public safety in that the areas have been reviewed for safe use by motorized traffic. These "Open Areas" are not known to have health risks or unusual circumstances that pose safety concerns for prudent users. The other action alternatives would not establish "Open Areas" and do not affect public safety.

Change in Class of Vehicle from Approval of Mixed Use. Alternatives 2 and 5 present the greatest risks to public safety from mixed use crashes, as they contain the most miles where motorized mixed use would occur on the roads with higher crash severities, higher crash probabilities or both. Alternative 6 follows with fewer roads proposed for motorized mixed use evaluated as having higher crash severities and probabilities. It also has fewer roads that are inconsistent with Combined Use of Division 16.5 OFF-HIGHWAY VEHICLES of California Vehicle Code (CVC) than Alternatives 2 and 5. The remaining Alternatives, 1, 3, 4, and 7, all have less than 3.4 miles of road with a change in class from "Open to Highway Legal Vehicles Only" to "Open to All Vehicles." (See Appendix J: Roads Analyzed for Motorized Mixed Use).

Change in Class of Vehicles from Reclassifying the Maintenance Level. Reclassifying passenger car roads to high clearance roads does not present a motorized mixed use safety risk in and of itself. By changing these roads, motorized mixed use would be allowed on roads where use previously was not designated. These roads were also analyzed for motorized mixed use. A road that is reclassified from passenger car (ML 3) to high clearance (ML 2) is no longer subject to the Highway Safety Act. (See Appendix J: Roads Analyzed for Motorized Mixed Use)

Changes in Season of Use: The proposed changes to the seasons of allowed use in Alternatives 4, 5, and 6 were not intended to serve as a safety measure designed to reduce accidents rates. The Forest does not have figures on accident rates related to weather conditions. It is likely that fewer accidents, attributable to winter weather conditions would occur compared to Alternatives 1, 2, 3 and 7.

Amendment to the Forest Plan. An amendment to the Forest Plan would not affect public safety in a meaningful or measurable way.

Cumulative Effects

The cumulative effects on public safety of all the reasonably foreseeable actions in Appendix H and the actions proposed in this EIS would maintain and improve public safety.

Affordability

Direct and Indirect Effects

All of the alternatives require approximately $10 million annually to fully maintain the designated motorized routes. See Table 3.08-4. Alternatives 1, 3, 4, and 7 cost the most to maintain at over $10.7 million. These alternatives have higher costs since fewer roads would be reclassified from Maintenance Level 3-5 to Maintenance Level 2 compared to Alternative 2, 5 and 6. Maintenance Level 3-5 roads account for the major amount of the expense in these alternatives. Alternatives 2, 5, and 6 each cost approximately $9.5 million annually to maintain, or about $1.2 million less than the other alternatives due primarily from changing Maintenance Level 3-5 roads to Maintenance Level 2.

Changes in class of vehicles allowed on passenger car roads by permitting motorized mixed use could increase annual maintenance slightly on some roads. It is difficult to determine what user related maintenance is attributable to motorcycles and four-wheel drive vehicles by whether they are licensed for highway use or not.

Prohibiting Cross Country Travel. Alternative 1 would continue to have unauthorized cross country travel on 754,066 acres. This would not affect affordability/cost of maintenance of the existing NFTS roads and trails. However, costs are incurred by the Forest Service for the repair and prevention of unacceptable resource damage on unauthorized routes and cross country travel. The action alternatives would prohibit cross country travel on 833,392 to 836,000 acres, reducing use on 869 miles of known unauthorized routes and future user created routes. Prohibiting motorized cross country travel would increase traffic on the designated routes only slightly since that same traffic is already using the designated system, to large extent, to gain access to cross country locations. Prohibiting cross country travel in all the action alternatives would likely affect the affordability of the designated system slightly by increased user related maintenance costs. Cost incurred restoring and rehabilitating damage caused by cross country travel, motorized use of unauthorized routes, and preventing additional damages would be reduced by a similar or greater amount.

Additions to the NFTS. Table 3.08-4 compares the cost maintaining the NFTS by alternative. The costs reflect changes to the system resulting from changes to maintenance levels, reopening Maintenance Level 1 roads, implementation costs and the mitigation costs listed in Appendix A, “Site Specific Road, Trail and Open Area Information,” for specific routes by each alternative.

Table 3.08-4. Summary comparison of alternatives with respect to affordability of annual maintenance, implementation, and mitigations

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Maintenance Costs by Miles of Roads							
Closed, ML 1	567.1	567.1	567.1	567.0	473.7	555.7	566.0
High Clearance, ML 2	1492.8	1655.0	1492.8	1499.9	1748.4	1639.3	1497.3
Passenger Car, ML 3	522.4	365.2	522.4	519.0	365.2	400.4	519.0
Passenger Car, ML 4&5	196.0	196.0	196.0	196.0	196.0	196.0	196.0
NFTS roads (total miles)	2778.3	2783.3	2778.3	2781.9	2783.2	2791.4.3	2778.3
Annual Road Cost	**$10,277,760**	**$8,754,444**	**$10,277,760**	**$10,248,897**	**$8,840,217**	**$9,116,553**	**$10,245,699**
Maintenance Costs by Miles of Trails							
High Clearance 4x4	133.9	158.1	133.9	139.4	178.5	156.4	150.8
ATV's < 48"	25.5	29.9	25.5	28.4	44.2	38.8	28.9
Single Track Motorcycle	168.8	194.8	168.8	183.0	194.9	189.9	185.3
Motorized Trails	328.2	382.8	328.2	350.8	417.6	385.1	365.0
Annual Trail Cost	**$466,343**	**$543,623**	**$466,343**	**$497,130**	**$589,410**	**$540,735**	**$518,243**
Annual Road and Trail Cost Total	**$10,744,103**	**$9,298,067**	**$10,744,103**	**$10,746,027**	**$9,429,627**	**$9,657,288**	**$10,763,942**
Implementation Costs							
Passenger car roads reclassified to ML 2	$0	$82,500	$0	$2,500	$82,500	$77,500	$2,500
MVUM Publication	$0	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
MMU Implementation	$0	$100,000	$0	$0	$100,000	$54,000	$0
Total Implementation Cost	**$0**	**$282,500**	**$100,000**	**$102,500**	**$282,500**	**$231,500**	**$102,500**
Mitigation Costs							
Mitigations Costs from "Appendix A"	$0	$220,150	$0	$42,950	$219,500	$145,750	$145,700
Total Implementation and Mitigation Costs	**$0**	**$491,150**	**$100,000**	**$135,450**	**$510,500**	**$355,750**	**$238,200**
Total estimated cost to implement and maintain annually (millions)	**$10.74**	**$9.80**	**$10.84**	**$10.89**	**$9.93**	**$10.03**	**$11.01**

Establishment of motorized "Open Areas": The establishment of 2,649 or 2,589 acres of "Open Areas" in Alternative 2 or 6 respectively would not affect affordability of the transportation system. Open areas are not considered an element of NFTS roads or trails. The Forest Service would incur cost to delineate, administer, and maintain these areas. The other action alternatives would not establish "Open Areas" and do not affect affordability.

Change in Class of Vehicle from Approval of Mixed Use. Most of the costs for designating passenger car roads for motorized mixed use on roads (changing class of vehicles allowed) would be associated with signing, clearing sight distance in curves and surface grading. The typical signs used to alert drivers to "Share the Road," would be placed at sufficient intervals to keep drivers aware and the

signs to delineate the extent of allowed motorized mix use. The estimated average cost to implement the motorized mixed use on passenger car roads is $2,000 per road designated. Alternatives 2 and 5 would change the class of vehicles allowed on 50 passenger car roads. Alternative 6 would change the class of vehicles on 27 roads to allow mixed use. No roads would be changed with Alternatives 1, 3, 4, or 7.

Costs associated with producing the Motor Vehicle Use Map (MVUM) are primarily from labor, as the INFRA database would need to be updated and draft maps produced and edited. The Regional Office would pay for printing.

Change in Class of Vehicles from Reclassifying the Maintenance Level. The key costs associated with reclassifying passenger car roads to high clearance roads are the signing, equipment and administrative costs to change the entrance strategy from accepting to discouraging passenger car travel. For this estimate, two signs were assumed to need replacing for every road; each sign costs about $300 to install and about $1,800 equipment and operator time to alter the road to high clearance. Also about $100 administrative and data steward's time would be needed to update the INFRA database. In total, approximately $2,500 would be needed to make the change from passenger car to high clearance road for each road. Alternatives 2 and 5 would reclassify 33 ML 3 roads to ML 2. Alternative 6 would reclassify 31 roads. Only one road would be reclassified in Alternatives 4 and 7, and none in Alternatives 1and 3. See Appendix J: Roads Analyzed for Motorized Mixed Use.

All of the roads proposed for reclassification from suitable for passenger cars to high clearance vehicles are Objective Maintenance Level 3 roads. Except for several staging area and campground roads these are forest collector routes or primary forest roads. These roads are not only maintained to provide passenger car access to destinations but are maintained at these higher levels for efficiency of use for activities such as commercial haul and fire suppression access. These roads have higher levels of capital investments in construction of the road prism and surfacing compared to the typical high clearance forest road. Some degree of loss in this capital investment is likely over time resulting from lower maintenance effort expended to maintain the roads at the ML 2 standard. The trend would be corresponding losses in efficiency in these roads resulting in higher user costs and higher cost to return the roads to original condition for safe use during scheduled activities.

Eighteen of these same primary roads in Alternatives 2, 5 and 6 that would be reclassified to a lower maintenance level have cost share easements. This where a private company holds a title easement, has shared in the construction costs and participates in the maintenance costs of these roads. These roads would experience the same trends in loss of capital investment and increased user costs.

Changes in Season of Use. Wet weather seasonal restrictions on roads and trails in Alternatives 4, 5 and 6 have potential to decrease road maintenance costs compared to Alternatives 1, 2, 3, and 7. The amount potential cost reduction is difficult to quantify. User generated maintenance costs could be reduced by increasing the interval of scheduled maintenance items such as grading the surface and repairing waterbars when roads and trails receive less damaged caused by wet weather use. Traffic drops off considerably once winter snow blankets the forest and vehicles no longer have access to most of the road and trail system. The season of allowed use in Alternatives 4, 5, and 6 coincides with the winter slow

down in traffic. Ill-timed traffic on a saturated road can cause damage that is costly to repair and increase the frequency of maintenance required whether or not it occurs during a wet weather restriction.

Amendment to the Forest Plan. An amendment to the Forest Plan to lift seasonal traffic restrictions would potentially result in a very slight increase in cost of maintenance on 8.6 miles of NFTS roads. The increase in cost would be the result of an increase in time motorized traffic is allowed to use these 8.6 miles of roads in Alternatives 2, 5, and 6. Motorized traffic would be allowed on 8.6 miles of Maintenance Level 2 for two additional months each year in Alternatives 5 and 6, and for three additional months each year in Alternative 2. The potential increase in maintenance cost would be the result of an increased maintenance interval of scheduled traffic generated maintenance of items such as waterbars, ditches, or drainage dips.

Cumulative Effects

The cumulative effects on affordability of all the reasonably foreseeable actions in Appendix H and the actions proposed in this EIS would have only minor affect to the overall affordability of the forest transportation system.

Lower overall maintenance costs are seen in the alternatives that reclassify the maintenance of passenger car roads to lower standards for high clearance vehicles and by imposing a season of use. The more miles of road reclassified to a lower standard, the lower the overall maintenance cost. Where there are savings in the projected overall annual maintenance cost in Alternatives 2, 5 and 6 compared to Alternatives 1, 3, 4 and 7, those saving would likely be offset by: the increased costs to return these roads to the higher maintenance standards during scheduled activities, increased user costs due to decreased efficiency (slower travel and higher vehicle repair cost), the increased mileages added to the system in those alternatives, cost of mitigations and implementation, and potential loss of capital investment in road surfacing.

Summary of Effects Analysis across All Alternatives

Table 3.08-5 summarizes the effects analysis for the transportation environment by ranking each alternative regarding how well it provides for each of the indicators. This summary is not meant to convey that the indicators are equal in importance. The following rankings were used: A score of 7 indicates the alternative has the least impact for the transportation environment to the indicator. A score of 1 indicates the alternative has the most impact for the transportation environment related to the indicator. A score of 0 indicates the indictor does not apply.

Table 3.08-5. Comparison of Effects to Transportation

Indicator	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Affordability – Annual Maintenance	4	7	3	2	6	5	1
Affordability – Implementation	7	1	6	5	2	3	4
Safety	6	2	7	5	1	3	4
Average	**5.7**	**3.3**	**5.3**	**4.0**	**3.0**	**3.7**	**3.0**

Chapter 3.09

Inventoried Roadless Areas & Special Areas

3.09. Inventoried Roadless Areas & Special Areas

This chapter describes the affected environment and environmental consequences for Inventoried Roadless Areas (IRAs) and Special Areas on Tahoe National Forest. IRAs are roadless areas identified in the second Roadless Area Review and Evaluation (RARE II). Special Areas are Forest Plan management area land allocations that include Wilderness, Experimental Forests, Wild and Scenic Rivers, Research Natural Areas (RNA), and Special Interest Areas (SIA). In addition, this section will review the effects of the alternatives on Citizen Inventoried Roadless Areas (CIRAs) identified by the California Wilderness Coalition.

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

The Forest Service conducted RARE II from 1977 to 1979 studying 11 roadless areas (171,328 acres) on the Tahoe National Forest for their wilderness values. The California Wilderness Act of 1984 designated 25,680 of those acres as the Granite Chief Wilderness. The Forest addressed management direction for IRAs in the 1990 Forest Plan. Information about IRAs on the Tahoe NF can be found in Volume 2 of the Final Environmental Impact Statement for the Forest Service Roadless Area Conservation Project, November 2000. That information can be accessed at the following website: http://fs.usda.gov/Internet/FSE_DOCUMENTS?fsmrs_072591.pdf

In 2001, the California Wilderness Coalition (CWC) completed its own inventory of potential wilderness areas on California public lands. For the purpose of this analysis, these areas will be referred to as citizen inventoried roadless areas (CIRAs). Restrictions on road construction and reconstruction specified in the 2001 Roadless Area Conservation Rule apply only to those areas within agency-identified IRAs. A separate analysis has been conducted to compare the effects of the alternatives on CIRAs. CIRAs located within agency-identified IRAs will not be analyzed separately.

There are three RNAs located on Tahoe National Forest. Research Natural Areas 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 general provisions of the Organic Administration Act of 1897 and the Forest and Rangeland Renewable Resource Research Act of 1978 authorize the designation of Experimental Forests. Experimental Forests provide lands for conducting research and development that serves as a basis for the management of forests and grasslands. There are two Experimental Forests located within the Tahoe National Forest.

Forest Plan direction for the North Fork American Wild River is to manage the designated river corridor in accordance with Public Law 95-625, which documents the Congressional designation of the

river. Forest Service direction for proposed Wild and Scenic rivers is to maintain and enhance the Wild and Scenic River characteristics and manage the same as designated Wild and Scenic Rivers. Four river corridors within the Tahoe NF have been recommended for designation as Wild and Scenic Rivers (W&S Study Report, May 1999). Proposed Wild and Scenic River corridors include sections of Sagehen Creek, Canyon Creek, North Yuba River, and the Lower South Yuba River. Management policy for the four proposed Wild and Scenic rivers is guided by FSM 2354.21, which directs the Forest Service to "manage wild and scenic river study areas to protect existing characteristics through the study period and until designated or released from consideration."

There are seven Special Interest Areas (SIAs) on the Tahoe National Forest. Special Interest Areas are established to protect , and where appropriate, foster public use, study, and enjoyment of areas with scientific, scenic, historical, geological, botanical, zoological, paleontological, or other special characteristics. Management direction for each SIA is contained in the 1990 Tahoe National Forest Land and Resource Management Plan (Forest Plan).

Effects Analysis Methodology

Assumptions Specific to Inventoried Roadless Areas and Special Areas

- All of the unauthorized routes and Maintenance Level 1 roads being 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.
- Granite Chief Wilderness is not affected by the proposed action or any alternative as motorized activity is prohibited in that area under all alternatives.
- No unauthorized motor vehicle routes within RNAs would be added to the NFTS in any alternative.
- No unauthorized motor vehicle routes in designated Wild and Scenic River corridors would be added to the NFTS in any alternative
- No vehicle class changes are proposed in designated Wild and Scenic Rivers in any alternative.

Data Sources

- Tahoe National Forest Land and Resources Management Plan (Forest Plan)
- Tahoe National Forest Geographic Information Systems layers (GIS)
- Appendix G of the Forest Plan FEIS
- Two Westside Rivers Wild and Scenic River Study Report, FEIS, 1999

Roadless and Special Area Indicators

The following indicators are used to identify effects that may occur in IRAs and/or Special Areas as a result of implementing the No Action Alternative and action alternatives:

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 IRAs.
- **Other locally identified unique characteristics**: IRAs 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.

CIRA Values: Citizen Inventoried Roadless Areas (CIRAs) were identified by the California Wilderness Coalition for their values as potential additions to the National Wilderness Preservation System. The effects on CIRAs will be disclosed in the alternatives by using the roadless and wilderness characteristics identified above.

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, 2007).

- ***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 or 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 human 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 animal communities, connectivity, potential or existing research natural areas, outstanding landscape features and significant cultural resource sites.

Experimental Forest Values: Experimental Forest values on the Tahoe National Forest (TNF) are related to their suitability as areas for research on the effects of forest management on wildlife and impacts to water quality, timing, and yield.

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 (Federal Register 1982). Outstandingly remarkable values are specific to each river segment and may include cultural, ecologic, fish, geologic, historic, scenic, recreation, wildlife or other special and unique features (USDA 1991b).

Research Natural Area Values: RNA values are specific to individual RNAs 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.

Roadless and Special Areas Methodology by Action

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

1. **Cross-country Travel**: Prohibition of cross country motor vehicle travel is included in all alternatives except Alternative 1 (no action).
2. **Additions to the NFTS**: The amount unauthorized routes proposed as additions to the NFTS within IRAs vary by alternative.
3. **Establishment of Motorized "Open Areas"**: No "Open Areas" are being proposed for establishment within IRAs or special areas in any alternative
4. **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.
5. **Amendments to Forest Plan:** Not applicable to IRAs or special areas.

Inventoried Roadless Areas: Affected Environment

Tahoe National Forest has eleven IRAs totaling 171,328 acres (Tahoe NF, GIS data), excluding private lands located within the IRA boundaries. The names and acres of each IRA are listed in Table 3.09-1.

Table 3.09-1. Inventoried Roadless Areas – Tahoe National Forest

Bald Mountain (extends onto the Humboldt-Toiyabe NF)	5,834
Castle Peak	15,738
Duncan Canyon	9,253
East Yuba	10,805
Granite Chief (Granite Chief Wilderness acreage included)	31,297
Grouse Lakes (Grouse Lake vehicular closure included)	19,271
Lakes (Basin) (extends onto the Plumas NF)	557
Middle Yuba	7,884
North Fork American River (NFAR Wild River included)	43,374
North Fork of the Middle Fork American River	11,257
West Yuba (extends onto the Plumas NF)	16,058

The character and amount of roads, private land and motorized trails varies greatly between the listed IRAs. Castle Peak and Duncan Canyon IRAs both inherited roads through land purchase or exchange that were built while those lands were in private ownership. Middle Yuba IRA contains extensive private land

parcels that are accessed by roads. East and West Yuba IRAs contain some primitive 4WD routes, as well as several NFTS and unauthorized motorcycle trails. The North Fork American River IRA has one road accessing private land and two minor unauthorized routes within the IRA boundary. Each of the Inventoried Roadless Areas is described in more detail below.

Bald Mountain IRA

The Bald Mountain IRA is located east of the Sierra Nevada Range on Sierraville Ranger District. Approximately 1,061 acres of this IRA has been established as a Research Natural Area (RNA). A small portion of the IRA is in private ownership near the northern boundary of the area.

Recreation use is low and consists mostly of hunting, hiking, and OHV use. There are a number of unimproved roads, trails, and dispersed recreation locations within the area. The primary attraction of the area is the good hunting which may be found there.

In the Forest Plan, the Bald Mountain IRA was allocated to the following Management Prescriptions; #5 Research and Botanical (15%) and #13 Timber an Range (85%). Table 3.09-2 shows the mileage of roads and trails in the Bald Mountain IRA by category.

Table 3.09-2. Roads and Trails in the Bald Mountain Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel (acreage open to motorized use: 4,490) Unauthorized routes Closed NFTS roads receiving some motorized use	 Not Applicable	 3.6 1.2
NFTS Roads open to all vehicles	All Year	4.6
State, County or other jurisdiction roads	All Year	0.8
NFTS Trails open only to non-motorized users	All Year	1.8
	Total Motorized Open to Public	**10.2**

*Numbers may not add up due to rounding.

Castle Peak IRA

The Castle Peak IRA is located along the crest of the Sierra Nevada between Castle Peak on the south and Mt. Lola on the north. The area is characterized by sparse vegetation, high elevations, steep, rocky terrain, and shallow soils. Nearly one-half of the area is in private ownership. The primary private landowner conducts timber management activities on their property. Logging has occurred on private lands in the White Rock area. No major mining activity has occurred in the area and there is little mineral potential. Several timber sales have been completed in the area.

Castle Peak and its surroundings are among the most scenic areas on the Tahoe National Forest. This is due to the rugged topography, presence of vistas of lakes, rock outcrops, etc. The IRA is popular for hiking in the summer and sees heavy cross-country skiing and snowmobile use in the winter.

Most of the IRA is open to OHV use on designated routes only. The general lack of OHV routes, however, contributes to low use except for snowmobiling in winter. There are several non-motorized trails through the area, including a portion of the Pacific Crest Trail, but few roads.

In the Forest Plan, this IRA was allocated to the following Management Prescriptions; #3 Dispersed Motorized Recreation (93%) and #11 Winter Recreation (7%). Table 3.09-3 shows the amount of roads and trails in the Castle Peak IRA by category.

Table 3.09-3. Roads and Trails in the Castle Peak Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel (acreage open to motorized use: 15,738) Unauthorized routes Closed NFTS roads receiving some motorized use	Not Applicable	 9.3 .8
NFTS Roads open to all vehicles	Open Year Around	3.4
NFTS Roads open to all vehicles	Seasonal Closure	0.5
NFTS Trails open to high clearance trail vehicles	Open Year Around	1.1
Roads/trails on private land	Open Year Around	3.6
NFTS Trails open only to non-motorized users	Open Year Around	14.8
NFTS Trails open only to hikers and equestrians (No mountain bikes allowed)	Open Year Around	6.9
	Total Motorized Open to Public	**18.7**

*Numbers may not add up due to rounding.

Duncan Canyon IRA

Duncan Canyon IRA is situated in eastern Placer County on the American River Ranger District. It includes portions of the State Game Refuge that encompasses recreation facilities located at French Meadows Reservoir.

The major feature of the area is the rugged Duncan Canyon. Red Star Ridge forms the eastern and southern boundary of the area while Little Bald Mountain and Sunflower Hill mark the western boundary. The northern boundary is the French Meadows – Soda Springs Road. One section (640 acres) near Sunflower Hill is in private ownership. In 1979, the Erickson Lumber Company constructed a road under special-use permit to access their lands. The company plans to conduct timber management activities on their lands.

Hunting, fishing and hiking are the principal recreation uses of this area. The Tevis Cup Loop passes through the area along Red Star Ridge. This trail is used for an annual endurance ride and run. The main attraction is Little Robinson Valley located in the western portion of the IRA.

In the Forest Plan, this IRA was allocated to the following Management Prescriptions; #2 Dispersed Non-Motorized Recreation (7%) and #15 Visual and Timber and (93%). Table 3.09-4 shows the amount of roads and trails in the Duncan Canyon IRA by category.

Table 3.09-4. Roads and Trails in the Duncan Canyon Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel (acreage open to motorized use: 8,641) Unauthorized routes Closed NFTS roads receiving some motorized use	 Not Applicable	 4.1 4.8
NFTS Roads open to all vehicles	All Year	0.1
NFTS Roads open to all vehicles	Seasonal Closure	0.2
NFTS Trails open to motorcycles	Seasonal Closure	0.5
NFTS Trails open to motorcycles	All Year	11.2
State, County or other jurisdiction roads	All Year	0.0
NFTS Trails open only to non-motorized users	All Year	2.5
	Motorized Open to Public	**20.9**

*Numbers may not add up due to rounding.

East Yuba IRA

The East Yuba IRA is located on Yuba River Ranger District, bordering Plumas National Forest in the Lavezzola Creek drainage. The western boundary is roaded from the "A" Tree Road through Cowell Mine into Empire and Lavezzola drainages. The eastern portion of the area is accessed by OHV routes that receive heavy use.

The Pacific Crest National Scenic Trail crosses the northern portion of the area. There are numerous routes constructed for mining during the past 100 years. Active prospecting and exploration occurs within the IRA, such as at the Four Hills Mine located in the northeast portion.

In the Forest Plan, this IRA was allocated to the following Management Prescriptions; #3 Dispersed Motorized Recreation (48%), #13 Timber and Range (20%), and #15 Visual and Timber (32%). Table 3.09-5 shows the mileage of roads and trails in the East Yuba IRA by category.

Table 3.09-5. Roads and Trails in the East Yuba Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel (acreage open to motorized use: 10,193) Unauthorized routes	 Not Applicable	 9.4
NFTS Roads open to highway legal vehicles only	All Year	0.0
NFTS Trails open to high clearance vehicles	Seasonal Closure	3.4
NFTS Trails open to high clearance vehicles	All Year	14.5
NFTS Trails only open to motorcycles	All year	14.5
Roads/trails on private land	Not Applicable	1.0
NFTS Trails open only to non-motorized users	All Year	0.9
NFTS Trails open only to hikers and equestrians (No mountain bikes allowed)	All Year	1.6
	Total Motorized Open to the Public	**42.9**

*Numbers may not add up due to rounding.

Granite Chief IRA

The Granite Chief IRA is located adjacent to the western watershed boundary of Lake Tahoe on the Truckee and American River Ranger Districts. The total acreage of Granite Chief IRA within Tahoe NF is 31,297 acres. The California Wilderness Act of 1984 designated 25,680 acres of this IRA as the Granite Chief Wilderness.

The area is used primarily by hikers, fishermen, and hunters. The major attractions of this area are high, rugged granitic cliffs and broad glaciated valleys found in the northern portion of the IRA. The numerous streams distributed throughout the area provide opportunities for hiking, camping, and sightseeing. The abundance of game and non-game animals also attracts a large number of visitors. Portion of a State Game Refuge extend into the area and consists of all of Picayune Valley, Little American Valley, and the west slope of Mt. Mildred.

In the Forest Plan this roadless area was allocated to the following Management Prescriptions; #1 Wilderness (74%), #2 Dispersed Non-Motorized Recreation (18%), #5 Research and Botanical (2%) and #13 Timber an Range (6%). Table 3.09-6 shows the amount of roads and trails in the Granite Chief IRA by category.

Table 3.09-6. Roads and Trails in the Granite Chief Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross Country Travel (acreage open to motorized use: 1,930) Unauthorized routes	Not Applicable	0.3
Roads/trails on private land	Not Applicable	0.7
Trails open only to hikers and equestrians (No mountain bikes allowed)	All year	51.7
	Total Motorized Open to Public	**1.1**

*Numbers may not add up due to rounding.

Grouse Lakes IRA

Grouse Lakes IRA is located in western Nevada County on the Yuba River Ranger District. The area includes numerous lakes and streams that are the focus of public recreation use. Over one-half of the Grouse Lakes is in private ownership. The primary owner is Sierra Pacific Industries. The company conducts timber management activities on their lands.

Dispersed recreation (hunting, fishing and hiking) is the primary use of the area. The majority of the area prohibits motor vehicle use, with a few exceptions. One exception is a small segment of the Meadow Lake jeep road which passes through a portion of the motor vehicle closure area. The area south of Fordyce Creek is open to OHV use with moderate to heavy use of Red Mountain and Signal Peak jeep trails.

In the Forest Plan this roadless area was allocated to the following Management Prescriptions; #2 Dispersed Non-Motorized Recreation (90%), #3 Dispersed Motorized Recreation (7%) and #13 Timber an Range (3%). Table 3.09-7 shows the mileage of roads and trails in the Grouse Lakes IRA by category.

Table 3.09-7. Roads and Trails in the Grouse Lakes Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel (acreage open to this motorized use: 6,081) Unauthorized routes Closed NFTS roads receiving some motorized use	Not Applicable	 3.3 .2
NFTS Roads open to highway vehicles only	All Year	0.0
NFTS Roads open to all vehicles	All Year	5.3
NFTS Trails open to high clearance trail vehicles	All Year	9.1
Roads/trails on private land	Not Applicable	2.7
NFTS Trails open only to non-motorized users	All Year	27.2
	Total Motorized Open to Public	**20.5**

*Numbers may not add up due to rounding.

Lakes Basin IRA

The Lakes Basin IRA is situated on both the Plumas and Tahoe National Forests. The portion of the IRA on the TNF is very rocky and sparsely vegetated. The southern boundary follows a jeep road from the vicinity of Oakland Pond to Snake Lake then extends westerly to the private lands near Hawley Lake. These private lands form the western boundary.

The Pacific Crest Trail (PCT) passes through the area near the administrative boundary between the Plumas NF and Tahoe NF. OHV use occurs on several jeep roads adjacent to the area, but overall the steep terrain of the TNF portion limits recreation use.

In the Forest Plan, this IRA was allocated to Management Prescription #3 Dispersed Motorized Recreation (100%). Table 3.09-8 shows the amount of roads and trails in the Lakes Basin IRA by category.

Table 3.09-8. Roads and Trails in the Lakes Basin Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel (acreage open to motorized use: 557) Unauthorized routes	 Not Applicable	 0.1
NFTS Trails open to high clearance trail vehicles	Open Year Around	0.4
NFTS Trails open only to hikers and equestrians (No mountain bikes allowed)	Open Year Around	2.0
Previously decommissioned roads	Closed	1.8
	Total Motorized Open to Public	**0.5**

*Numbers may not add up due to rounding.

Middle Yuba IRA

The Middle Yuba IRA is situated on the Middle Yuba River, primarily on the Yuba River Ranger District. There is a small portion on the eastern edge in the Sierraville Ranger District. The entire IRA is located within an area of alternate land ownership pattern. Over 40 percent of this area is privately owned. Most of the private land would be receive intensive timber management activities. The area is also included in cost-share supplements.

There are some active mining claims in this area. There is abundant evidence of historic mining throughout the area, such as mineshafts, buildings, primitive roads, and tailings. Mining activity continues today, particularly placer mining. Recreation use of the IRA includes fishing and river use associated with suction dredging, sluicing, and panning for gold.

In the Forest Plan, this IRA was allocated to the following Management Prescriptions; #3 Dispersed Motorized Recreation (76%) and #13 Timber and Range (24%). Table 3.09-9 shows the mileage of roads and trails in the Middle Yuba IRA by category.

Table 3.09-9. Roads and Trails in the Middle Yuba Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel (acreage open to motorized use: 7,884)		
Unauthorized routes	Not Applicable	4.8
Closed NFTS roads receiving some motorized use		1.2
NFTS Roads open to highway legal vehicles only	All Year	0.6
NFTS Roads open to all vehicles	All Year	6.6
NFTS Trails open to high clearance trail vehicles	All Year	0.7
State, County or other jurisdiction roads	All Year	0.1
Roads/trails on private land	Not Applicable	15.4
	Total Motorized Open to Public	**29.4**

*Numbers may not add up due to rounding.

North Fork American River IRA

The North Fork American River IRA is situated on both sides of the North Fork of the American River. The North Fork of the American Wild River corridor is included within the IRA. The area extends from the western forest boundary near Giant Gap to approximately 1½ miles east of Heath Springs, and is located with the American River, Truckee, and Yuba River Ranger Districts.

Hiking, fishing, and hunting are the primary recreation uses for the area. The main attractiveness of this area is the North Fork American Wild River, which is protected under the Wild River Act. Other areas include the high-elevation lakes in the Loch Leven area, which are sensitive to heavy, extended use by man. National Forest System lands surrounding the area are primarily managed for vegetation management.

In the Forest Plan, this IRA was allocated to the following Management Prescriptions; #2 Dispersed Non-Motorized Recreation (48%), #3 Dispersed Motorized Recreation (17%), #5 Research and Botanical (2%), #6 Wild River (17%) and #13 Timber and Range (16%). Table 3.09-10 shows the mileage of roads and trails in the North Fork American River IRA by category.

Table 3.09-10. Roads and Trails in the North Fork American River Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel (acreage open to motorized use: 15,562) Unauthorized routes and Closed NFTS roads receiving some motorized use	Not Applicable	 1.2 1.1
NFTS Roads open to highway legal vehicles only	All Year	0.1
NFTS Roads open to all vehicles	Seasonal Closure	0.1
NFTS Roads open to all vehicles	All Year	1.1
NFTS Trails open to motorcycles	All Year	2.3
NFTS Trails open only to hikers and equestrians (No mountain bikes allowed)	All Year	0.0
Roads and trails on private land	All Year	3.1
	Total Motorized Open to Public	**9.0**

*Numbers may not add up due to rounding.

North Fork of the Middle Fork of the American River IRA

The North Fork of the Middle Fork of the American River IRA is located in Placer County on the American River Ranger District between Mosquito Ridge and the Foresthill Divide. The area is characterized by steep and rugged canyons and the major attraction is the North Fork of the Middle Fork of the American River.

Only 500 acres are in private ownership. Mining has been an important activity in the area since the early days of the Gold Rush and numerous active mines are located in the area. Recreation use is low and primarily involves hunting, fishing, and hiking. Virtually all of the area is open to OHV use, but the steep topography and lack of many roads limits use.

In the Forest Plan, this IRA was allocated to the following Management Prescriptions; #3 Dispersed Motorized Recreation (90%) #5 Research and Botanical (2%), #7 Wildlife (5%) and #8 Visual (3%). Table 3.09-11 shows the amount of roads and trails in the North Fork of the Middle Fork American River IRA by category.

Table 3.09-11. Roads and Trails in the North Fork of the Middle Fork American River IRA

Road and Trail Category	Season of Use	Miles
Cross country travel (acreage open to motorized use: 11,175) Unauthorized routes Closed NFTS roads receiving some motorized use	Not Applicable	 1.2 .1
NFTS Roads open to highway legal vehicles only	Open Year Around	0.0
NFTS Roads open to all vehicles	Seasonal Closure	0.3
NFTS Roads open to all vehicles	Open Year Around	1.1
NFTS Trails open to motorcycles	Seasonal Closure	2.3
NFTS Trails open to high clearance trail vehicles	Open Year Around	0.6
NFTS Trails open to motorcycles	Open Year Around	12.5
NFTS Trails open only to hikers and equestrians (No mountain bikes allowed)	Open Year Around	0.0
	Total Motorized Open to Public	**18.2**

*Numbers may not add up due to rounding.

West Yuba IRA

The West Yuba IRA is situated north of Downieville and west of Craycroft Ridge in the Rattlesnake Creek drainage; portions of this IRA are located within Plumas National Forest.

The main attractions to the area are the stream bottoms and mountain peaks that create a variety of scenery. Hunting, hiking, and fishing are the primary recreation uses of the area. OHV use is also a very popular recreation activity on the existing network of roads and trails located within the IRA. National Forest Systems lands surrounding the West Yuba area are primarily managed for timber production, and heavily prospected and mined for valuable minerals.

In the Forest Plan this roadless area was allocated to the following Management Prescriptions; #3 Dispersed Motorized Recreation (30%), #13 Timber and Range (30%) and #15 Visual & Timber (40%). Table 3.09-12 shows the amount of roads and trails in the West Yuba IRA by category.

Table 3.09-12. Roads and Trails in the West Yuba Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross Country Travel (acreage open to motorized use: 16,058)		
Unauthorized routes	Not Applicable	9.4
Closed NFTS roads receiving some motorized use		1.8
NFTS Roads open to all vehicles	All Year	6.0
NFTS Trails open to high clearance trail vehicles	All Year	8.2
NFTS Trails open to motorcycles	All Year	9.7
Roads/trails on private land	Not Applicable	0.6
	Total Motorized Open to Public	**35.7**

*Numbers may not add up due to rounding.

Inventoried Roadless Areas: Environmental Consequences

In the following section, each IRA will be listed and environmental consequences described for the action alternatives. Tables showing differences between the action alternatives are only included for those IRAs with substantial changes between alternatives. The effects of the No Action Alternative will be described first for all IRAs.

Alternative 1 (No Action)

Direct and Indirect Effects

Cross Country Travel: The No Action Alternative could reduce roadless character in each IRA because cross country travel by motor vehicles would be allowed to continue on 98,309 acres of IRAs currently open to motorized use on Tahoe NF. Motor vehicle travel is already prohibited on 73,019 acres of lands being managed for primitive and semi-primitive non-motorized recreation use within the affected IRAs. Under Alternative 1, 46.7 miles of unauthorized routes and 11.3 miles of closed NFTS roads would continue to have some motor vehicle use in Inventoried Roadless Areas.

Increased noise generated by motor vehicles and more evidence of human activity due to cross-country travel with continued route proliferation would alter the following roadless and wilderness 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 adversely impacted.
- Natural appearing landscapes with high scenic quality would be adversely impacted.
- Natural ecological systems would be adversely impacted.
- The degree of undeveloped characteristics as measured by the level of human modification would be adversely impacted.
- Outstanding opportunities for solitude as measured by the opportunity to experience isolation from the evidence of humans would be adversely affected.

Additions to the NFTS: No direct or indirect effects would occur in IRAs because no unauthorized routes would be added to the NFTS under Alternative 1.

Establishment of Motorized "Open Areas": No direct or indirect effects would occur in IRAs because no motorized "Open Areas" would be established under Alternative 1.

Changes to the NFTS: No direct or indirect effects would occur in IRAs because no changes would be made to the NFTS or to the existing closures under Alternative 1.

Amendments to the Forest Plan: No direct or indirect effects would occur in IRAs because there would be no Amendment to the Forest Plan under Alternative 1

Cumulative Effects

This alternative would contribute towards negative cumulative effects in IRAs because additional future route proliferation would adversely affect the roadless and wilderness characteristics within those areas.

Action Alternatives - Proposed Management Actions

Direct and Indirect Effects

The following section describes how proposed motor vehicle route additions and changes to the NFTS identified in the action alternatives could affect roadless and wilderness character within IRAs. Generally, motor vehicle use has an adverse effect on overall roadless and wilderness character. Conversely, reducing the amount of motorized use within an IRA would have a positive effect on roadless and wilderness characteristics. All routes under consideration for motorized use in IRAs are currently available to motorized use. The effect of this motorized use is already part of the existing situation. Prohibiting motorized use on these routes would improve overall roadless and wilderness character within

IRAs. Each action alternative analyzed in this FEIS would improve roadless and wilderness character of IRAs by reducing the amount of roads and trails available for motor vehicle use.

The statements listed below summarize the overall effects each action alternative would have on the roadless and wilderness character of IRAs located on Tahoe National Forest.

Cross Country Travel: Cross country travel would be prohibited on a total of 171,328 IRA acres (98,309 acres of proposed prohibition) in all the action alternatives. This prohibition would serve to stop proliferation of unauthorized routes and would prohibit use on all unauthorized routes not proposed for addition as motor vehicle routes to the NFTS. It would also prohibit use on all closed NFTS roads not being re-opened that are currently receiving some motorized use. The mileage of routes open for motor vehicle use (NFTS and unauthorized) would be reduced considerably from the existing situation. Alternatives 3 and 4 would add zero miles of unauthorized routes, while Alternatives 2, 5, 6 and 7 would prohibit use on 36.9 (79%) to 43.1 (92%) miles of available unauthorized routes. Roadless and wilderness characteristics would improve over time as unauthorized routes passively restore to natural conditions.

Additions to the NFTS: Within IRAs, there are only a few road segments being proposed for addition to the NFTS in the alternatives to provide access to dispersed recreation sites from existing NFTS roads. Four action alternatives would increase the mileage of NFTS motorized trails within affected IRAs. The majority of routes proposed for addition are existing short spurs accessing dispersed recreation sites adjacent to existing NFTS routes. The impact these additions would have on roadless and wilderness characteristics are explained in the effects analysis for each IRA.

Establish Motorized "Open Areas": No motor vehicle "Open Areas" are being proposed for establishment within IRAs in any of the action alternatives; therefore, there is no effect on the IRAs and this will not be addressed under each IRA.

Changes to the NFTS: Alternatives 2, 5 and 6 would change the class of vehicles allowed on short sections of a few NFTS roads in IRAs from highway legal vehicles only to open to all vehicles. Those changes would be implemented through a combination of motorized mixed use and changes in vehicle class allowed. These proposed changes would not impact roadless and wilderness characteristics of the IRAs.

Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on all native surface roads and motorized trails. Seasonal restrictions would improve the following roadless and wilderness characteristics: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the upper watersheds that become sources of public drinking water; 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period; and 4) Outstanding opportunities for solitude.

Reopening of Maintenance Level 1 (ML 1) roads will not be addressed in the individual IRAs since there are no ML 1 roads being opened in any IRA except the West Yuba IRA, where it will be addressed in more detail. Alternative 5 is the only alternative that would reopen a ML 1 road within an IRA

Amendments to Forest Plan: Not applicable to the individual IRAs; therefore, this will not be addressed under each IRA.

Cumulative Effects

Each of the action alternatives would improve the roadless characteristics of IRAs by allowing motorized use on fewer miles of roads and trails and by prohibiting cross country travel. There are currently 206.9 miles (NFTS and unauthorized routes) available for public motorized use in the No Action Alternative. The action alternatives would all reduce the total number of miles available to public motorized use. The action alternatives range from 160.3 miles (23% reduction) of routes open for motorized use in Alternative 5, to 149.0 miles (28 % reduction) in Alternatives 3 and 4. The reduction of available roads and eventual natural restoration routes prohibited to use would slowly improve overall roadless characteristics over time.

Table 3.09-13 compares total differences between action alternatives within Inventoried Roadless Areas on Tahoe NF.

Table 3.09-13. Total Roads/Trails/Areas in Inventoried Roadless Areas by Alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross-country travel (Acres)		Prohibited on 73,019 acres Continues on 98,309 acres	Prohibited on all 171,328 acres	Prohibited on all 171,328 acres	Prohibited on all 171,328 acres	Prohibited on all 171,328 acres	Prohibited on all 171,328 acres	Prohibited on all 171,328 acres
Unauthorized routes		46.7 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
Closed NFTS roads receiving some motorized use		11.3 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
2. Additions to the NFTS	**a. Roads added to the NFTS**	0.0 miles	0.1 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
	b. Motorized Trails added to the NFTS	0.0 miles	7.6 miles	0.0 miles	0.0 miles	9.8 miles	3.6 miles	6.2 miles
3. Establishment of Motorized "Open Areas"		None	None	None	None	None	None	None
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	0.0 miles	0.2 miles	0.0 miles	0.0 miles	0.2 miles	0.6 miles	0.0 miles
	b. Change in Class of Vehicles resulting from changes in maintenance levels	0.0 miles	0.5 miles	0.0 miles	0.0 miles	0.5 miles	0.1 miles	0.0 miles
	c. Change in Season of Use	0.0 miles	0.0 miles	0.0 miles	113.0 mi.	113.5 mi.	113.0 mi.	0.0 miles
	d. Reopening Maintenance Level 1 Roads	0.0 miles	0.0 miles	0.0 miles	0.0 miles	1.6 mi.	0.0 miles	0.0 miles
5. Amendments to the Forest Plan		None	None	None	None	None	None	None
Total Mileage Open to Motorized Use		**206.9 mi.**	**156.6 mi.**	**149.0 mi.**	**149.0 mi.**	**160.3 mi.**	**152.6 mi.**	**155.2 mi.**
Percentage of Existing Routes Open for Motor Vehicle Use		**100%**	**76%**	**72%**	**72%**	**77%**	**74%**	**75%**

Bald Mountain IRA

Cross Country Travel: Cross country travel by motor vehicles within the Bald Mountain IRA would be prohibited on an additional 4,490 acres (5,834 total acres) in each action alternative. This prohibition would stop the proliferation of new unauthorized routes within the IRA. The prohibition of motorized cross country travel on existing unauthorized routes and NFTS routes that are still receiving some motorized use would reduce the total mileage of roads and trails available for motorized use. Each action alternative would reduce the amount of roads and trails available for motorized use from 10.2 miles to 5.3 miles. The prohibition of cross country travel would benefit the roadless area and wilderness characteristics of Bald Mountain IRA by stopping the proliferation of unauthorized routes and reducing the amount of roads and trails available for motorized use. Opportunities for semi-primitive motorized recreation opportunities would be reduced in all action alternatives.

Additions to the NFTS: There would be no roads or trails added to the NFTS within the Bald Mountain IRA in Alternatives 2, 3, 4, 5 or 7. Alternative 6 would add two very short spur trails (D_560-20a, D_560-20b) accessing dispersed recreation sites. These NFTS trail additions total 114 feet in length. The addition of these trails to the NFTS would have little effect on the naturalness of the immediate area or the overall roadless characteristics due to their short length and pre-existence. Overall roadless characteristics would improve under all action alternatives as motor vehicle use would be prohibited on 3.6 miles of unauthorized routes and 1.2 miles of closed NFTS roads still receiving motorized use.

Changes to the Existing NFTS: There are no changes proposed for the class of vehicles allowed on existing NFTS roads in any of the action alternatives. Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on all NFTS routes in the IRA. These seasonal restrictions would serve to improve the following roadless area and wilderness characteristics: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the watershed that are sources of public drinking water; 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period; and 4) Outstanding opportunities for solitude. Seasonal vehicle closures would negatively affect Semi-Primitive Motorized opportunities because motor vehicle access would be limited to open periods.

Cumulative Effects: All of the action alternatives would improve the roadless characteristics within Bald Mountain IRA by prohibiting motorized cross country travel on all 5,834 acres and reducing the amount of motorized access on the existing network of motorized routes. All of the action alternative would reduce the miles available for motorized use from 10.2 miles to 5.3 miles. Overall, roadless area characteristics would improve over time as unauthorized routes passively restore to natural conditions.

Castle Peak IRA

Cross Country Travel: Cross country travel by motor vehicles within the Castle Peak IRA would be prohibited on 15,738 acres in each action alternative. The prohibition of motorized cross country travel on existing unauthorized routes and NFTS routes that are still receiving some motorized use would reduce the total mileage of roads and trails available for motorized use. Alternatives 3 and 4 reduce the amount of roads and trails available for motorized use from 18.7 to 8.6 miles. Alternatives 2, 5, 6 and 7 reduce the amount of motorized roads and trails from 18.7 to 9.6 miles. The prohibition of cross country travel

would benefit roadless area and wilderness characteristics of Castle Peak IRA by stopping the proliferation of unauthorized routes and reducing the amount of roads and trails available for motorized use. The prohibition of motorized travel on all unauthorized routes would have a negative effect on opportunities for dispersed motorized recreation.

Additions to the NFTS: There are no roads proposed for addition to the NFTS in any of the action alternatives within the Castle Peak IRA. Alternatives 3 and 4 would not designate any new routes for the NFTS. Alternatives 2, 5, 6 and 7 would add three motorized trails (TKN-J4, TKN-J5 and TKN-J6) to the NFTS totaling approximately one mile within the boundary of the IRA.

TKN-J5 (0.3 mi.) is a trail located in Castle Valley that terminates at "Slab Rock." TKN-J4 is located west of Andesite Peak with approximately 0.6 miles located in the IRA. The third trail, TKN-J6 enters the eastern side of the IRA for approximately 0.1 miles, and provides access to the eastside of Summit Lake. Each of these routes access existing dispersed recreation sites. All of three trails enter the edges of Castle Peak IRA, and are close enough to Interstate 80 that traffic noise from the freeway is still noticeable. If designated, these routes would have a minor impact on solitude because the noise of motorized vehicles would not be louder than the background noise from the freeway in the immediate vicinity. Additionally, in Alternative 6, two short spur trails (D_14E08, D_TKN-004) totaling .02 mile in length would be designated to provide motor vehicle access to dispersed recreation sites.

By designating those preexisting routes, there would continue to be minor effects to the high scenic quality landscape of the IRA due to vegetative disturbance and compaction at turnaround points. The majority of the Castle Peak IRA would remain a good candidate as a reference landscape because proposed changes to the NFTS are on the periphery of the IRA.

Changes to the NFTS: There are no changes to the class of vehicles allowed on existing National Forest System roads in any of the alternatives. However, Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions would improve roadless and wilderness characteristics values for: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the upper watersheds that become sources of public drinking water; 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period; and 4) Outstanding opportunities for solitude. The seasonal closure of NFTS routes would have negative effects on opportunities for semi-primitive motorized experiences.

Cumulative Effects: All of the action alternatives would improve the overall roadless character of the Castle Peak IRA by prohibiting cross country motorized travel on 15,738 acres and thereby reducing the mileage of routes available for motorized use by approximately 60 percent. Alternatives 2, 5, 6, and 7 reduce the miles open for motorized vehicles from 18.7 to 9.6. Alternatives 3 and 4 would prohibit use on all of the trails unauthorized for motorized use in this IRA. Overall, roadless area characteristics would improve over time as unauthorized routes passively restore to natural conditions.

Duncan Canyon IRA

Cross Country Travel: Each action alternative would prohibit cross country travel by motor vehicles on all 9,253 acres within the Duncan Canyon IRA. Prohibition of cross country travel, in each of the action

alternatives, would reduce the total amount of roads and trails available for motorized use from 20.9 to 12.0 miles. The prohibition of cross country travel would benefit the roadless area and wilderness characteristics of this IRA by stopping the proliferation of unauthorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the NFTS: There would be no additional roads designated within the Duncan Canyon IRA in any of the action alternatives. Alternatives 2, 4 and 5 would add one short motorized trail segment (D_88) to the NFTS, and Alternative 6 would add two motorized trails (D_88, D16E10). Those trails would be added to provide access to dispersed recreation sites. The addition of a few hundred feet of routes to the NFTS would have little effect on the overall roadless characteristics of the IRA due to their short length and pre-existence.

Changes to the NFTS: There are no changes to the class of vehicles allowed on existing NFTS roads in the Duncan Canyon IRA in any of the alternatives. Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on all native surface roads and motorized trails (11.3 miles). Those seasonal restrictions would improve the following roadless areas characteristics: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the upper watersheds that all become sources of public drinking water; 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the seasonal closure period and 4) Outstanding opportunities for solitude. The seasonal closure of NFTS routes would have negative effects on opportunities for semi-primitive motorized experiences.

Cumulative Effects: All of the action alternatives would improve the roadless character of the Duncan Canyon IRA by prohibiting cross country motorized travel on 9,253 acres and thereby reducing the mileage of routes available for motorized use by approximately 40 percent. Each action alternative would reduce the number miles open for motorized vehicles from 20.9 to 12.0 miles. Alternatives 3 and 4 would eliminate use on all of the trails unauthorized for motorized use in this IRA. Overall, roadless area characteristics would improve over time as unauthorized routes passively restore to natural conditions.

East Yuba IRA

Cross Country Travel: Cross country travel by motor vehicles would be prohibited on 10,805 acres in each action alternative within the East Yuba IRA. This prohibition would also reduce the total amount of roads and trails available for motorized use. Alternatives 3 and 4 would reduce the amount of roads and trails available for motorized use from 42.9 to 33.5 miles. Alternatives 2, 5, 6 and 7 would reduce the amount of motorized roads and trails from 41.8 to 35.4, 36.8, 35.0 and 34.6 miles respectively. The prohibition of cross country travel would benefit the overall roadless area and wilderness characteristics of the IRA by stopping the proliferation of unauthorized routes and reducing the amount of roads and trails available for motorized use. The prohibition of cross country travel would eliminate use of all unauthorized routes in this IRA and would have a negative effect on opportunities for dispersed motorized recreation.

Additions to the NFTS: Alternatives 3 and 4 would not make any additions to the NFTS within the East Yuba IRA. Alternative 2 would add 18 motorized trails (1.8 miles) and one road (124 feet) to the NFTS. Alternative 5 would add 20 motorized trails (3.3 miles) to the NFTS. Alternative 6 would add 18

motorized trails (1.5 miles) to the NFTS. Alternative 7 would add 4 motorized trails (1.1 miles) to the NFTS. Alternatives 5, 6, and 7 would not add any roads to the NFTS. Out of the 20 motorized routes, six of the longer routes are discussed below.

Route YRN-11 would be added as a motorized trail open to high clearance trail vehicles in Alternatives 2, 5, 6 and 7. This trail provides access to a dispersed recreation site near Spencer Lake. This trail would have a slight effect on roadless character within the IRA because it is a short segment (0.2 mi.) that closely parallels an existing NFTS route.

Routes YRN-5a and YRN-5c would be added as motorized trails open to high clearance trail vehicles in Alternatives 2, 5, 6 and 7. These routes provide access to a remote, well-defined dispersed recreation site off the Gold Valley four-wheel drive trail. Vehicle access tends to be by motorcycles and jeeps used by anglers, jeepers, and hunters. Eliminating motor vehicle access to this dispersed site would force individuals to utilize less desirable locations along the trail in the event they want to camp. The addition of these routes to the NFTS would have slight effects on roadless character because they are relatively short segments which access dispersed recreation sites.

Route YRN-4 would be added as a motorized trail open to high clearance trail vehicles in Alternatives 2, 5, 6 and 7. This trail, which is accessed from the Big Boulder four-wheel drive trail, is a historic mining route. The trail provides access to a scenic vista and has historically received heavy motorcycle use. Addition of this route would have a slight effect on roadless character because it is a short segment that stays relatively close to an existing NFTS route.

Route YRN-007 would be added as a motorized trail open to high clearance trail vehicles in Alternatives 2 and 5. This trail provides access to an old mine used for dispersed recreation. Only a short segment of YRN-007 enters the IRA along its eastern boundary. Since only the very end of the route is located within the IRA boundary there would be minimal effects to roadless area characteristics.

Route YRN-9 would be added as a motorized trail open to high clearance trail vehicles in Alternatives 2 and 5. This trail is very faint on the ground. This trail is longer and affects the roadless character more because it is in the heart of the IRA and ventures farther from existing motorized system routes. It reduces the opportunities for solitude in a band along the trail because of the noise from the motorized vehicles. It would also retain a band of semi-primitive motorized character in that part of the IRA.

Alternatives 2, 5 and 6 would add 14 trail segments that provide motor vehicle access to dispersed recreation sites within the IRA. The other action alternatives would have a negative impact on opportunities for semi-primitive motorized recreation by prohibiting motor vehicle access to identified dispersed recreation sites.

Changes to the NFTS: There are no changes in the class of vehicles allowed on existing NFS roads in any of the alternatives. Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions would improve the following roadless areas and wilderness characteristics: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the upper watersheds that are sources of public drinking water; 3) Opportunities for semi-primitive non-motorized and primitive types of recreation; and 4) Outstanding opportunities for solitude during the closure period. Seasonal closures would have a negative effect on opportunities for semi-primitive motor vehicle experiences.

Cumulative Effects: All of the action alternatives would improve the overall roadless character of the East Yuba IRA by prohibiting cross country motorized travel on 10,805 acres and reducing the number of trails with motorized use. The addition of motorized trails to the NFTS would continue to have minimal effects on roadless character because they are short segments of motorized trails that stay relatively close to an existing NFTS route. None of the motorized trails added to the NFTS in Alternative 2, 5, 6 and 7 would have substantial effects, but in a cumulative fashion they would contribute to a reduction in roadless character in the IRA. Alternatives 3 and 4 would provide for the greatest improvement in overall roadless character because no motorized trails are proposed to be added to the NFTS in those alternatives. Overall, roadless area characteristics within this IRA would improve over time as unauthorized routes passively restore to natural conditions

Table 3.09-14 displays the acres available for cross country travel and miles of roads and trails available for motorized use in the East Yuba IRA for the range of action alternatives.

Table 3.09-14. Miles of Roads/Trails/Areas in East Yuba Inventoried Roadless Area by Alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross-country travel (Acres)		Prohibited on 612 acres Continues on 10,193 acres	Prohibited on all 10,805 acres	Prohibited on all 10,805 acres	Prohibited on all 10,805 acres	Prohibited on all 10,805 acres	Prohibited on all 10,805 acres	Prohibited on all 10,805 acres
Miles of unauthorized routes open to motor vehicle use		9.4 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
2. Additions to the NFTS	**a. Roads added to the NFTS**	0.0 miles	124 feet	0.0 miles	0.0 miles	0.0 miles	0.0 miles.	0.0 miles
	b. Motorized Trails added to the NFTS	0.0 miles	1.8 miles	0.0 miles	0.0 miles	3.3 miles	1.5 miles	1.1 miles
3. Establishment of Motorized "Open Areas"		None	None	None	None	None	None	None
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.01 mi.	0.01 mi.	0.0 miles
	b. Change in Class of Vehicles resulting from changes in maintenance levels	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
	c. Change in Season of Use	0.0 miles	0.0 miles	0.0 miles	29.0 mi.	29.0 mi.	29.0 mi.	0.0 miles
	d. Reopening Maintenance Level 1 Roads	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
5. Amendments to the Forest Plan		None	None	None	None	None	None	None
Total Miles Open to Motorized Use*		**42.8 miles**	**35.3 mi.**	**33.5 mi.**	**33.5 mi.**	**36.8 mi.**	**35.0 mi.**	**34.6 mi.**

*Includes State, County and private jurisdiction roads in all alternatives. Alternative 1 includes unauthorized routes and closed NFTS roads still receiving motorized use.

Granite Chief IRA

Cross Country Travel: Cross country travel would be prohibited on the entire 31,297 acres of the Granite Chief IRA in all action alternatives. Most of this acreage is within Wilderness or management areas that already preclude the use of motor vehicles. The remaining 1,930 acres of this IRA would be prohibited for cross country travel in the action alternatives. On NFS land, only 0.3 miles of unauthorized routes exist within the IRA. These routes would no longer be available for motorized use in the action alternatives. The prohibition of cross country travel would benefit the roadless and wilderness characteristics of the Granite Chief IRA by preventing the proliferation of unauthorized routes and by eliminating motorized use on the only existing motor vehicle route in the IRA.

Additions to the NFTS: There are no roads or trails proposed for addition to the NFTS in any of the action alternatives.

Changes to the NFTS: There are no proposed changes in class of vehicle or season of use on NFTS roads or trails in any of the action alternatives.

Cumulative Effects: Each action alternative would improve the roadless and wilderness character of the Granite Chief IRA. The heart of Granite Chief IRA is a congressionally designated wilderness that precludes motorized use. The only possible negative impacts to roadless characteristics would be if cross country travel were allowed in parts of the IRA that are not wilderness or that currently prohibit motor vehicle use.

Grouse Lakes IRA

Cross Country Travel: Cross country travel would be prohibited on all 19,271 acres of this IRA in each of the action alternatives. The prohibition of cross country would reduce the total amount of roads and trails available for motorized use. Alternatives 3 and 4 reduce the amount of roads and trails available for motorized use from 20.5 to 17.1 miles. Alternatives 2 and 5 reduce the amount of motorized roads and trails from 20.5 to 18.3 miles. Alternatives 6 and 7 reduce the amount of motorized roads and trails from 20.5 to 18.1 miles. The prohibition of cross country travel would benefit roadless and wilderness characteristics within Grouse Lakes IRA by stopping the proliferation of unauthorized routes and reducing the amount of roads and trails available for motorized use. The prohibition of motorized cross country travel in this IRA would have a positive effect on opportunities for dispersed non-motorized recreation.

Additions to the NFTS: Alternatives 3 and 4 would not make any additions to the NFTS. Alternative 2 would add 4 motorized trails (1.2 miles) and 2 roads (199 feet) to the NFTS. Alternative 5 would add 6 motorized trails (1.2 miles) to the NFTS. Alternative 6 would add 6 motorized trails (1.0 miles) to the NFTS. Alternative 7 would add 3 motorized trails (1.1 miles) to the NFTS. Refer to Table 3.09-15. Two of the longer routes that are in Alternatives 2, 5, 6, and 7 are discussed below.

Trail YRS-F1 consists of several short spurs accessing dispersed recreation sites along the Fordyce Jeep Trail within Grouse Lakes IRA. The effects to roadless character would be limited due to the short length of the routes and their close proximity to the existing motorized trail. The routes do extend the motorized influence into a wider band along the Fordyce Jeep trail. This would result in slightly more

impact on opportunities for solitude and other experiences related to semi-primitive non-motorized recreation.

Another motorized trail (YRS-G3), approximately one-mile in length would also be added to the NFTS north and east of Baltimore Lake, in Alternatives 2, 5, 6, and 7. Adding this motorized trail would have negative effects to roadless character because it is separate from, and beyond, the Fordyce Jeep Trail. Adding this route to the NFTS would affect opportunities for solitude because of noise from motor vehicle use. Likewise there is a band of influence along the motorized trail where the ROS opportunities would be semi-primitive motorized rather than semi-primitive non-motorized. The natural appearing landscape and high scenic quality is only slightly affected due to the continuing existence of the motorized trail.

Changes to the NFTS: There would be no changes to the class of vehicles allowed on all existing NFTS routes in any of the action alternatives. Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions would improve the following roadless area characteristics: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the upper watersheds that are sources of public drinking water; 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities and 4) Outstanding opportunities during the closure period. Seasonal restrictions would negatively affect opportunities for semi-primitive motorized experiences.

Cumulative Effects: Each of the action alternatives would improve roadless characteristics within Grouse Lakes IRA through the prohibition of cross country travel across 19,271 acres and reducing the mileage of roads and trails available for motorized use. Overall, roadless area characteristics within this IRA would improve over time as unauthorized routes passively restore to natural conditions.

Table 3.09-15. Miles of Roads/Trails/Areas in Grouse lakes Inventoried Roadless Area by Alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross-country travel (Acres)		Prohibited on 13,190 acres Continues on 6,081 acres	Prohibited on all 19,271 acres	Prohibited on all 19,271 acres	Prohibited on all 19,271 acres	Prohibited on all 19,271 acres	Prohibited on all 19,271 acres	Prohibited on all 19,271 acres
Miles of unauthorized routes open to motor vehicle use		3.3 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
Closed NFTS roads still receiving some motorized use		.2 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
2. Additions to the NFTS	**a. Roads added to the NFTS**	0.0 miles	199 feet	0.0 miles	0.0 mile	0.0 mile	0.0 miles.	0.0 miles
	b. Motorized Trails added to the NFTS	0.0 miles	1.2 miles	0.0 miles	0.0 miles	1.2 miles	1.0 miles.	1.1 miles
3. Establishment of Motorized "Open Areas"		None	None	None	None	None	None	None
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	0.0 miles	0.01 mi.	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
	b. Change in Class of Vehicles resulting from changes in maintenance levels	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
	c. Change in Season of Use	0.0 miles	0.0 miles	0.0 miles	14.4 mi.	14.4 mi.	14.4 mi.	0.0 miles
	d. Reopening Maintenance Level 1 Roads	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
5. Amendments to the Forest Plan		None	None	None	None	None	None	None
Total Miles Open to Motorized use*		**20.5 miles**	**18.3 mi.**	**17.1 mi.**	**17.1 mi.**	**18.3 mi.**	**18.1 mi.**	**18.1 mi.**

*Includes State, County and private jurisdiction roads in all alternatives. Alternative 1 includes unauthorized routes and closed NFTS roads still receiving motorized use.

Lakes Basin IRA

Cross Country Travel: Each action alternative would prohibit cross country travel by motor vehicles on 557 acres within the Lakes Basin IRA. The prohibition of cross country travel would benefit roadless area and wilderness characteristics of the Lakes Basin IRA by stopping the proliferation of unauthorized routes and reducing the amount of roads and trails available for motorized use. The prohibition of motorized travel on all unauthorized routes would have a negative effect on opportunities for dispersed motorized recreation.

Additions to the NFTS: There are no roads or motorized trails proposed for addition to the NFTS in any of the action alternatives in this IRA.

Changes to the NFTS: There are no proposed vehicle class changes on NFTS roads in any of the action alternatives. Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions would improve the following roadless area characteristics: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the upper watersheds that are sources of public drinking water; 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities and 4) Outstanding opportunities for solitude during the seasonal closure period.

Cumulative Effects: All action alternatives would serve to improve the roadless characteristics of the Lakes Basin IRA by prohibiting cross country travel on 557 acres and reducing the amount of roads and trails available for motorized use. No unauthorized routes are proposed for addition to the NFTS within this IRA in any of the action alternatives. Overall, roadless area characteristics within the Lakes Basin IRA would improve over time as unauthorized routes passively restore to natural conditions.

Middle Yuba IRA

Cross Country Travel: Cross country travel would be prohibited on all 7,884 acres of this IRA in each of the action alternatives. The prohibition of cross country motor vehicle travel would reduce the total amount of roads and trails available for motorized use from 29.4 to 23.4 miles for each alternative. The prohibition of cross country travel would benefit overall roadless area and wilderness characteristics of the Middle Yuba IRA by stopping the proliferation of unauthorized routes and reducing the amount of roads and trails available for motorized use. The prohibition of motorized use on all unauthorized routes in this IRA would have a negative effect on opportunities for semi-primitive motorized recreation.

Additions to the NFTS: There are no roads or motorized trails being proposed for addition to the NFTS in any of the action alternatives for this IRA.

Changes to the NFTS: Alternatives 2, 5 and 6 would change the class of vehicles allowed on all NFTS roads within this IRA from highway legal vehicles only to open to all vehicles (total .6 mi.).The change in vehicle class allowed would not have an effect on roadless area characteristics of this IRA. Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions would improve the roadless areas characteristics for: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the upper watersheds that are sources of public drinking water; 3) Opportunities for semi-primitive non-motorized

and primitive recreation opportunities and 4) Outstanding opportunities for solitude during the closure period.

Cumulative Effects: Each of the action alternatives would improve the roadless character of the Middle Yuba IRA by prohibiting cross country travel and reducing the amount of roads and trails available for motorized use within the IRA. No motorized trails would be added to the NFTS within this IRA. Overall, roadless area characteristics within this IRA would improve over time as unauthorized routes passively restore to natural conditions.

North Fork American River IRA

Cross Country Travel: Each action alternative would prohibit cross country travel on 43,374 acres within the North Fork American River IRA. This prohibition would reduce the total amount of roads and trails available for motorized use from 9.0 to 6.6 miles in each action alternative. The prohibition of cross country travel would benefit overall roadless area and wilderness characteristics within the IRA by stopping the proliferation of unauthorized routes and reducing the amount of roads and trails available for motorized use. The prohibition of motorized use of all unauthorized routes in this IRA would have a negative effect on opportunities for dispersed motorized recreation.

Additions to the NFTS: There are no roads or motorized trails added to the NFTS in this IRA in any of the action alternatives.

Changes to the NFTS: Alternatives 2, 5 and 6 would change the class of vehicles allowed on all NFTS roads within the North Fork American River IRA from highway legal vehicles only to open to all vehicles (total .1 mi.).The change in vehicle class allowed would not have an effect on roadless area characteristics of this IRA. Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions would improve the roadless areas characteristics for: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the upper watersheds that are sources of public drinking water; 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities and 4) Outstanding opportunities for solitude during the closure period.

Cumulative Effects: Each of the action alternatives would improve the roadless character of the North Fork American River IRA by prohibiting cross country travel on 43,374 acres and reducing the amount of roads and trails available for motorized use. The IRA remains intact with high levels of primitive to semi-primitive non-motorized recreation opportunities that maintain the high quality roadless characteristics in each action alternative. Overall, roadless area characteristics within this IRA would improve over time as unauthorized routes passively restore to natural conditions.

North Fork of the Middle Fork of the American River IRA

Cross Country Travel: Each action alternative would prohibit cross country travel on 11,257 acres within the North Fork of the Middle Fork American River IRA. This prohibition would reduce the total amount of roads and trails available for motorized use from 18.2 to 16.9 miles in each action alternative. The prohibition of cross country travel would benefit roadless area and wilderness characteristics within the IRA by stopping the proliferation of unauthorized routes and reducing the amount of roads and trails

available for motorized use. The prohibition of motorized use on all unauthorized routes in this IRA would have a negative effect on opportunities for dispersed motorized recreation.

Additions to the NFTS: There are no roads or motorized trails proposed for addition to the NFTS in any of the action alternatives.

Changes to the NFTS: None of the action alternatives proposes changes to the vehicle class allowed on NFTS routes within the North Fork of the Middle Fork American River IRA. Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on all NFTS routes. These seasonal restrictions would improve the following roadless area characteristics: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the upper watersheds that are sources of public drinking water; 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities; and 4) Outstanding opportunities for solitude during the closure period.

Cumulative Effects: Due to the very steep topography of the area, only 1.2 miles of unauthorized routes and .1 miles of closed NFTS roads are currently receiving some motor vehicle use. Those routes would be prohibited to motor vehicle use in each of the action alternatives. Overall, roadless area characteristics within the North Fork of the Middle Fork American River IRA would improve over time as unauthorized routes passively restore to natural conditions.

West Yuba IRA

Cross Country Travel: Each of the action alternatives would prohibit cross country travel by motor vehicles on the entire 16,058 acres within the West Yuba IRA. Alternatives 3 and 4 would reduce the amount of roads and trails available for motorized use from 35.7 to 24.4 miles. Alternatives 2, 5, 6 and 7 would reduce the amount of motorized roads and trails from 35.7 to 28.0, 30.2, 24.5 and 27.4 miles respectively through the prohibition of motorized use on several miles of unauthorized routes. The prohibition of cross country travel would benefit overall roadless area and wilderness characteristics of this IRA by stopping the proliferation of unauthorized routes and reducing the amount of roads and trails available for motorized use. The prohibition of motorized use of all unauthorized routes in this IRA would have a negative effect on opportunities for dispersed motorized recreation.

Additions to the NFTS: Alternatives 3 and 4 would not make any additions to the NFTS. Alternative 2 would add 5 motorized trails (3.6 miles) to the NFTS. Alternative 5 would add 6 motorized trails (4.2 miles) to the NFTS. Alternative 6 would add 4 motorized trails (300 feet total) to the NFTS. Alternative 7 would add 2 motorized trails (2.9 miles) to the NFTS. Refer to Table 3.09-16. Three of the longer routes that are in the action alternatives are discussed below.

Route YRN-M2 would be added to the NFTS as a motorized trail open to motorcycles in Alternatives 2 and 5. Use of the motorized trail would be seasonally prohibited for wet weather in Alternative 5. This motorized trail connects the Downieville single track trail to a difficult four-wheel drive trail. This motorized trail creates a loop to Chimney Rock and Poker Flat. It provides very challenging double black diamond riding (limited opportunities), requiring slower travel (less noise). The motorized trail parallels the Downie River for a short distance and connects challenging four-wheel drive and motorcycle trails along the river. Opening this trail to motorcycle use would have a negative effect on solitude because of

motorcycle noise. Due to the low numbers of users this effect would occur primarily on weekends. The motorized use of this trail is consistent with semi-primitive motorized standards in the Forest Plan. The addition of this existing trail to the NFTS would have a minor negative effect on the overall natural appearing landscape and high scenic quality of the area.

Route YRN-M3b would be added to the NFTS as a motorized motorcycle trail in Alternatives 2, 5 and 7. Use of this motorized trail would be seasonally prohibited for wet weather in Alternatives 5 and 6. The route is an old historic mining trail that requires a high skill level to navigate. It provides loop connection from Downie River to the Castle Rock trails system. Opening this trail to motorcycle use would have a negative effect on solitude because of motorcycle noise. Due to the low numbers of users, this effect would occur primarily on weekends. The motorized use of this trail is consistent with semi-primitive motorized standards in the Forest Plan. The addition of this route would have an effect on the overall natural appearing landscape and high scenic quality of the area.

Route YRN-7 would be added to the NFTS as a motorized trail open to high clearance trail vehicles in Alternatives 2, 5 and 7. Use of this motorized trail would be seasonally prohibited for wet weather in Alternatives 5. This route is a short ¼-mile spur located adjacent to two system routes: the Poker Flat and Texas Flat four-wheel drive routes. Poker Flat is a high value recreation destination associated with this motorized trail. This route continues to a popular vista point. Current use is low. This motorized trail is in the north east corner of the IRA. It has similar effects as described above with other proposed motorcycle trails with there being a slightly higher impact because the width of the trail is greater.

Changes to the NFTS: There are no changes to the class of vehicles allowed on existing NFTS roads in any of the alternatives. Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on all native surface roads and motorized trails. Seasonal restrictions would improve the following roadless area characteristics: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the upper watersheds that all become sources of public drinking water; 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities; and 4) Outstanding opportunities for solitude during the seasonal closure period. Opportunities for semi-primitive motorized activity would be reduced with implementation of seasonal restrictions. One Maintenance Level 1 road would re-opened in Alternative 5 totaling 1.6 miles. This route is located on the western edge of the West Yuba IRA west of Poker Flat in the Canyon Creek drainage. Opening this route to motorized use would have a negative effect on solitude because of noise. The re-opening of this existing route would have a minor negative effect on the overall natural appearing landscape and high scenic quality of the area.

Cumulative Effects: Each action alternative would improve the roadless character of the West Yuba IRA by prohibiting cross country travel on 16,058 acres and reducing the amount of roads and trails available for motorized use. If added to the NFTS, YRN-M3b and YRN-M2 would affect roadless characteristics, especially opportunities for recreation in a semi-primitive non-motorized setting. The main effect these motorized trails have is the negative effects on solitude from motorcycle noise. Due to the low numbers of users, this effect would occur primarily on weekends. The motorized use of these trails is consistent with semi-primitive motorized standards in the Forest Plan. These motorized trails affect the naturalness for a reference landscape in a very slight way. YRN 7 is a jeep route in the north

east corner of West Yuba which would be added to the NFTS in Alternatives 2, 5 and 7. It has similar effects as described above for the motorcycle trails with there being a slightly higher impact because the width of the trail is greater. Alternative 5 would result in the least improvement in roadless character because four motorized trails would be added to the NFTS and one ML 1 road would be reopened. While the effects to roadless character from adding these routes are not great, the cumulative effects are greater particularly because the proposed motorized trails (not the ML 1 road) are within the heart of the IRA. Alternatives 2 and 7 have greater benefits to roadless character than Alternative 5 because the designated system would have less mileage of motorized routes in the area. Alternatives 3 and 4 would not add motorized trails to the NFTS in the West Yuba IRA and would have the most positive effect for maintaining roadless characteristics in the area. Alternative 6 is similar to Alternatives 3 and 4, except that it would provide opportunities for motorized access to four dispersed recreation sites.

Table 3.09-16. Miles of Roads/Trails/Areas in West Yuba Inventoried Roadless Area by Alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross-country travel (Acres)		Prohibited on zero acres Continues on 16,058 acres	Prohibited on all 16,058 acres	Prohibited on all 16,058 acres	Prohibited on all 16,058 acres	Prohibited on all 16,058 acres	Prohibited on all 16,058 acres	Prohibited on all 16,058 acres
Miles of unauthorized routes open to motor vehicle use		1.8 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
Closed NFTS roads still receiving some motorized use		9.4 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
2. Additions to the NFTS	**a. Roads added to the NFTS**	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
	b. Motorized Trails added to the NFTS	0.0 miles	3.6 miles	0.0 miles	0.0 miles	4.2 miles	300 feet	2.9 miles
3. Establishment of Motorized "Open Areas"		None	None	None	None	None	None	None
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
	b. Change in Class of Vehicles resulting from changes in maintenance levels	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
	c. Change in Season of Use	0.0 miles	0.0 miles	0.0 miles	23.9 mi.	29.7 mi.	24.0 mi.	0.0 miles
	d. Reopening Maintenance Level 1 Roads	0.0 miles	0.0 miles	0.0 miles	0.0 miles	1.6 miles	0.0 miles	0.0 miles
5. Amendments to the Forest Plan		None	None	None	None	None	None	None
Total Miles Open to Motorized use*		**35.7 miles**	**28.0 mi.**	**24.4 mi.**	**24.4 mi.**	**30.2 mi.**	**24.5 mi.**	**27.4 mi.**

*Includes State, County and private jurisdiction roads in all alternatives. Alternative 1 includes unauthorized routes and closed NFTS roads still receiving motorized use.

Citizen Inventoried Roadless Areas (CIRAs): Affected Environment

The California Wilderness Coalition (CWC) inventory identified approximately 113,474 acres of land on the Tahoe NF as potential wilderness (CIRAs). Approximately 83% of those acres are already located within agency-identified IRAs and are included in the IRA analysis. The additional 17,964 acres (excluding 1,185 acres of private inholdings) of CIRAs being analyzed include dispersed recreation sites, trailheads, and NFTS roads. Approximately 56% of this acreage is included within the Roaded Natural ROS Class, while 30% is identified as Primitive Motorized, and 14% as Primitive Non-motorized. Table 3.09-17 shows the amount of roads and trails in the CIRA's by category.

Large tracts of CIRA acreage outside agency-identified IRAs include approximately 4,400 acres in the Castle Peak vicinity (Castle Peak CIRA); 3,000 acres south of Granite Chief Wilderness (Granite Chief Additions CIRA); 4,500 acres in the Grouse Lakes (Grouse Lakes CIRA) vicinity; 1,100 acres adjacent to the North Fork American River IRA (N.F. American River CIRA); and 5,800 acres adjacent to North Fork of the Middle Fork of the American River IRA (Black Oak CIRA).

Table 3.09-17. Roads and Trails in Citizen Inventoried Roadless Areas (total TNF acreage outside IRAs)

Road and Trail Category	Season of Use	Miles
Cross Country Travel (acreage open to motorized use: 15,472)		
Unauthorized routes	Not Applicable	19.6
Closed NFTS roads receiving some motorized use		6.1
NFTS Roads open to all vehicles	All Year/Seasonal	12.2
NFTS Trails open to high clearance trail vehicles	All Year	2.1
NFTS Trails open to motorcycles	All Year	3.7
Roads/trails on private land	Not Applicable	4.1
	Total Motorized Open to Public	**47.8**

Citizen Inventoried Roadless Areas: Environmental Consequences

Alternative 1 (No Action)

Direct and Indirect Effects

Cross Country Travel: The No Action Alternative could reduce roadless and wilderness character in CIRAs because cross country travel by motor vehicles would be allowed to continue on 15,472 acres of CIRAs currently open to motorized use on Tahoe NF. Motor vehicle travel is already prohibited on 2,492 acres of lands being managed for semi-primitive non-motorized recreation use within the affected CIRAs. Under Alternative 1, 19.6 miles of unauthorized routes and 6.1 miles of closed NFTS roads would continue to have some motor vehicle use in CIRAs.

Increased noise generated by motor vehicles and more evidence of human activity due to cross-country travel with continued route proliferation would alter the following roadless and wilderness 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 adversely impacted.
- Natural appearing landscapes with high scenic quality would be adversely impacted.
- Natural ecological systems would be adversely impacted.
- The degree of undeveloped characteristics as measured by the level of human modification would be adversely impacted.
- Outstanding opportunities for solitude as measured by the opportunity to experience isolation from the evidence of humans would be adversely affected.

Additions to the NFTS: No direct or indirect effects would occur in CIRAs because no unauthorized routes would be added to the NFTS under Alternative 1.

Establishment of Motorized "Open Areas": No direct or indirect effects would occur in CIRAs because no motorized "Open Areas" would be established under Alternative 1.

Changes to the NFTS: No direct or indirect effects would occur in CIRAs because no changes would be made to the NFTS or to the existing closures under Alternative 1.

Amendments to the Forest Plan: No direct or indirect effects would occur in CIRAs because there would be no Amendment to the Forest Plan under Alternative 1.

Cumulative Effects

This alternative would contribute towards negative cumulative effects in CIRAs because additional future route proliferation would adversely affect roadless and wilderness characteristics within those areas.

Action Alternatives - Proposed Management Actions

Direct and Indirect Effects

The following section describes how proposed motor vehicle route additions and changes to the NFTS identified in the action alternatives could affect roadless and wilderness character within CIRAs. Generally, motor vehicle use has an adverse effect on overall roadless and wilderness character. Conversely, reducing the amount of motorized use within a CIRA would have a positive effect on roadless and wilderness characteristics. All routes under consideration for motorized use in CIRAs are currently available to motorized use. The effect of this motorized use is already part of the existing situation. Prohibiting motorized use on these routes would improve overall roadless and wilderness character within CIRAs. Each action alternative analyzed in this FEIS would improve roadless and wilderness character of CIRAs by reducing the amount of roads and trails available for motor vehicle use.

The statements listed below summarize the overall effects each action alternative would have on the roadless and wilderness character of CIRAs located on Tahoe National Forest.

Cross Country Travel: Each of the action alternatives would prohibit cross country travel by motor vehicles on the entire 17,964 acres within CIRAs resulting in several miles of unauthorized routes.

Alternatives 3, 4, and 7 would reduce the amount of roads and trails available for motorized use from 47.8 to 22.1 miles. Alternatives 2, 5, and 6 would reduce the amount of motorized roads and trails from 47.8 to 23.2, 23.4, and 23.9 miles respectively. The prohibition of cross country travel would benefit overall roadless area and wilderness characteristics of this CIRA by stopping the proliferation of unauthorized routes and reducing the amount of roads and trails available for motorized use. The prohibition of motorized use of all unauthorized routes in this CIRA would have a negative effect on opportunities for dispersed motorized recreation.

Additions to the NFTS: Alternative 3 would not make any additions to the NFTS. Alternative 2 would add two road segments (0.2 miles total) and two motorized trail segments (0.9 miles) to the NFTS. Alternative 4 would add one road segment (0.02 miles total) to the NFTS. Alternative 5 would add two road segments (0.2 miles total) and three motorized trail segments (0.9 miles total) to the NFTS. Alternative 6 would add six road segments (0.6 miles total) and three motorized trails (1.2 miles total) to the NFTS. Alternative 7 would add one trail segment (0.6 miles total) to the NFTS (Refer to Table 3.09-18). Four of the routes proposed for addition in the action alternatives are discussed below.

Route YRS-003B (0.34 miles) would be added to the NFTS as a motorized trail open to high clearance vehicles in Alternatives 2, 5, and 6. Use of this route would be seasonally prohibited for wet weather in Alternatives 5 and 6. The motorized use of this trail is consistent with semi-primitive motorized standards in the Forest Plan. The addition of this existing trail to the NFTS would have a minor negative effect on the overall natural appearing landscape and high scenic quality of the area.

Route TKS-11 would be added to the NFTS as a motorized trail open to high clearance vehicles in Alternatives 2, 5, 6, and 7. The route accesses a well-developed dispersed recreation site located near the Rubicon River. Use of this motorized trail would be seasonally prohibited for wet weather in Alternatives 5, 6, and 7. The motorized use of this trail is consistent with semi-primitive motorized standards in the Forest Plan. The addition of this route would have a minor effect on the overall natural appearing landscape and high scenic quality of the area.

Route ARM-90 (0.3 miles) would be added in Alternative 6 as a motorized trail in order to access an isolated NFTS motorized trail. No resource concerns have been noted for addition of this route which is located in a Roaded Natural ROS class

Route D_16 TH19-1 (0.4 miles) would be added as an ML2 road in order to access a popular dispersed recreation site. No resource concerns were noted for addition of this route which is located in a Roaded Natural ROS class.

Establishment of Motorized "Open Areas": Not applicable to these areas.

Changes to the NFTS: There is one proposed change to the class of vehicles allowed on existing NFTS Roads 3 and 3-4. A total of .35 mile of these roads within the Granite Chief Additions CIRA would be downgraded from an ML-3 road to an ML-2 to provide OHV users with a connection between road systems open to travel by non-highway legal vehicles. This change would have no affect on overall roadless characteristics.

Alternatives 4, 5 and 6 would impose wet weather seasonal restrictions on the majority of native surface NFTS roads and motorized trails. Seasonal restrictions would improve the following roadless area

and wilderness characteristics: 1) High quality and undisturbed soil, water, and air resources; 2) Quality of water resources in the upper watersheds that all become sources of public drinking water; 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities; and 4) Outstanding opportunities for solitude during the seasonal closure period. Opportunities for semi-primitive motorized activity would be reduced with implementation of seasonal restrictions.

Cumulative Effects

Each action alternative would improve the overall roadless character of the affected CIRAs by prohibiting cross country travel on 17,964 acres and reducing the amount of roads and trails available for motorized use.

Each of the action alternatives would reduce the mileage of routes available to motorized use by at least 50%. Alternative 4 would protect the most roadless and wilderness characteristics of the affected CIRAs because it would only add one short road segment (0.02 miles) to the NFTS and would implement seasonal use restrictions on 18.0 miles of existing NFTS roads and trails. Alternative 2 would protect the least overall roadless and wilderness characteristics as it would add 1.1 miles of motor vehicle routes to the NFTS and not implement any seasonal use restrictions on motor vehicle use.

Overall, each of the action alternatives would gradually improve roadless area and wilderness characteristics within the affected CIRA acreage over time as unauthorized routes passively restore to natural conditions.

Table 3.09-18. Total Roads/Trails/Areas in Citizen Inventoried Roadless Areas by Alternative

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross-country travel (Acres)		Prohibited on 2,492 acres Continues on 15,472 acres	Prohibited on all 17,964 acres	Prohibited on all 17,964 acres	Prohibited on all 17,964 acres	Prohibited on all 17,964 acres	Prohibited on all 17,964 acres	Prohibited on all 17,964 acres
Unauthorized routes		19.6 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
Closed NFTS roads receiving some motorized use		6.1 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
2. Additions to the NFTS	**a. Roads added to the NFTS**	0.0 miles	0.2 miles	0.0 miles	0.02 miles	0.2 miles	0.6 miles	0.0 miles
	b. Motorized Trails added to the NFTS	0.0 miles	0.9 miles	0.0 miles	0.0 miles	1.1 miles	1.2 miles	0.0 miles
3. Establishment of Motorized "Open Areas"		None	None	None	None	None	None	None
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 miles
	b. Change in Class of Vehicles resulting from changes in maintenance levels	0.0 miles	0.4 miles	0.0 miles	0.0 miles	0.4 miles	0.4 miles	0.0 miles
	c. Change in Season of Use	0.0 miles	0.0 miles	3.5 miles	18.0 mi.	18.0 mi.	18.0 mi.	0.0 miles
	d. Reopening Maintenance Level 1 Roads	0.0 miles	0.0 miles	0.0 miles	0.0 miles	0.0 mi.	0.0 miles	0.0 miles
5. Amendments to the Forest Plan		None	None	None	None	None	None	None
Total Mileage Open to Motorized Use		**47.8 mi.**	**23.2 mi.**	**22.1 mi.**	**22.1 mi.**	**23.4 mi.**	**23.9 mi.**	**22.1 mi.**
Percentage of Existing Routes Open for Motor Vehicle Use		**100%**	**49%**	**46%**	**46%**	**49%**	**50%**	**46%**

Wilderness: Affected Environment & Environmental Consequences

The Granite Chief Wilderness is the only federally designated wilderness within the Tahoe NF. The wilderness is 24,864 acres, and was part of Granite Chief IRA. The area is managed for primitive ROS recreation opportunities. Motorized vehicle use is prohibited within all federally designated wilderness areas. No motor vehicle routes are being proposed for addition within Granite Chief Wilderness. Three very short road segments accessing dispersed recreation sites (0.1 miles total) within a half-mile of the wilderness boundary are proposed for addition to the NFTS in Alternative 6. The addition of these routes to the NFTS would not have a negative effect on wilderness characteristics (specifically, effects to solitude from vehicle noise) because of their extremely short length and very close proximity to existing NFTS roads. No road or trail segments are being proposed for addition within a half-mile of the Granite Chief Wilderness in any of the other action alternatives.

Experimental Forests: Affected Environment

There are two Experimental Forests located within the Tahoe National Forest: Onion Creek and Sagehen. Onion Creek Experimental Forest is 2,846 acres in size and located south of Mt. Disney and the Sugar Bowl Ski Area. The management emphasis for this area is to continue promoting the tasks of studying the interrelationships between water, plants, soils and climate, as related to water quality, yield, and flow timing. Several roads are located within this Experimental Forest, but recreation and OHV use is not encouraged.

Sagehen Experimental Forest is 7,552 acres in size and located is west of State Highway 89, about six miles north of the town of Truckee. The management emphasis for this area ias to provide two alternative types of stand structure typified by even-age openings and stands managed to produce and maintain mature forest structure. This area includes one small campground and some designated four-wheel-drive trails. These recreation uses will be monitored for compatibility with the research purposes for this area.

Experimental Forests: Environmental Consequences

Onion Creek Experimental Forest

Cross Country Travel: Cross country travel is currently prohibited within the Onion Creek Experimental Forest and would continue to be prohibited in each action alternative.

Additions to the NFTS: One motorized trail providing access to a dispersed site would be added to the NFTS in Alternatives 2, 5 and 6. This route is less than 0.2 mile in length and use of the route would be consistent with Experimental Forest management objectives. The other action alternatives do not propose this route and therefore would not have any effects on the Onion Creek Experimental Forest.

Establishment of Motorized "Open Areas": Not applicable to this area; therefore, there is no effect.

Changes to the NFTS: No changes in class of vehicles are proposed in any alternative. Seasonal restrictions would be implemented on all native surface roads and motorized trails during the wet periods of the year in Alternatives 4, 5 and 6. Those seasonal restrictions would be consistent with Experimental

Forest management objectives. No Maintenance Level 1 roads are being proposed for re-opening within this experimental forest in any of the action alternatives; therefore, there is no effect.

Forest Plan Amendment: Not applicable to this area; therefore, there is no effect.

Sagehen Experimental Forest

Cross Country Travel: Cross country travel is currently prohibited within the Sagehen Experimental Forest and would continue to be prohibited in each action alternative.

Additions to the NFTS: Within the Sagehen Experimental Forest there is one motorized trail being considered for addition to the NFTS. Route TKN 001 is included in Alternatives 2 and 5. This motorized trail is about a quarter mile in length and would connect an existing OHV trail to a system road. Without this connection the OHV route ends up being an out and back route which is a less preferable recreation opportunity. The effects from this route on the Experimental Forest are likely to be slight due to the length of the route. Alternatives 3, 4, 6 and 7 would have no effects because no motorized trails are proposed for addition to the NFTS within Sagehen Experimental Forest.

Establishment of Motorized "Open Areas": Not applicable to this area; therefore, there is no effect.

Changes to the NFTS: No changes in class of vehicles are proposed in any alternative. Seasonal restrictions would be implemented on all native surface roads and motorized trails during the wet periods of the year in Alternatives 4, 5 and 6. Those seasonal restrictions would be consistent with Experimental Forest management objectives. No Maintenance Level 1 roads are being proposed for re-opening within this experimental forest in any of the action alternatives; therefore, there is no effect.

Forest Plan Amendment: Not applicable to this area; therefore, there is no effect.

Designated and Proposed Wild and Scenic Rivers: Affected Environment

Designated and Proposed Wild and Scenic Rivers are managed to preserve their notable values or features (identified as "outstandingly remarkable values"), as part of, or for eventual inclusion into the National Wild and Scenic River System. On the Tahoe National Forest, this management direction applies to those NFS lands within ¼ mile on either side of the North Fork of the American River, which has a "Wild River" designation; and proposed sections of Sagehen Creek, Lower South Yuba River, North Yuba River and Canyon Creek.

There are no proposed additions to the NFTS within the North Fork of the American Wild River corridor, or the proposed corridors along the North Fork Yuba River and Canyon Creek. A total of less than one-mile of unauthorized routes is being proposed for addition to the NFTS along Sagehen Creek and the South Yuba River. Each of the proposed additions (12 spur routes) would provide motor vehicle access to dispersed recreation sites adjacent to existing NFTS routes.

Several of the action alternatives have identified seasonal restrictions during wet-weather periods for motor vehicle routes located within the four proposed Wild and Scenic River corridors.

North Fork of the American River

The North Fork of the American is a federally designated Wild and Scenic River partially located on the Tahoe National Forest. Motor vehicle use is prohibited within the entire "Wild River" corridor (9,455 acres). There are currently no NFTS motor vehicle routes within the river corridor and no proposed additions in any of the alternatives. Management of the Wild River corridor would remain unchanged as a result of this planning effort.

The North Fork American River was designated as a "Wild River" because it is free of impoundments and generally inaccessible by motor vehicles, with watersheds and shorelines essentially primitive, and waters unpolluted. It represents a vestige of primitive America.

Canyon Creek

A thirty-mile section of Canyon Creek was proposed for designation as a Wild and Scenic River. Within this corridor, 28-miles were recommended as a "Wild River" and two-miles as a "Scenic River." The Canyon Creek Wild and Scenic corridor (4,565 acres) was found eligible for its "outstandingly remarkable" primitive and semi-primitive recreation and scenic values. The proposed Wild and Scenic River corridor includes 5.3 miles of NFTS roads and trails and 2.4 miles of unauthorized motor vehicle routes.

Canyon Creek was recommended as an addition into the National Wild and Scenic River System because of its identified semi-primitive/primitive recreation and scenic values as well as the historic mining values of the area.

North Yuba River

The North Yuba Proposed Wild and Scenic River includes 45 miles of river corridor (14,228 acres) that is eligible for its "outstandingly remarkable" fisheries, heritage resources, vegetation, scenic and recreation values. The river is managed as a "Recreational River" from Yuba Pass downstream to Shenanigan Flats, and as a "Scenic River" from Shenanigan Flats to Wambo Bar. Within this corridor there are currently 13.3 miles of NFTS, and 10.3 miles of unauthorized motor vehicle routes included in the proposed Wild and Scenic River corridor. The river is easily accessible from motor vehicles, as State Highway 49 closely parallels 90 percent of this river segment.

The North Yuba River was recommended as an addition to the National Wild and Scenic River System because of the National significance of the gold mining history and State level significance of the fishery. In addition, the river provides a broad range of recreation opportunities, high scenic quality, and plant values.

Sagehen Creek

The eight-mile corridor (2,451 acres) of proposed Sagehen Creek Wild and Scenic River was found to be eligible for "Scenic River" designation because of its "outstandingly remarkable" ecosystem, geologic, fisheries, unique wildlife, and historic values. The proposed Wild and Scenic river corridor is paralleled by US 89 and NFTS roads. There are numerous dispersed recreation sites located adjacent to Sagehen Creek. Included within the proposed Wild and Scenic River corridor are 9.9 miles of NFTS roads and trails and 4.8 miles of unauthorized motor vehicle routes.

Sagehen Creek was recommended to as an addition into the National Wild and Scenic River System because of its outstandingly remarkable ecosystem values in the form of fens, unique plants, special geologic formations that support the fens, unique water chemistry that supports rare caddis flies, an excellent assemblage of native fisheries, unique wildlife values, and historical logging values eligible to the National Register of Historic Places.

South Yuba River

Nineteen-miles of the proposed South Yuba Wild and Scenic River are located on the Tahoe NF. The river corridor was found to be eligible for designation because of its "outstandingly remarkable" scenic, recreational and cultural values. The river segment from Jordan Creek to 0.3 miles below Lang's Crossing is managed as a "Recreational River"; the next segment to approximately 0.5 miles below the confluence of Fall Creek is managed as a "Scenic River"; and the final segment to the forest boundary is managed as a "Recreational River". Included within the proposed Wild and Scenic river corridor (3,161 acres) are 5.9 miles of NFTS motor vehicle routes and 2.4 miles of unauthorized motor vehicle routes.

The South Yuba River below Spaulding was recommended as an addition into the National Wild and Scenic River System because of its outstanding broad recreation opportunities and high scenic qualities, water associated recreation activities, and historic values.

Wild and Scenic Rivers: Environmental Consequences

The following section describes how the alternatives affect designated and proposed Wild and Scenic rivers using the following indicator: **Outstandingly Remarkable Values** as identified in the affected environment.

Alternative 1 (No Action)

Direct and Indirect Effects

Cross Country Travel: The No Action Alternative could degrade outstandingly remarkable values in all proposed Wild and Scenic river corridors because it allows the potential for cross country travel across all 24,405 affected acres. Cross country travel with continued route proliferation could reduce scenic, recreational, historic, ecosystem, wildlife, plant and other values across all proposed Wild and Scenic River corridors. The prohibition of motor vehicle use within the 9,445 acres of the North Fork American Wild River would continue.

Additions to the NFTS: There would be no direct or indirect effects on proposed Wild and Scenic River corridors because no unauthorized routes are being proposed for addition as NFTS roads or trails in the No Action Alternative.

Establishment of Motorized "Open Areas": Not applicable to designated or proposed Wild and Scenic Rivers.

Changes to the NFTS: There would be no direct or indirect effects on proposed Wild and Scenic River corridors because no changes to the NFTS regarding class of vehicle, season of use or reopening of ML 1 roads is proposed in this alternative.

Forest Plan Amendment: Not applicable to designated or proposed Wild and Scenic Rivers.

Cumulative Effects

Alternative 1 would contribute towards negative cumulative effects on designated and proposed Wild and Scenic Rivers because additional future route proliferation would adversely affect the identified outstandingly remarkable values as mentioned in the affected environment.

Action Alternatives

Direct and Indirect Effects

Cross Country Travel: The Action Alternatives could improve the outstandingly remarkable values in all proposed Wild and Scenic river corridors because it prohibits cross country travel across all 24,405 affected acres.

Additions to the NFTS: This is addressed for each proposed Wild and Scenic River corridors.

Establishment of Motorized "Open Areas": Not applicable to designated or proposed Wild and Scenic River corridors.

Changes to the NFTS: This is addressed for each proposed Wild and Scenic River corridor if there are changes to the NFTS regarding class of vehicle or season of use. There will be no re-opening of ML 1 roads in any alternative.

Forest Plan Amendment: Not applicable to designated or proposed Wild and Scenic Rivers; therefore, there are no effects and it will not be discussed further.

Cumulative Effects

The action alternatives would contribute towards positive cumulative effects on designated and proposed Wild and Scenic Rivers because decreased route proliferation would benefit the identified outstandingly remarkable values.

North Fork of the American River

Cross Country Travel: Cross country travel is already prohibited within the North Fork American Wild and Scenic River. There is no change in any of the alternatives. Continuing the prohibition on cross country travel will maintain or enhance the outstandingly remarkable values of the North Fork American River.

Additions to the NFTS: There are no proposed additions to the NFTS in any of the alternatives. Adding no additional roads or trails to the NFTS in North Fork American Wild River corridor would maintain or enhance the outstandingly remarkable values of the area.

Changes in the NFTS: There is 0.1 mile of native surface road along the edge of the Wild & Scenic River corridor. This road is currently managed as open to all vehicles all year. Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on this road. These seasonal restrictions would be consistent with maintaining the outstandingly remarkable values of the North Fork American River. There are no changes in the class of vehicle and ML1 roads would not be re-opened in this corridor; therefore, there is no additional effect.

Cumulative Effects: Each of the action alternatives would enhance the outstandingly remarkable values associated with North Fork American River by prohibiting cross country travel within the river

corridor. Alternatives 4, 5 and 6 would further enhance those values by restricting use of designated motor vehicle routes during the wet weather season.

Canyon Creek

Cross Country Travel: Cross country travel would be prohibited on 4,565 acres within the Canyon Creek river corridor. The prohibition of cross country travel would prevent proliferation of unauthorized routes and would serve to maintain or enhance the outstandingly remarkable values of Canyon Creek. The prohibition of cross country travel would result in a reduction of the total amount of roads and trails available for motorized use

Additions to the NFTS: There are no proposed additions to the NFTS in any of the alternatives. Adding no new roads or trails to the NFTS would maintain or enhance the remarkably outstanding values associated with Canyon Creek.

Changes to the NFTS: There are no changes proposed to the class of vehicles allowed on existing NFTS roads in any of the alternatives. Wet weather seasonal restrictions on all native surface roads and trails would be imposed in Alternatives 4, 5 and 6 which would improve the current water quality conditions. These seasonal restrictions would enhance the outstandingly remarkable values associated with Canyon Creek. There are no ML1 roads being re-opened in this corridor; therefore, there is no additional effect.

Cumulative Effects: Each of the action alternatives would enhance the outstandingly remarkable values associated with Canyon Creek by prohibiting cross country travel and reducing the amount of roads and trails available for motorized use within the river corridor. Alternatives 4, 5 and 6 would further enhance those values by restricting use of designated motor vehicle routes during the wet weather season.

North Yuba River

Cross Country Travel: Cross country travel would be prohibited on 10,634 acres within the river corridor in each of the action alternatives. The prohibition of cross country travel would prevent proliferation of additional unauthorized routes and serve to maintain or enhance the outstandingly remarkable values of the North Yuba River.

Additions to the NFTS: There are no proposed additions to the NFTS in any of the alternatives.

Changes to the NFTS: Wet weather seasonal restrictions on all native surface roads and trails are proposed in Alternatives 4, 5 and 6 which would serve to improve the current water quality conditions. The class of vehicles allowed would be changed from “Roads open to highway legal vehicles only” to “Roads open to all vehicles” on 3.9 miles in Alternatives 2 and 5 and on 1.9 miles in Alternative 6. The changes in class of vehicles that would be allowed are the result of a mixed use safety analysis. Allowing mixed use would have no impact on identified outstandingly remarkable values. There are no ML1 roads being re-opened in this corridor; therefore, there is no additional effect.

Cumulative Effects: Each of the action alternatives would serve to maintain or enhance the outstandingly remarkable values associated with North Yuba River by prohibiting cross country travel and reducing the amount of roads and trails available for motorized use within the river corridor. Alternatives

4, 5 and 6 would further enhance those values by restricting use of designated motor vehicle routes during the wet weather season.

Sagehen Creek

Cross Country Travel: Cross country travel would be prohibited on 2,165 acres within the river corridor in each action alternative. The prohibition of cross country travel would prevent the proliferation of unauthorized routes and serve to maintain or enhance the outstandingly remarkable values identified for Sagehen Creek. The prohibition of cross country travel would result in a reduction of the total amount of roads and trails available for motorized use in each action alternative. Reducing the total miles of routes available for motor vehicle use would enhance the outstandingly remarkable values associated with Sagehen Creek.

Additions to the NFTS: Alternatives 3, 4 and 7 would not include any additions to the NFTS. Alternatives 2 and 5 propose the addition of 3 spur roads to the NFTS totaling 300 feet. The average length of these roads is 100 feet. These roads all come off existing NFTS roads to provide access to dispersed recreation sites. Alternative 6 proposes the addition of 4 roads to the NFTS totaling .1miles. The average length of these roads is 160 feet. These roads also come off existing NFTS roads to provide access to dispersed recreation sites. No substantial resource concerns were identified for these proposed additions to the NFTS. The designation of these short spur roads accessing dispersed recreation sites would have minor negative effects to the outstandingly remarkable values associated with Sagehen Creek.

Changes to the NFTS: Wet weather seasonal restrictions on all native surface roads and trails would be imposed in Alternatives 4, 5 and 6. Those restrictions would serve to improve the current water quality conditions and therefore enhance the outstandingly remarkable values associated with Sagehen Creek. The class of vehicles allowed would be changed from “Roads open to highway legal vehicles only” to “Roads open to all vehicles” on 2.1 miles in Alternatives 2, 5 and 6. The proposed changes in vehicle class allowed is the result of a mixed use analysis as described in Appendix J. Allowing mixed use identified NFTS roads would have no impact of the rivers outstandingly remarkable values. There are no ML1 roads being re-opened in this corridor; therefore, there is no additional effect.

Cumulative Effects: Each of the action alternatives would maintain or enhance the outstandingly remarkable values associated with Sagehen Creek by prohibiting cross country travel and reducing the amount of roads and trails available for motorized use within the river corridor. Alternatives 4, 5 and 6 would further enhance those values by restricting use of designated motor vehicle routes during the wet weather season.

South Yuba River

Cross Country Travel: Cross country travel would be prohibited on 3,161 acres within the river corridor in all of the action alternatives. Each action alternatives would reduce the number of miles of roads and trails available for motorized use. The reduction in mileage of routes available for motor vehicle use would enhance the high scenic quality associated with the South Yuba River.

Additions to the NFTS: Alternatives 3, 4 and 7 would not include any additions to the NFTS. Alternatives 2, 5 and 6 propose the addition of 8 spur roads to the NFTS totaling .5 miles. The average

length of these roads is 322 feet. These roads all come off existing NFTS roads to provide access to dispersed recreation sites within the "Recreational River" corridor. These short spur roads accessing dispersed recreation sites would serve to maintain or enhance the outstandingly remarkable values associated with South Yuba River by providing opportunities for motorized access to visitors for enjoyment of the recreation and scenic values associated with the South Yuba River.

Changes to the NFTS: The class of vehicles allowed would be changed from "Roads open to highway legal vehicles only" to "Roads open to all vehicles" on three tenths of a mile in Alternatives 2, 5 and 6. These changes in class of vehicles allowed are the result of a mixed use analysis as described in Appendix J. Allowing mixed use on these existing NFTS roads would have no impact of the rivers outstandingly remarkable values. Wet weather seasonal restrictions on all native surface roads and trails would be imposed in Alternatives 4, 5 and 6 which would improve the current water associated recreation activities values of the South Yuba River. There are no ML1 roads being re-opened in this corridor; therefore, there is no additional effect.

Cumulative Effects: Each of the action alternatives would serve to maintain or enhance the outstandingly remarkable values associated with South Yuba River by prohibiting cross country travel and reducing the amount of roads and trails available for motorized use within the river corridor. Alternatives 4, 5 and 6 would further enhance those values by restricting use of designated motor vehicle routes during the wet weather season.

Research Natural Areas: Affected Environment and Environmental Consequences

The Forest has three areas: Lyon Peak/Needle Lake (700acres) located on the northern boundary of Granite Chief Wilderness, Sugar Pine Point (625 acres) located about 4 miles due south of Cisco Grove just north of the North Fork American River; and Babbitt Peak (1061 acres) located north and west of Babbitt Peak on the Sierraville District. Babbitt Peak was designated for the distinctive and unusual occurrence of Washoe pine and mature stands of mountain mahogany and their significant potential for research and ecological study. Sugar Pine Point was designated for the good examples of the various stages of succession in a mixed conifer forest and the area represents a zone of overlap of ponderosa pine and Jeffrey pine. Lyon Peak was designated for the Mountain Hemlock and several other uncommon plants that provide high potential for research and ecological study. Motor vehicles are excluded from all three of these areas. No changes in management of these RNAs will occur under any alternative. There are no environmental consequences associated with RNAs in any of the alternatives.

Special Interest Areas: Affected Environment and Environmental Consequences

The 1990 Forest Land and Resource Management Plan designated 7 Special Interest Areas (SIA). Each area has specific language that may or may not permit some level of OHV use. In general due to the special nature of each of these areas, OHV trails would either be excluded or not encouraged. The Special Interest Areas are: Placer County Big Tree Grove Botanical Area (346 acres), Devils Postpile Geologic

Area (69 acres), Glacier Meadow Geologic Area (84 acres), Grouse Falls Scenic Area (220), Meadow Lake Cultural Area (58 acres), Sagehen Headwaters (79 acres), and Mason Fen (30) acres. If an OHV trail is proposed within a SIA the land management plan direction and land allocation would have to be considered to determine if a trail was allowable and or appropriate. No changes in management of these SIAs will occur under any alternative. There are no environmental consequences associated with SIAs in any of the alternatives.

Summary of Effects Analysis across All Alternatives

This section summarizes the effects analysis for roadless and special areas for each measurement indicator. Table 3.09-19 summarizes the effects analysis for special areas by ranking each alternative based on negative or positive impacts that could occur from proposed management actions. A score of one indicates that the alternative would have the most negative impact to Special Area resources; while a score of seven identifies the alternative that would be most beneficial to those resources.

Table 3.09-19 Summary Table – Special Areas – Tahoe NF

Impact to Special Area Resources	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
All IRAs, Experimental Forest, W & S Rivers	1	3	5	7	2	6	4

Chapter 3.10

Adjacent Ownerships

3.10. Adjacent Ownerships

Affected Environment

Adjacent Lands of Other Ownerships

Compatibility between the management of National Forests and the management of adjacent private land is important in reducing conflicts. Within the established boundaries of the Tahoe National Forest (TNF) are approximately 381,000 acres of privately owned land, with parcels varying in size from about 5 acres to over 12,000 acres. Additional private land adjoins the Forest's exterior boundary and along interior inclusions (i.e., areas of private land excluded when the TNF was established). More than 2,700 miles of property boundary interface between the National Forest System (NFS) and private land.

The checkerboard pattern of ownership in this area results from the railroad land grants of the 1860's, which were intended to encourage the construction of railroads and schools by granting alternate sections of land to the railroads and the States. The majority of this land is currently owned by Sierra Pacific Industries and other timber land managing companies, resulting in about 2,000 miles of property boundaries between them and the TNF. Many cooperative agreements for road construction and maintenance have been entered into with adjacent land owners; many of which allow for public access across private land. Sierra Pacific Industries (SPI) manages more than 250,000 acres in the Sierra Nevada. They are the largest corporate land owner in the TNF. SPI has stated that they are opposed to public off-highway vehicle (OHV) use on their lands. The assumption has been made in estimating environmental effects in this EIS that SPI corporate forest roads would not be available for use by the public.

Scattered throughout the TNF are smaller parcels and tracts of privately owned land. These parcels are mostly the result of homesteads, Native American Allotments, mineral patents, and State School land sales. These small parcels are typically 5 to 100 acres with irregular shapes.

Different land ownerships, by themselves, do not create conflict in regards to public access by wheeled motor vehicles. Different land ownership objectives often do create conflict, even on lands in the same ownership. Opportunities to coordinate with intermingled and adjacent land owners will continue, underlining the importance of developing compatible road and trail management objectives between private and NFS lands.

Recently, more encroachment and trespassing have occurred along the National Forest/private property boundaries, resulting in user-created routes existing on private land. Several of the unauthorized routes under consideration for addition to the NFTS and closed NFTS roads proposed for reopening are on the other side of private lands through which the Forest Service does not have a valid right of way. None of the alternatives add roads or motorized trails to the NFTS on private land without a valid right of way. All additions to the NFTS lie wholly on NFS lands. However, providing additional NFTS motorized recreation opportunities on the other side of private land could have an impact on the private landowners whose land would need to be crossed to get to those opportunities. Prior to making any additions to the NFTS on NFS lands on the other side of these private lands, mitigation measures are specified in Appendix A (Site Specific Road, Trail and Open Area Information) that permission must first be obtained from the private land owner to grant public access. Once this permission is obtained, the portion of the

roads and/or trail on NFS lands would be added to the NFTS and then made available for public access. Prior to the permission being obtained, public use of these roads and trails would be prohibited. If the land owner is unwilling to give permission for public access, the portion of those routes on NFS lands would not be added to the NFTS and public use would be prohibited on them. Routes on the other side of lands owned by SPI were excluded from this consideration unless the Forest Service already has a right-of-way or easement. Table 3.10-1 lists those roads and trails on NFS lands which could be added to the NFTS once permission from the private land owner is obtained for public access through their lands.

Table 3.10-1. Routes Potentially Affecting Private Land under Consideration for Addition to the NFTS

Route ID	Description of Need as Part of the NFTS
ARM-5	Trail connecting two routes near Eliot Meadow which connects two National Forest System Roads.
H29-11	Former NFTS road coming off of the 29 Road to the north near Omega going into and dead ending on private land. The majority of the route is on private land.
H293	Former NFTS road on Sleighville Ridge northeast of Camptonville parallel to County Road Road 115 accessing private land at Sleighville House.
H293-19	Former NFTS road 293-19 coming off of County road 293 north of Miller Ranch. First part of road crosses private land.
H293-4-18	Former NFTS road south of Henness Pass road accessing private land at Gates Orchard.
H34-4	Former NFTS road number 34-4. Makes a small loop to the north off of the Jouberts Road just south of Indian Hill and Highway 49 near Indian Valley. Short segment crosses private land immediately adjacent to the Jouberts Road.
H34-8-3	Former NFTS road accessing dispersed recreation site on private land in Indian Valley just south of Highway 49.
H36-3-1	Former NFTS road east of Malakoff Diggings in Missouri Canyon which makes a loop between two National Forest System roads. One small segment crosses private land near Humbug Creek.
H38	Former NFTS road north of the Sugar Pine Flat Research Natural Area coming off National Forest System road number 38 accessing private land at Pelliam Flat.
H823-1-1	Former NFTS road west of Gold Lake coming of National Forest System road number 9 to the north accessing private land at Howard Creek Meadows.
H833	Former NFTS road west of Malakoff Diggings near Bloody Run. Short segment near intersection with County Road 522 crosses private land.
H88-13	Former NFTS road just south of China Flat OHV staging area connecting a NFTS motorcycle trail with Placer County road 88. Majority of route is on private land.
N25-1-1	Former NFTS road number 25-1-1 connecting NFTS road number 25 just north of Cal-Ida to NFTS road number 25-1. Short segment near junction with the NFTS road 25-1 crosses private land.
N96-12c	Former NFTS road coming north off of the Mosquito Ridge Road near Mosquito Narrows. One segment dead ends at Cedar Springs and the other segment dead ends at Big Oak Flat.
TKN-J4	This trail accesses Andesite Peak and has views along the way.
TKN-J9	This trail follows a powerline and provides an alternative route to other nearby routes with safety concerns.

Route ID	Description of Need as Part of the NFTS
TKN-Q1	This trail is located on top of a buried phone line. It parallels an existing trail that was meant to re-route users; however, some users prefer to follow the buried line rather than the alternative system trail.
YRM-M4	Comes off of Sierra County road number 201 south of the town of Alleghany. Accesses private land at Minnesota Flat.
YRN-M3b	Motorcycle trail connecting the Downie River Trail to Castle Rock Trail. Crosses small segment of private land near Castle Rock Trail.
YRS-AF	South of Fordyce Lake. Comes off of NFTS motorcycle trail and provides access to a small lake. Short segment near intersection with existing trail crosses private land.
YRS-SF5	Comes off of Highway 20 to the north near Bear Valley. One curve in trail touches a parcel of private land.

Adjacent National Forest System Land

The TNF adjoins three other National Forests: Plumas, Eldorado, Humboldt-Toiyabe, as well as the Lake Tahoe Basin Management Unit (LTBMU). Shared administrative duties often occur along the Forest boundaries. The TNF, for example, currently administers a small portion of the Plumas National Forest northeast of Bullards Bar Reservoir. This shared administration is intended primarily to facilitate efficient, economical management of NFS land. Adjacent National Forests currently have coordinated travel management planning to ensure the amount of contrast between respective National Forests is minimized.

Private Land Interface

Private land interface situations may occur when NFS lands are adjacent to private lands that have been, or may be, developing for recreation, rural, residential, urban or commercial uses. When National Forest road and trail management objectives differ from our neighbors, the potential for mutual conflicts exist. Generally these private land interface conflicts arise adjacent to private lands where the land owners have conflicting road and trail management objectives and different perceptions about how NFS roads and trails adjacent or near their property should be managed. Typically these lands range from small communities, towns, and subdivisions to scattered rural residences. Some of these private land owners are concerned that the effects of Forest Service road and trail management will have negative effects on water quality, noise, dust, and recreation opportunities. As a result of these concerns, often private land owners are opposed to motor vehicle use, trespassing by recreationists, and road maintenance. Many people feel the Forest should provide buffers on NFS lands. To add to this complexity, land owners may have conflicting needs and attitudes about management of roads and trails next to them. One land owner may be completely supportive of adjoining motorized recreation opportunities while another resident may be totally opposed due aesthetic concerns, noise, or dust drifting onto their property.

Residential and community development of private lands adjacent to National Forest boundaries is expanding. The Sierra Nevada foothill counties are the fastest growing in the State. It is predicted that, through the subdivision of private lands, the number of land owners within and adjacent to National Forest boundaries will significantly increase. The number of land owners with different road and trail management objectives and perceptions about how NFS roads and trails should be managed will also

increase dramatically. Table 3.10-2 displays the current miles of roads and trails within the Urban/Rural/ Wildland Interface (¼ mile of private land, 1990 LRMP) by class of vehicle and season of use.

Table 3.10-2. Motorized Roads and Trails within Urban/Rural/Wildland Interface

Road/Trail Category	Season of Use	Length (miles)
Cross Country Travel Acres Unauthorized routes and closed NFTS roads still receiving some motorized use (miles)	N/A	268,400 596.2
NFTS Roads open to highway legal vehicles only (miles)	Open Seasonally	72.9
	Open Year Around	79.8
NFTS Roads open to all vehicles (miles)	Seasonal Closure	106.0
	Open Year Around	329.7
NFTS Trails open to high clearance trail vehicles (miles)	Seasonal Closure	4.8
	Open Year Around	19.5
NFTS Trails open to ATVs and motorcycles only (miles)	Seasonal Closure	.5
	Open Year Around	3.6
NFTS Trails open to motorcycles only (miles)	Seasonal Closure	3.9
	Open Year Around	22.3
Subtotal NFTS Motorized Roads & Trails		**642.9**
State, County or other jurisdiction roads	Open Year Around	**209.0**
Private Roads	Open Year Around	**6.2**
Total Motorized		**1,454.3**

Local Plans and Initiatives

County plans, zoning plans: All county plans in the State of California affect all of the private roads within county boundaries. In the counties in the TNF, private lands adjacent to National Forests are generally zoned for very low housing densities (one dwelling per 160 or 640 acres). The regulations for these zones keep roads available for use by the public consistent with the California Vehicle Code.

There will be little effect on county planning from the decisions made from this project. County zoning and regulations are only peripherally affected by TNF management. County plans and zoning are primarily based on locations of existing infrastructure, distance to schools, services, utilities, and land capabilities. There are no direct ties between these plans and route designations on the TNF, so the effects from the decisions made by this project on county plans and the effect of county plans on this decision are minimal.

Other Federal Lands

The Bureau of Land Management has a multiple-use management mission, similar to that of the Forest Service, and the agency's management plans reflect stewardship commitments comparable to those that apply to the National Forests. The Forest Service coordinates management activities and planning at various geographic scales with the Bureau of Land Management, including travel management.

State Parks

Units of the California State Park system, that are in the Sierra Nevada, protect all their wildlife and plants and give special care to sensitive species. State Parks have regulations that prohibit any disturbance or destruction of natural resources. The Forest Service coordinates management activities and planning at various geographic scales with the State Parks, including travel management.

Environmental Consequences

Measures or Factors Used to Assess Environmental Consequences

Management activities proposed in all of the alternatives could directly, indirectly, or cumulatively affect adjacent ownerships. National Forest travel management decisions have the potential to affect adjacent ownerships. The following factors indicate potential effects on adjacent ownerships:

1. Adding motorized roads and trails to the NFTS on the other side of private land,
2. Management of wheeled motorized vehicle activities adjacent to private

1. Motorized Roads and Trails on the Other Side of Private Land

Several of the unauthorized routes under consideration for addition to the NFTS are on the other side of private land. In addition, some of the Maintenance Level 1 roads proposed for reopening are also on the other side private lands. Allowing public motorized use on these routes on the other side of private land could have an impact on the private landowners. Before these routes, on the other side of private land, are designated for public motorized use, permission must first be obtained from the private land owner to grant public access. Prior to the permission being obtained, public use of these routes on the other side of private land would be prohibited. If the land owner is unwilling to give permission for public access, these routes would not be available for public use. Routes on the other side of lands owned by Sierra Pacific Industries (SPI) were excluded from this consideration unless the Forest Service already has a right-of-way or easement since they have indicated they are unwilling to encourage use by public motorized vehicles on their land. Table 3.10-3 lists those NFTS roads and trails on the other side of private land which would be made available for public motorized use once permission from the private land owner is obtained for public access.

Table 3.10-3. Additions to the NFTS and Reopening of Maintenance Level 1 roads on the other side of Private Land by Alternative

Action Proposed	Route ID	Description	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Additions to the NFTS	**ARM-5**	Trail connecting two routes near Eliot Meadow which connects two NFTS roads.	X	X		X	X		X
	H29-11	Former NFTS road coming off of the 29 Road to the north near Omega going into and dead ending on private land. The majority of the route is on private land.	X				X		
	H293	Former NFTS road on Sleighville Ridge northeast of Camptonville parallel to County Road Road 115 accessing private land at Sleighville House.	X				X		
	H293-4-18	Former NFTS road south of Henness Pass road accessing private land at Gates Orchard.	X				X		
	H34-8-3	Former NFTS road accessing dispersed recreation site on private land in Indian Valley just south of Highway 49.	X				X		
	H36-3-1	Former NFTS roads east of Malakoff Diggings in Missouri Canyon which makes a loop between two NFTS roads. One small segment crosses private land near Humbug Creek.	X				X		
	H833	Former NFTS road west of Malakoff Diggings near Bloody Run. Short segment near intersection with County road 522 crosses private land.	X				X		
	H88-13	Former NFTS road just south of China Flat OHV staging area connecting a National Forest System motorcycle trail with Placer County road 88. Majority of route is on private land.	X				X		
	TKN-J4	This trail accesses Andesite Peak and has views along the way.	X	X			X	X	X
	TKN-J9	This trail follows a powerline and provides an alternative route to other nearby routes with safety concerns.	X	X		X	X	X	X
	TKN-Q1	This trail is located on top of a buried phone line. It parallels an existing trail that was meant to re-route users; however, some users prefer to follow the buried line rather than the alternative system trail.	X	X			X	X	
	YRM-M4	Comes off of Sierra County road number 201 south of the town of Alleghany. Accesses private land at Minnesota Flat	X	X			X	X	X
	YRN-M3b	Motorcycle trail connecting the Downie River Trail to Castle Rock Trail. Crosses small segment of private land near Castle Rock Trail.	X	X			X		X
	YRS-AF	South of Fordyce Lake. Comes off of National Forest System motorcycle trail and provides access to a small lake. Short segment near intersection with existing trail crosses private land.	X	X		X	X	X	X
	YRS-SF5	Comes off of Highway 20 to the north near Bear Valley. One curve in trail touches a parcel of private land.	X	X		X	X	X	X
Subtotal Number of Road/Trail Additions to the NFTS			**15**	**8**	**0**	**4**	**15**	**6**	**7**

[1] Alternative 1 does not propose any additions to the NFTS or reopening of maintenance level 1 roads, the numbers shown indicate the continued use of routes unauthorized for public motorized access

Action Proposed	Route ID	Description	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Reopening ML 1 Roads	**N96-12c**	Maintenance Level 1 NFTS road coming north off of the Mosquito Ridge Road near Mosquito Narrows. One segment dead ends at Cedar Springs and the other segment dead ends at Big Oak Flat.	X				X		
	N25-1-1	Maintenance Level 1 NFTS road number 25-1-1 connecting NFTS road number 25 just north of Cal-Ida to National Forest System road number 25-1. Short segment near junction with the 25-1 Road crosses private land.	X				X		
	H823-1-1	Maintenance Level 1 NFTS road west of Gold Lake coming of National Forest System road number 9 to the north accessing private land at Howard Creek Meadows.	X				X		
	H38	Maintenance Level 1 NFTS road north of the Sugar Pine Flat Research Natural Area coming off NFTS road number 38 accessing private land at Pelliam Flat.	X				X		
	H34-4	Maintenance Level 1 NFTS road number 34-4. Makes a small loop to the north off of the Jouberts Road just south of Indian Hill and Highway 49 near Indian Valley. Shorth segment crosses private land immediately adjacent to the Jouberts Road.	X				X		
	H293-19	Maintenance Level 1 NFTS road 293-19 coming off of County Road 293 north of Miller Ranch. First part of road crosses private land.	X				X		
Subtotal Reopening ML 1 Roads			**6**				**6**		
Number of Routes Requiring Access Through Private Land			**21**	**8**	**0**	**4**	**21**	**6**	**7**

Under the No Action Alternative, unauthorized use by wheeled motorized vehicles on all of the roads and trails listed in Table 3.10-3 would be expected to continue unless action was taken by the private land owner to stop public access. Alternative 3 would prohibit use by wheeled motorized vehicles on all routes unauthorized for motor vehicles on NFS lands which are on the other side of private land. Alternatives 2, 4, 6 and 7 have a minor amount of unauthorized roads and trails on the other side of private land where use by wheeled motorized vehicles would be allowed to continue. Alternative 5 has 21 routes on the other side of private land where use by wheeled motorized vehicles would be allowed to continue. This use, however, would only be allowed once the private land owner has given permission for public access. Prior to such permission being given, public use by wheeled motorized vehicles would be prohibited.

Alternative 1

Cross Country Travel: Cross country travel is not prohibited in Alternative 1. This cross country travel could result in additional unauthorized trespass onto private land by wheeled motor vehicles. This trespass could create conflicts with the private land owners.

Additions to the NFTS: There are no additions of any roads, trails, or areas to the NFTS in Alternative 1.

Establishment of Motorized "Open Areas": "Open Areas" would not be established in Alternative 1. There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: There are no changes to the NFTS in this alternative.

Amendments to the Forest Plan: There are no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 1 would have the greatest cumulative effect on adjacent private lands. Wheeled public motorized use on all 21 routes on the other side of private land would not be prohibited. In addition, not prohibiting cross country travel could result in the proliferation of more trespass onto private land.

Alternative 2

Cross Country Travel: Cross country travel would be prohibited in Alternative 2. This would limit the proliferation of new unauthorized routes onto private lands. This prohibition would have a positive effect on adjacent land owners.

Additions to the NFTS: Alternative 2 proposes to add 8 unauthorized routes to the NFTS on the other side of private land. The mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) require that permission from the private land owner granting public access first be obtained prior to designating these routes on the motor vehicle use map.

Establishment of Motorized "Open Areas": None of the "Open Areas" being established in this alternative are on the other side of private land. There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: Alternative 2 would not reopen any Maintenance Level 1 (ML 1) roads on the other side of private land. Changing the season of use or class of vehicles on NFTS roads and motorized trails crossing private land are not anticipated to effect adjacent ownerships.

Amendments to the Forest Plan: The Forest Plan Amendment would not impact private land.

Cumulative Effects: Alternative 2 would reduce the impacts on private land by prohibiting cross country travel and reducing the number of routes on the other side of private land requiring permission from the land owner from 21 to 8.

Alternative 3

Cross Country Travel: Cross country travel would be prohibited in Alternative 3. This would limit the proliferation of new unauthorized routes onto private lands. This prohibition would have a positive effect on adjacent land owners.

Additions to the NFTS: There would be no proposed additions of any roads trails or areas to the NFTS in Alternative 3.

Establishment of Motorized "Open Areas": "Open Areas" would not be established in Alternative 3. There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: There would be no changes to the NFTS in this alternative. Changing the season of use or class of vehicles on NFTS roads and motorized trails crossing private land are not anticipated to effect adjacent ownerships.

Amendments to the Forest Plan: There would be no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 3 would reduce the impacts on access across private land by prohibiting cross country travel and reducing the number of routes on the other side of private land requiring permission from the land owner from 21 to zero.

Alternative 4

Cross Country Travel: Cross country travel would be prohibited in Alternative 4. This would limit the proliferation of new unauthorized routes onto private lands. This prohibition would have a positive effect on adjacent land owners.

Additions to the NFTS: Alternative 4 proposes to add 4 unauthorized routes to the NFTS on the other side of private land. The mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) require that permission from the private land owner granting public access first be obtained prior to designating these routes on the motor vehicle use map.

Establishment of Motorized "Open Areas": "Open Areas" would not be established in Alternative 4. There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: Alternative 4 would not reopen any ML 1 roads on the other side of private land. Changing the season of use or class of vehicles on NFTS roads and motorized trails crossing private land are not anticipated to effect adjacent ownerships.

Amendments to the Forest Plan: There would be no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 4 would reduce the impacts on access across private land by prohibiting cross country travel and reducing the number of routes on the other side of private land requiring permission from the land owner from 21 to 4.

Alternative 5

Cross Country Travel: Cross country travel would be prohibited in Alternative 5. This would limit the proliferation of new unauthorized routes onto private lands. This prohibition would have a positive effect on adjacent land owners.

Additions to the NFTS: Alternative 5 proposes to add 15 unauthorized routes to the NFTS on the other side of private land. The mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) require that permission from the private land owner granting public access first be obtained prior to designating these routes on the motor vehicle use map.

Establishment of Motorized "Open Areas": "Open Areas" would not be established in Alternative 5. There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: Alternative 5 would reopen 6 ML 1 roads on the other side of private land. The mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) require that permission from the private land owner granting public access first be obtained prior to designating these routes on the motor vehicle use map. Changing the season of use or class of vehicles on NFTS roads and motorized trails crossing private land are not anticipated to effect adjacent ownerships.

Amendments to the Forest Plan: The Forest Plan Amendment would not impact private land.

Cumulative Effects: Alternative 5 would reduce the impacts on access across private land by prohibiting cross country travel and requiring permission from the private land owners for the 21 routes on the other side of private land prior to their being designated on the motor vehicle use map.

Alternative 6

Cross Country Travel: Cross country travel would be prohibited in Alternative 6. This would limit the proliferation of new unauthorized routes onto private lands. This prohibition would have a positive effect on adjacent land owners.

Additions to the NFTS: Alternative 6 proposes to add 6 unauthorized routes to the NFTS on the other side of private land. The mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) require that permission from the private land owner granting public access first be obtained prior to designating these routes on the motor vehicle use map.

Establishment of Motorized "Open Areas": None of the "Open Areas" being established in this alternative are on the other side of private land. There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: Alternative 6 would not reopen any ML 1 roads on the other side of private land. Changing the season of use or class of vehicles on NFTS roads and motorized trails crossing private land are not anticipated to effect adjacent ownerships.

Amendments to the Forest Plan: The Forest Plan Amendment would not impact private land.

Cumulative Effects: Alternative 6 would reduce the impacts on access across private land by prohibiting cross country travel and reducing the number of routes on the other side of private land requiring permission from the land owner from 21 to 6.

Alternative 7

Cross Country Travel: Cross country travel would be prohibited in Alternative 7. This would limit the proliferation of new unauthorized routes onto private lands. This prohibition would have a positive effect on adjacent land owners.

Additions to the NFTS: Alternative 7 proposes to add 7 unauthorized routes to the NFTS on the other side of private land. The mitigation measures specified in Appendix A (Site Specific Road, Trail and Open Area Information) require that permission from the private land owner granting public access first be obtained prior to designating these routes on the motor vehicle use map.

Establishment of Motorized "Open Areas": "Open Areas" would not be established in Alternative 7. There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: Alternative 7 would not reopen any ML 1 roads on the other side of private land. Changing the season of use or class of vehicles on NFTS roads and motorized trails crossing private land are not anticipated to effect adjacent ownerships.

Amendments to the Forest Plan: There would be no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 2 would reduce the impacts on access across private land by prohibiting cross country travel and reducing the number of routes on the other side of private land requiring permission from the land owner from 21 to 7.

2. Management of wheeled motorized vehicle activities adjacent to private land

Private land interface situations may occur when NFS lands are adjacent to private lands that have been, or may be, developed for recreation, rural, residential, urban or commercial uses. When National Forest road and trail management objectives differ from our neighbors, the potential for mutual conflicts exist. Generally these private land interface situations arise adjacent to private lands where the land owners have conflicting road and trail management objectives and different perceptions about how NFS roads and trails adjacent or near their property should be managed.

All of the action alternatives reduce the number of miles of roads and trails open to wheeled motorized vehicles within ¼ mile of private land (Urban/Rural/Wildland Interface, 1990 LRMP). The largest decrease is Alternative 3. The smallest decrease is in Alternative 5. In addition, all of the action alternatives prohibit cross country travel within ¼ mile of private land which will reduce the proliferation of additional unauthorized routes. Alternatives 4, 5 and 6 impose wet weather restrictions on all native surface roads and trails which limit their use to the summer months.

Alternative 1

Cross Country Travel: Cross country travel would not be prohibited in Alternative 1 on 268,400 acres within ¼ mile of private land. Cross country travel would also result in the continued use of approximately 596.2 miles of unauthorized routes within ¼ mile of private land. This use would create conflicts with the private land owners.

Additions to the NFTS: There would be no addition of any roads trails or areas to the NFTS in Alternative 1. Since there would be no additions, there would be no potential adverse impacts on adjacent land owners from this element.

Establishment of Motorized "Open Areas": "Open Areas" would not be established within ¼ mile of private land in Alternative 1. There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: There would be no changes to the NFTS in this alternative.

Amendments to the Forest Plan: There would be no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 1 would have the greatest cumulative effect on lands within ¼ mile of adjacent private land. The amount of mileage available for wheeled motorized use remains at 1,454.3 miles. It would not prohibit cross country travel on 268,400 acres within ¼ mile of private land.

Alternative 2

Cross Country Travel: Cross country travel would be prohibited in Alternative 2. This would limit the proliferation of new unauthorized routes adjacent to private lands. The prohibition of cross country travel

would also result in reducing use on all unauthorized roads, trails and areas not added to the NFTS. These changes would have a positive effect on adjacent land owners.

Additions to the NFTS: Alternative 2 would add an additional 16.3 miles of motorized trails within ¼ mile of private land to the NFTS. These additional roads and motorized trails would have the potential to have adverse effects to the adjacent land owners.

Establishment of Motorized "Open Areas": Two areas totaling 35.3 acres would be established as "Open Areas" within ¼ mile of private land. These additional established "Open Areas" would increase the potential for adverse effects to the adjacent land owners.

Changes to the NFTS: Alternative 2 would approve mixed use on 63.7 miles of NFTS within ¼ mile of private land. Due to increased motor vehicle use this would have an adverse impact on adjacent land owners**.** It would also change the class of vehicle on 38.6 miles of NFTS within ¼ mile of private land as a result of changed maintenance levels. This would result in additional noise and dust impacts as a result of OHV use. The season of use would be shortened on 1 mile of NFTS roads and motorized trails within ¼ mile of private land which would lessen the impact on the same private land owners. No ML 1 roads would be reopened.

Amendments to Forest Plan: The Forest Plan Amendment would not have any impacts to adjacent land owners.

Cumulative Effects: Alternative 2 would reduce the impacts within ¼ mile of adjacent private land by lowering the amount of mileage available for wheeled motorized use from 1,454.3 miles to 876.6. It would also reduce the acreage of cross country use from 268,434.8 acres to 35.3 within ¼ mile of private land. The cumulative effect would be a reduction in the impacts to adjacent land owners.

Alternative 3

Cross Country Travel: Cross country travel would be prohibited in Alternative 3. This would limit the proliferation of new unauthorized routes adjacent to private lands. The prohibition of cross country travel would also result in reducing use on all unauthorized roads, trails and areas not added to the NFTS. These changes would have a positive effect on adjacent land owners.

Additions to the NFTS: There would be no additions of any roads trails or areas to the NFTS in Alternative 3. Since there would be no additions, there would be no potential adverse impacts on adjacent land owners from this element.

Establishment of Motorized "Open Areas": "Open Areas" would not be established within ¼ mile of private land in Alternative 3. There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: There would be no changes to the NFTS in this alternative.

Amendments to the Forest Plan: There would be no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 3 would reduce the impacts within ¼ mile of adjacent private land by lowering the amount of mileage available for wheeled motorized use from 1,454.3 miles to 858.2. It

would also reduce the acreage of cross country use from 268,434.8 acres to zero within ¼ mile of private land. The cumulative effect would be a reduction in the impacts to adjacent land owners.

Alternative 4

Cross Country Travel: Cross country travel would be prohibited in Alternative 4. This would limit the proliferation of new unauthorized routes adjacent to private lands. The prohibition of cross country travel would also result in reducing use on all unauthorized roads, trails and areas not added to the NFTS. These changes would have a positive effect on adjacent land owners.

Additions to the NFTS: Alternative 4 would add an additional 7.5 miles of motorized trails within ¼ mile of private land to the NFTS. These additional roads and motorized trails would have the potential to have adverse effects to the adjacent land owners.

Establishment of Motorized "Open Areas": "Open Areas" would not be established within ¼ mile of private land in Alternative 4.There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: Alternative 4 would not approve mixed use on any NFTS within ¼ mile of private land. It would however change the class of vehicle on 1.5 miles of NFTS within ¼ mile of private land as a result of changed maintenance levels. This would result in additional noise and dust impacts as a result of OHV use. The season of use would be shortened on 376.5 miles of NFTS roads and motorized trails within ¼ mile of private land which would lessen the impact on the same private land owners. No ML 1 roads would be reopened.

Amendments to the Forest Plan: There would be no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 4 would reduce the impacts within ¼ mile of adjacent private land by lowering the amount of mileage available for wheeled motorized use from 1,454.3 miles to 867.1. It would also reduce the acreage of cross country use from 268,400 acres to zero within ¼ mile of private land. The cumulative effect would be a reduction in the impacts to adjacent land owners.

Alternative 5

Cross Country Travel: Cross country travel would be prohibited in Alternative 5. This would limit the proliferation of new unauthorized routes adjacent to private lands. The prohibition of cross country travel would also result in reducing use on all unauthorized roads, trails and areas not added to the NFTS. These changes would have a positive effect on adjacent land owners.

Additions to the NFTS: Alternative 5 would add an additional 21.3 miles of motorized trails within ¼ mile of private land to the NFTS. These additional roads and motorized trails would have the potential to have adverse effects to the adjacent land owners.

Establishment of Motorized "Open Areas": "Open Areas" would not be established within ¼ mile of private land in Alternative 5. There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: Alternative 5 would approve mixed use on 63.7 miles of NFTS roads within ¼ mile of private land. It would also change the class of vehicle on 38.6 miles of NFTS within ¼ mile of private land as a result of changed maintenance levels. These changes in the class of vehicles would allow OHV use on these roads presently restricted to highway legal vehicles only. This would result in additional noise and dust impacts to adjacent land owners as a result of OHV use. 10.5 miles of ML 1 roads would be reopened within ¼ mile of private land. This would increase the amount of motor vehicle use near private land and would potentially have an adverse impact on the land owners. These adverse impacts would be mitigated by shortening the season of use on 394.4 miles of NFTS roads and motorized trails within ¼ mile of private land.

Amendments to the Forest Plan: The Forest Plan Amendment would not have any impacts to adjacent land owners.

Cumulative Effects: Alternative 5 would reduce the impacts within ¼ mile of adjacent private land by lowering the amount of mileage available for wheeled motorized use from 1,454.3 miles to 892.2. It would also reduce the acreage of cross country use from 268,434.8 acres to zero within ¼ mile of private land. The cumulative effect would be a reduction in the impacts to adjacent land owners.

Alternative 6

Cross Country Travel: Cross country travel would be prohibited in Alternative 6. This would limit the proliferation of new unauthorized routes adjacent to private lands. The prohibition of cross country travel would also result in reducing use on all unauthorized roads, trails and areas not added to the NFTS. These changes would have a positive effect on adjacent land owners.

Additions to the NFTS: Alternative 6 would add an additional 16.0 miles of motorized trails within ¼ mile of private land to the NFTS. These additional roads and motorized trails would have the potential to have adverse effects to the adjacent land owners.

Establishment of Motorized "Open Areas": One new area totaling 3.9 acres would be established as an "Open Area" within ¼ mile of private land. This additional established "Open Area" would increase the potential for adverse effects to the adjacent land owners.

Changes to the NFTS: Alternative 6 would approve mixed use on 4.1 miles of NFTS roads within ¼ mile of private land. It would also change the class of vehicle on 27.5 miles of NFTS within ¼ mile of private land as a result of changed maintenance levels. These changes in the class of vehicles would allow OHV use on these roads presently restricted to highway legal vehicles only. This would result in additional noise and dust impacts to adjacent land owners as a result of OHV use. Only .4 miles of Maintenance Level 1 roads would be reopened within ¼ mile of private land. This would increase the amount of motor vehicle use near private land and potentially have an adverse impact on the land owners. These adverse impacts would be mitigated by shortening the season of use on 387.5 miles of NFTS roads and motorized trails within ¼ mile of private land.

Amendments to the Forest Plan: The Forest Plan Amendment would not have any impacts to adjacent land owners.

Cumulative Effects: Alternative 6 would reduce the impacts within ¼ mile of adjacent private land by lowering the amount of mileage available for wheeled motorized use from 1,454.3 miles to 879.7. It would also reduce the acreage of cross country use from 268,434.8 acres to 3.9 within ¼ mile of private land. The cumulative effect would be a reduction in the impacts to adjacent land owners.

Alternative 7

Cross Country Travel: Cross country travel would be prohibited in Alternative 7. This would limit the proliferation of new unauthorized routes adjacent to private lands. The prohibition of cross country travel would also result in reducing use on all unauthorized roads, trails and areas not added to the NFTS. These changes would have a positive effect on adjacent land owners.

Additions to the NFTS: Alternative 2 would add an additional 10.8 miles of motorized trails within ¼ mile of private land to the NFTS. These additional roads and motorized trails would have the potential to have adverse effects to the adjacent land owners.

Establishment of Motorized "Open Areas": "Open Areas" would not be established within ¼ mile of private land in Alternative 7.There would be no potential adverse impacts on adjacent private land owners from this element.

Changes to the NFTS: The only changes to the NFTS within ¼ mile of private land in Alternative 7 would be changing the class of vehicle on 1.5 miles of NFTS as a result of changed maintenance levels. This change in the class of vehicles would allow OHV use on these roads presently restricted to highway legal vehicles only. This would result in additional noise and dust impacts to adjacent land owners as a result of OHV use.

Amendments to the Forest Plan: There would be no amendments to the Forest Plan in this alternative.

Cumulative Effects: Alternative 7 would reduce the impacts within ¼ mile of adjacent private land by lowering the amount of mileage available for wheeled motorized use from 1,454.3 miles to 869. It would also reduce the acreage of cross country use from 268,400 acres to zero within ¼ mile of private land. The cumulative effect would be a reduction in the impacts to adjacent land owners.

Table 3.10-4. Miles of roads and trails for each alternative within ¼ mile of private land by class of vehicle and season of use

Action type		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
1. Cross country travel								
(miles)		596.2	0	0	0	0	0	0
(acres)		268,400	0	0	0	0	0	0
2. Additions to the NFTS	**a. Roads added to the NFTS**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	b. Motorized Trails added to the NFTS	0	16.3	0.0	7.5	21.3	16.0	10.8
3. Establishment of Motorized "Open Areas" (acres)		0	35.3	0	0	0	3.9	0
4. Changes to the NFTS	**a. Change in Class of Vehicles resulting from approval of mixed use**	0	63.7	0.0	0.0	63.7	4.1	0.0
	b. Change in Class of Vehicles resulting from changes in maintenance levels	0	38.6	0.0	1.5	38.6	27.5	1.5
	c. Change in Season of Use	0	1.0	0.0	376.5	394.4	387.5	0.0
	d. Reopening Maintenance Level 1 Roads	0	0.0	0.0	0.0	10.5	0.4	0.0
5. Amendments to the Forest Plan		No Effect						
	Total Miles*	**1454.3**	**876.6**	**858.2**	**867.1**	**892.2**	**879.7**	**869.0**
	Total Acres	**268,434.8**	**35.3**	**0**	**0**	**0**	**3.9**	**0**

*Includes State, County and private roads. Alternative 1 also includes unauthorized routes and closed NFTS roads still receiving some motorized use.

Summary of Effects Analysis across All Alternatives

The following table summarizes the effects analysis for adjacent ownerships by ranking each alternative regarding how well it provides for each of the indicators. The following rankings were used: A score of 7 indicates the alternative has the least impact for adjacent ownerships related to the indicator. A score of 1 indicates the alternative has the greatest adverse impact for adjacent ownerships.

Table 3.10-5. Comparison of Effects to Adjacent Ownerships

Indicator	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of additions to the NFTS and reopening of Maintenance Level 1 Roads crossing private requiring prior approval from the private land owner	1	3	7	6	2	5	4
Management of wheeled motorized activities within ¼ mile of private land.	1	4	7	6	2	3	5
Average	**1**	**3.5**	**7**	**6**	**2**	**4**	**4.5**

Chapter 3.11

Society, Culture & Economy

3.11. Society, Culture & Economy

The Tahoe National Forest Region (TNF Region) encompasses more area than the TNF itself. For the purposes of this EIS, the TNF Region consists of all or part of Five California counties. These counties are Nevada, Placer, Plumas, Yuba and Sierra. Information on TNF Region's society, culture, and economy is organized using these five counties.

In the *western portion* of the TNF Region, people orient themselves to the Sacramento area for work and to the TNF for recreation activities. In the *eastern portion* of the TNF Region, residents focus on Reno, Sparks, and Carson City in Nevada for work and the nearby Tahoe National Forest for recreation.

Population and Demographics

Historical Background

People have lived in the TNF Region for thousands of years. Americans of European ancestry came to the TNF Region during the latter half of the nineteenth century. They introduced a different culture and outlook toward the Forest. The area attracted settlers who transformed the foothills with European agricultural practices and intense, but localized, resource extraction. Gold discovery in 1848 brought thousands of miners to the TNF Region. When gold supplies diminished, many people left the region. Economic activity shifted to extensive renewable resource extraction, principally timber, and agriculture.

People in the TNF Region today derive their livelihood and well-being in diverse ways. The Forest is used for traditional cultural subsistence, scientific and educational exploration, logging, mining, and recreating on the weekends, and telecommuting from a home in the woods during the work week. People in the TNF Region are as diverse as their activities and their reasons for living in the region.

Current Population and Growth Trends

The Sierra Nevada Region counties contain an estimated 400,000 people (Table 3.11-1). The population of the Sierra Nevada Region is changing in terms of numbers of people, age and ethnic composition, incomes, occupations, and leisure activities.

Table 3.11-1. Historic Population of Counties in the TNF Region (thousands of people)

County	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Percent change,1989-1999
Plumas	19.3	19.7	19.9	20.2	20.6	20.6	20.5	20.4	20.4	20.6	20.5	6.0
Sierra	3.2	3.3	3.3	3.3	3.3	3.4	3.4	3.4	3.4	3.4	3.2	-0.4
Nevada	74.1	78.5	80.4	82.2	83.6	84.9	85.9	86.8	87.7	88.8	89.6	21.0
Placer	161.0	172.8	178.4	184.1	189.4	194.1	199.6	206.3	212.4	217.9	225.9	40.3
Yuba	56.3	58.8	59.5	60.6	61.4	61.8	62.1	61.4	60.8	61.4	60.4	7.3
Total	**313.9**	**341.5**	**350.5**	**358.3**	**364.7**	**371.5**	**378.3**	**384.7**	**392.1**	**399.6**	**399.6**	**27.3**

City/County Population and Housing Estimates, 1990-1999. Sacramento, CA: State of California, Department of Finance

Approximately 57 percent of the TNF Region's population lives in Placer County. Placer County has also seen the largest population growth in recent years with more than a 40 percent increase. The smallest

proportion of the TNF Region's population lives in Sierra County with less than one percent of the population. The population of Sierra County has actually been declining in recent years.

California State agencies have projected population growth for the TNF Region's counties. In the next decade, most counties are expected to grow at a faster rate than they did between 1989 and 1998. Population increases may affect how communities develop.

Ethnicity

The distribution of ethnic groups in the Sierra Nevada Region differs significantly from the State of California averages. The White, not Hispanic population in the TNF Region ranges from 69.7 to 93.2 percent compared to the State average of 51.5 percent. See Table 3.11-2. Yuba County has a Hispanic population of 13.3 percent, the other counties range from 4.9 to 8.7 percent compared to the State average of 29.9 percent. Yuba County matches the State average of Asian/Pacific Islander population of 11.1 percent while the other counties range .3 to 2.5 percent. The State average of Black Americans is 6.9 percent compared to the TNF Region's range of .2 percent to 3.8 percent. The population of American Indians in the TNF Region is greater than the State Average ranging .8 to 3.0 percent compared to .6 for the State.

Table 3.11-2. Percent of TNF Region county populations by ethnicity, 1998

County	White, not Hispanic (percent)	Hispanic (percent)	Asian/ Pacific Islander (percent)	Black American (percent)	American Indian (percent)
Plumas	89.9	5.7	0.6	0.8	3.0
Sierra	92.0	5.8	0.3	0.2	1.8
Nevada	93.2	4.9	0.8	0.2	0.9
Placer	87.3	8.7	2.5	0.7	0.8
Yuba	69.7	13.3	11.1	3.8	2.1
State Average	**51.5**	**29.9**	**11.1**	**6.9**	**0.6**

As the population of the Sierra Nevada Region grows, the ethnic composition of its residents will change. The population of the TNF Region is expected to more than double over the next 50 years. At the same time, the number of Hispanic residents is projected to grow at a greater rate than the number of white residents. Proportions of other ethnic groups, except whites, are expected to remain essentially the same as in 1998 (Sierra Nevada Forest Plan Amendment FEIS 2001). See Table 3.11-3

Table 3.11-3. Projected populations of the TNF Region counties by ethnicity, 2040

County	White, not Hispanic (percent)	Hispanic (percent)	Asian/Pacific Islander (percent)	Black American (percent)	American Indian (percent)	Total Population (thousands)
Plumas	79.0	15.6	0.7	0.7	4.0	**24.6**
Sierra	90.3	8.5	0.2	0.1	0.9	**3.5**
Nevada	94.1	4.9	0.5	0.8	0.6	**249.3**
Placer	80.4	13.5	4.3	0.8	0.9	**522.2**
Yuba	45.4	22.0	28.2	3.0	1.4	**109.8**
State Average	**44.4**	**34.9**	**13.3**	**6.4**	**0.6**	
					Total	**909.4**

Age Distribution of the Population

The largest percentages of elderly people (more than 65 years old) live in Plumas, Sierra and Nevada Counties. The largest percentages of young people (17 years old or younger) live in Placer and Yuba Counties as shown in Table 3.11-4 below (Sierra Nevada Forest Plan Amendment FEIS 2001).

Table 3.11-4. Percent of Population of TNF Region counties by age group, 1998

County	Age Groups					
	0-4	**5-17**	**18-30**	**31-45**	**46-65**	**>65**
Plumas	4.4	17.0	15.6	19.2	24.5	19.4
Sierra	3.0	17.6	14.3	19.5	26.7	19.0
Nevada	4.9	17.0	14.4	19.8	24.9	19.0
Placer	6.9	19.5	15.3	23.4	23.4	11.0
Yuba	9.1	24.5	17.5	22.5	16.6	9.8

Projections for 2010 indicate that absolute numbers of elderly people will rise, but the proportion of elderly people will remain constant or drop in all Counties. At the same time, the share of the population less than 17 years old is also projected to drop.

Table 3.11-5 shows that by 2040, the share of the population that is less than 17 years old will have increased. Elderly people will be a lower percentage of the population than they are currently. High birth rates and in-migration is expected to double populations between 1998 and 2040 in Placer County.

Table 3.11-5. Projected percent of population of TNF Region Counties by age group, 2040

County	0-4	5-17	18-30	31-45	46-65	>65	Percent Population Growth 1998-2040
Plumas	5.5	13.5	15.2	17.4	27.6	20.8	19.4
Sierra	4.3	10.6	13.4	15.7	31.3	24.7	2.1
Nevada	5.8	14.9	15.3	17.9	24.9	21.2	82.3
Placer	6.8	17.6	16.7	18.7	22.5	17.7	132.6
Yuba	9.3	21.7	19.2	17.4	18.9	13.4	76.7

Per Capita Income

Table 3.11-6 shows historical per capita incomes for residents of the Sierra Nevada Region, with adjustment for inflation, for the period 1972 to 1997 (Sierra Nevada Forest Plan Amendment FEIS 2001). In 1972, the Counties with the three highest per capita incomes were Sierra and Placer. The lowest income was in Yuba County. All Counties, however, have shown net gains for real income over the period, but the rate of gains has differed markedly. Incomes have grown fastest in Plumas and Nevada Counties over the last 25 years. Slowest income growth has been in Yuba County.

Table 3.11-6. Inflation-adjusted per capita incomes - Residents of TNF Region counties, 1972-1997

County	Thousands of 1995 Dollars						
	1972	1977	1982	1987	1994	1997	Percent Change 1972-1997
Plumas	15.1	16.1	15.4	18.2	19.3	21.2	40.5%
Sierra	15.7	15.9	14.7	18.2	18.5	19.8	26.5%
Nevada	14.9	16.9	15.9	19.6	20.8	21.8	46.0%
Placer	15.5	18.5	19.4	23.9	25.2	27.9	79.5%
Yuba	12.5	13.4	13.3	14.4	14.7	15.1	20.4%

Employment and Income: Affected Environment

Labor Force Trends

During the 1990s, the TNF Region experienced different trends in labor force development. The Gold Country and Carson Range subregions had the greatest growth in labor force, with a 15 percent increase in nine years. This growth occurred despite a statewide recession in California. These two subregions share parts of the Interstate 80 corridor, and lie in or near the Sacramento and Reno metropolitan areas.

Trends in workforce numbers have been negative in counties where the timber industry, ranching, or both have historically played a significant economic role. Of all counties in the Sierra Nevada Region, Sierra County has experienced the greatest reduction in workforce, down by 19 percent between 1990 and 1998.

Unemployment

In most Sierra Nevada counties and communities, unemployment rates between 1990 and 1998 were higher than average statewide unemployment rates. Exceptions to this trend were foothill communities in Nevada, and Placer counties (all of which are within commuting distance of Sacramento).

Unemployment data aggregated by county or by subregion do not show differences in unemployment between communities. In general, more remote communities at high elevations have higher unemployment rates than lower elevation communities in the same county.

Seasonal Employment

Many jobs related to recreation are seasonal. Rural residents often take several part-time jobs during a year. Peak employment months in the summer indicate the importance of summer recreational

employment. For most counties in the TNF Region, January and February are the lowest employment months of the year.

The ratio of employment in the lowest employment month to the highest employment month is an index of the relative magnitude of employment swings in a county. A ratio close to 1 indicates comparatively smaller fluctuations in employment than lower ratios. Table 3.11-7 provides information about the seasonality of employment in the counties in TNF Region. Nevada and Placer Counties experience slight changes in total employment over the course of a year. Plumas and Sierra Counties, where recreation and tourism are important to county economies, have the lowest ratios, and therefore the greatest swings in employment during a year.

Table 3.11-7 displays trends in the share of temporary jobs among all jobs between the period from 1989 through 1993 and the period from 1994 through 1998. A negative value in the change in share of employment indicates a relative increase in seasonal jobs between the two periods, and a positive value a decrease in the proportion of seasonal jobs. Sierra County, which lost the largest proportion of workforce in the 1990s, shows the highest change toward more permanent jobs. This trend may indicate that the jobs lost in Sierra County were seasonal jobs.

Table 3.11-7. Patterns and Trends in Seasonality of Employment in TNF Region Counties, 1989-1998

County	Average Lowest Employment Month, 1994-1998	Average Peak Employment Month, 1994-1998	Ratio Peak Month Employment to Low Month Employment, 1994-1998	Change in Share of Permanent Employment, 1989-1993 vs. 1994-1998
Plumas	January	September	0.80	+2.8
Sierra	January	August	0.82	+11.3
Nevada	April	August	0.96	-8.4
Placer	January	November	0.97	-15.7
Yuba	February	August	0.86	+4.8
Total - All California	**January**	**August**	**0.96**	**-4.1**

Sources: State of California Employment Development Department, Labor Market Information Division

Employment and Income: Environmental Consequences

Economic Impacts

The assessment of economic impacts attempts to identify potential effects that Forest Service management may have on local, county, and regional economic systems and on people using the natural resources that the TNF 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 would be insignificant or would they be felt in very specific segments of the local economy?

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 LRMPs, 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 user 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 (2002)*. (www.fs.fed.us/recreation/programs/nvum).

The TNF participated in the NVUM project from October 2004 through September 2005. There were approximately 3,930,000 TNF visits during fiscal year 2005. The full TNF NVUM report is available on the web through the Natural Resource Information System (NRIS) Human Dimensions Module. http://fsweb.nris.fs.fed.us/products/Human_Dimensions_NVUM/HD-NVUM_12/index.shtml

Table 3.11-8 presents participation rates by activity for the Tahoe National Forest during the NVUM survey period. The "Total Activity Participation (%)" column of the table presents the participation rates by activity. Participation rates will exceed 100% since visitors can participate in multiple activities. The "Percent as Main Activity" column presents the participation rates in terms of primary activity.

Table 3.11-8. Activity Participation on Tahoe National Forest (NVUM FY2005 data)

Activity	Activity Emphasis for Road & Trail Use	Total Activity Participation (%)	Percent as Main Activity (%)
Snowmobiling	Motorized	7.6	7.2
Driving for Pleasure	Motorized	15.9	3.0
OHV Use	Motorized	3.9	1.6
Other Motorized Activity	Motorized	3.3	1.6
		Motorized Subtotal	**13.4**
Hiking / Walking	Non-motorized	32.4	15.7
Bicycling	Non-motorized	7.7	6.2
Other Non-motorized	Non-motorized	11.1	4.2
Cross country Skiing	Non-motorized	5.0	3.7
Backpacking	Non-motorized	0.7	0.4
Horseback Riding	Non-motorized	0.2	0.1
		Non-motorized Subtotal	**20.5**

Activity	Activity Emphasis for Road & Trail Use	Total Activity Participation (%)	Percent as Main Activity (%)
Downhill Skiing	Other	32.4	31.5
Fishing	Other	15.3	11.5
Viewing Natural Features	Other	53.6	6.0
Relaxing	Other	36.6	3.6
Motorized Water Activities	Other	6.2	2.0
Hunting	Other	2.2	1.6
Non-motorized Water	Other	3.1	1.7
Developed Camping	Other	5.6	1.2
Primitive Camping	Other	1.6	0.6
Picnicking	Other	9.3	0.6
Viewing Wildlife	Other	36.3	0.3
Sightseeing	Other	0.0	0.0
No Activity Reported	Other	2.5	2.5
Resort Use	Other	1.6	0.2
Visiting Historic Sites	Other	4.9	0.2
Nature Study	Other	3.7	0.1
Gathering Forest Products	Other	1.5	0.1
Nature Center Activities	Other	1.9	0.0
		Other Subtotal	**63.7**
		Total	**104.5**

The primary activity participation rates obtained from the NVUM 2005-2005 (Percent as Main Activity) displayed in Table 3.11-8 were used to estimate use by activity emphasis. The emphasis areas were grouped into those emphasizing non-motorized, motorized and other activities. Motorized activities were those that used motor vehicles on Forest Service roads and trails. Non-motorized activities still used the Forest's roads and trails, but on foot or by non-motorized transportation such as cross country skis or bicycles. All other activities are all the other Forest based activities measured by the NVUM survey that didn't utilize roads or trails to pursue their primary activity. Examples of "other" are downhill skiing, motorized water activities, etc. Motor vehicles may have been used to reach a destination or participate in the activity, but it was not the primary emphasis of the visit.

Table 3.11-8a 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) and the total number of visits of 3,931,709 reported in the TNF NVUM report. Users were determined to be either local or non-local based on the miles from the user's residence to the Forest boundary. If the user reported living within 50 miles of the Forest boundary, they are considered local; if over 50 miles, they are considered non-local. It is critically important to distinguish between local and non-local spending as only non-locals bring new money and new economic stimulus into the local community. Local spending is already accounted for in the study area base data. It is impossible to predict how locals would have spent money if they didn't have local recreation opportunities on the National Forest, but it's a safe guess that much of that money would not have been lost to the local economy. People tend to substitute other local recreation activities or change the time or place for continuing the same activity rather than traveling long distances and incurring high

costs to do the same activity. Table 3.11-8a indicates that the most popular non-motorized use is hiking/walking, followed by bicycling. The most popular motorized use is snowmobiling, followed by driving for pleasure. Table 3.11-9 indicates that non-local visitors spend more per visit than local visitors primarily because of overnight lodging expenditures. Motorized day use expenditures are generally higher than for non-motorized activities, but non-local overnight visitors engaged in non-motorized activities generally expend more than non-local motorized users (except for snowmobiling). Snowmobilers spend the most per visit, especially non-local visitors.

Table 3.11-8a. Number of Party Trips by Activity

	Use (Party Trips)				
	Non-local Day Use	**Non-local Overnight**	**Local Day use**	**Local Overnight**	**Non-Primary**
Non-motorized					
Hiking/Walking	9,975	19,650	91,650	7,142	5,819
Bicycling	9,939	7,643	36,193	2,820	2,298
Other Non-motorized	2,669	5,178	24,518	1,910	1,557
Cross country Skiing	2,204	6,832	14,489	1,073	247
Backpacking	0	1,206	0	1,309	58
Horseback Riding	64	123	584	45	37
Motorized					
Snowmobiling	3,821	6,245	29,761	5,575	5,004
Driving for Pleasure	1,430	1,732	19,737	682	2,293
OHV Use	1,398	2,455	6,405	1,868	411
Other Motorized Activity	1,398	2,455	6,405	1,868	411

	Use (Party Trips)				
	Non-local Day Use	**Non-local Overnight**	**Local Day use**	**Local Overnight**	**Non-Primary**
Other					
Fishing	10,549	20,015	45,668	8,439	3,653
Hunting	635	2,809	7,849	3,090	400
Viewing Wildlife	200	463	841	146	297
Motorized Water Activities	1,747	3,069	8,006	2,335	513
Non-motorized Water	1,080	2,096	9,924	773	630
Downhill Skiing	17,513	41,280	105,076	33,624	9,058
Developed Camping	667	1,573	4,003	1,281	345
Primitive Camping	0	1,809	0	1,963	87
Resort Use	111	262	667	213	58
Picnicking	334	786	2,001	640	173
Viewing Natural Features	4,003	9,226	16,812	2,919	5,930
Visiting Historic Sites	111	262	667	213	58
Nature Center Activities	0	0	0	0	0
Nature Study	67	154	280	49	99
Relaxing	2,001	4,718	12,009	3,843	1,035
Gathering Forest Products	56	131	334	107	29
Sightseeing	0	0	0	0	0
No Activity Reported	1,390	3,276	8,339	2,669	719
Subtotal	**59,710**	**140,745**	**358,260**	**114,643**	**30.643**

Table 3.11-9. Expenditures ($ per visit) by 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	19.09	0.00	24.10	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

	Expenditures ($ per visit)				
	Non-local Day Use	**Non-local Overnight**	**Local Day use**	**Local Overnight**	**Non-Primary**
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	18.52	70.36	15.00	49.20	12.41
Non-motorized Water	18.52	70.36	15.00	49.20	12.41
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	19.09	0.00	24.10	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	18.52	70.36	15.00	49.20	12.41
Visiting Historic Sites	18.52	70.36	15.00	49.20	12.41
Nature Center Activities	18.52	70.36	15.00	49.20	12.41
Nature Study	18.52	70.36	15.00	49.20	12.41
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	18.52	70.36	15.00	49.20	12.41
No Activity Reported	18.52	70.36	15.00	49.20	12.41

Economic Effects

The employment and labor income effects stemming from current motorized and non-motorized activities occurring on the TNF were estimated. The economic effects of all other types of recreation combined on the TNF have also been reported for comparison purposes. Economic effects tied to motorized and non-motorized activities were estimated to address the economic impact issue tied directly to Travel Management. 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.

Economic Effects Analysis Procedures

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, used for this jobs and income analysis, was five counties in Northern California and one in Nevada surrounding the TNF. The counties included in California are Nevada, Placer, Plumas, Sierra and Yuba, and Washoe County, Nevada.

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 that were attributable to all current recreation use (wildlife and non-wildlife activities), motorized, non-motorized and other activities for the TNF were generated.

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

Estimated economic effects (full and part-time jobs and labor income) 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.

Response Coefficients by Activity Type

Table 3.11-10 displays the estimated employment and labor income response coefficients (employment and labor income per 1,000 visits) by local and non-local activity types. The response coefficients indicate the number of full and part-time jobs and dollars of labor income per thousand visits by activity type. The response coefficients are useful in: 1) understanding the economic effects tied to a given use level; 2) understanding projected employment effects for various use scenarios (sensitivity analysis); and 3) understanding the differences in employment effects by activity type. The response coefficients displayed in Table 3.11-10 along with the number of visits were used to estimate the economic effects for local and non-local use by activity type.

Analysis of information displayed in Table 3.11-10 indicates that economic effects tied to local visitation generate lower employment and labor income effects. This is a result of local visitors spending less per visit in comparison to non-local visitors (see Table 3.11-9). In addition, economic effects vary widely by motorized and non-motorized activity types. The lowest employment effect is tied to local hiking/walking, bicycling, other non-motorized and horseback riding activities (Note: the economic effects are identical for these categories since they share the same spending profile). 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 cannot be generalized that motorized or non-motorized activities contribute more or less to the local economy on a per visit basis. It is also important to be careful with the use of response coefficients. They reflect an economic structure that is a snapshot in time, that is, they are not applicable to visitation numbers that are dramatically different from current recreation levels. If recreation activities and/or visits were to change radically, there would be a structural shift in the economy as spending patterns changed and these response coefficients would no longer reflect underlying economic processes.

Table 3.11-10. Employment and Labor Income Response Coefficients by Activity Type

		Employment (Jobs per 1,000 Party-Trips)		**Labor Income (2006 dollars)** ($ per 1,000 Party-Trips)	
		Direct Effects	**Indirect & Induced Effects**	**Direct Effects**	**Indirect & Induced Effects**
Non-motorized Use					
Hiking/ Walking, Bicycling, Horseback Riding, Other Non-motorized	Local Day	0	0	$4,497	$2,832
	Local Overnight	1	0	$20,858	$13,610
	Non-Local Day	0	0	$9,840	$5,375
	Non-Local Overnight	2	1	$65,265	$40,393
	NP	0	0	$4,497	$2,832
Backpacking	Local Day	0	0	$0	$0
	Local Overnight	1	0	$18,864	$14,050
	Non-Local Day	0	0	$0	$0
	Non-Local Overnight	1	0	$25,717	$15,671
	NP	1	0	$19,864	$14,050

		Employment (Jobs per 1,000 Party-Trips)		Labor Income (2006 dollars) ($ per 1,000 Party-Trips)	
		Direct Effects	Indirect & Induced Effects	Direct Effects	Indirect & Induced Effects
Motorized Use					
OHV Use	Local Day	0	0	$7,971	$5,133
	Local Overnight	1	0	$21,248	$14,331
	Non-Local Day	0	0	$12,531	$8,069
	Non-Local Overnight	1	1	$35,416	$23,885
	NP	0	0	$7,971	$5,133
Driving	Local Day	0	0	$4,960	$3,036
	Local Overnight	1	0	$27,264	$16,878
	Non-Local Day	0	0	$7,801	$4,774
	Non-Local Overnight	2	1	$45,447	$28,134
	NP	0	0	$4,960	$3,036
Snowmobile	Local Day	1	0	$14,256	$9,080
	Local Overnight	2	1	$50,348	$31,460
	Non-Local Day	1	0	$24,227	$14,834
	Non-Local Overnight	3	1	83,919	$52,436
	NP	1	0	$14,256	$9,080
Cross Country Ski	Local Day	0	0	$8,287	$5,318
	Local Overnight	2	1	$54,525	$34,350
	Non-Local Day	1	0	$13,018	$8,354
	Non-Local Overnight	4	1	$90,881	$57,253
	NP	0	0	$8,287	$5,318
All Other Use					
	Local Day	0	0	$8,647	$4,845
	Local Overnight	1	0	$34,829	$18,284
	Non-Local Day	0	0	$14,606	$7,711
	Non-Local Overnight	2	1	$67,234	$32,411
All Other Activities	NP	0	0	$8,647	$4,845

All Other Activities includes Developed Camping, Primitive Camping, Resort Use, Picnicking, Viewing Natural Features, Visiting Historic Sites, Nature Center Activities, Nature Study, Relaxing, Fishing, Hunting, Motorized Water Activities, Non-motorized Water, Downhill Skiing, Gathering Forest Products, Viewing Wildlife, Sightseeing, and No Activity Reported.

Motorized and Non-motorized Use

Table 3.11-11 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 3.11-12 expresses these employment and labor income effects as a percent of total employment and income for each activity. In general, the estimated economic effects are a function of the number of visits and the dollars spent locally by the visitors. For example, non-local users typically spend more money per visit than local users. Also, activities that draw more users will be responsible for more economic activity in comparison to activities that draw fewer users, holding constant spending per visit. Given that the analysis is dependent on

visitation and expenditure estimates, any changes to these estimates affect the estimated jobs and labor income.

Table 3.11-11 indicates that approximately 217 total average annual jobs in the 5 county area (direct, indirect and induced, full-time, temporary, and part-time) and $6.9 million total labor income (direct, indirect and induced) are attributable to non-motorized visitation on the TNF. The two largest activities are hiking/walking and cross country skiing. Together these activities account for about 12% of the jobs and 11% of the income generated from all of the activities analyzed. These activities account for about 147 jobs and provided $4.6 million in labor income to the 5 county area.

Motorized activities were responsible for approximately 103 total jobs (direct, indirect and induced) and $3.2 million total labor income (direct, indirect and induced). The two largest motorized uses are snowmobiling and driving for pleasure. These two activities contribute about 6.4% of the jobs from the activities in the table, and provide about 5.7% of the labor income. Together these two activities contribute 84 jobs and provide about $2.6 million in labor income to the 5 county area.

"All Other Activities" (see Table 3.11-8 for a list) are significant economic contributors for the activities studied. They provide 952 jobs, or 75% of the jobs from the activities analyzed. Labor income is about $34 million, or 77% of the income generated by these activities.

Table 3.11-12 shows that about 17% of the jobs provided from these 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, 7% motorized use and 77% from "Other Activities."

Table 3.11-11. Employment and Labor Income Effects by Activity Type

	Employment (full & part-time jobs)		**Labor Income** (2008 dollars)	
	Direct	**Indirect & Induced**	**Direct**	**Indirect & Induced**
Non-Motorized Use				
Backpacking - Local	1	0	$26,909	$19,033
Non-local	1	0	$32,105	$19,564
Hiking/Walking - Local	21	9	$581,556	$369,257
Non-local	52	20	$1,409,203	$864,779
Horseback Riding - Local	0	0	3,704	$2,352
Non-local	0	0	$8,976	$5,508
Bicycling - Local	8	3	$229,659	$145,821
Non-local	20	8	$556,500	$341,505
Cross country Skiing - Local	7	3	$184,869	$117,924
Non-local	25	10	$672,460	$423,983
Other Non-motorized - Local	6	2	$155,575	$98,782
Non-local	14	5	$376,984	$231,342
Total Non-motorized	**155**	**61**	**$4,238,500**	**$2,639,849**
Subtotal	**217**		**$6,878,349**	

	Employment (full & part-time jobs)		Labor Income (2008 dollars)	
	Direct	**Indirect & Induced**	**Direct**	**Indirect & Induced**
Motorized Use				
OHV Use - Local	3	1	$93.937	$61,744
Non-local	4	2	$108,139	$72,378
Driving for Pleasure - Local	5	2	$120,601	$73,949
Non-local	4	1	$93,027	$57,508
Snowmobiling - Local	27	11	$729,783	$461,315
Non-local	25	9	$638,280	$397,622
Other Motorized Activity - Local	3	1	$93,937	$61,744
Non-local	4	2	108,139	$72,378
Total Motorized	**74**	**29**	**$1,985,843**	**$1,258,638**
Subtotal	**103**		**$3,244,481**	
All Other Use				
All Other Activities - Local	254	118	$8,762,334	$4,884,906
Non-local	403	176	$13,557,831	$6,960,639
Total Other	**658**	**295**	**$22,320,165**	**$11,845,545**
Subtotal	**952**		**$34,165,710**	
Grand Total	**887**	**385**	**$28,544,508**	**$15,744,032**

Table 3.11-12. Percent of Total Employment and Labor Income Effects by Activity Type

	Employment (% of full & part-time jobs)		Labor Income (2008 dollars) (% of Total Income)	
	Direct	**Indirect & Induced**	**Direct**	**Indirect & Induced**
Non-Motorized Use				
Backpacking - Local	0.1%	0.0%	0.1%	0.0%
Non-local	0.1%	0.0%	0.1%	0.0%
Hiking/Walking - Local	1.6%	0.7%	1.3%	0.8%
Non-local	4.1%	1.6%	3.2%	2.0%
Horseback Riding - Local	0.0%	0.0%	0.0%	0.0%
Non-local	0.0%	0.0%	0.0%	0.0%
Bicycling - Local	0.6%	0.3%	0.5%	0.3%
Non-local	1.6%	0.6%	1.3%	0.8%
Cross country Skiing - Local	0.6%	0.2%	0.4%	0.3%
Non-local	2.0%	0.8%	1.5%	1.0%
Other Non-motorized - Local	0.4%	0.2%	0.4%	0.2%
Non-local	1.1%	0.4%	0.9%	0.5%
Total Non-motorized	**12.2%**	**4.8%**	**9.6%**	**6.0%**

	Employment (% of full & part-time jobs)		Labor Income (2008 dollars) (% of Total Income)	
	Direct	**Indirect & Induced**	**Direct**	**Indirect & Induced**
Motorized Use				
OHV Use - Local	0.3%	0.1%	0.2%	0.1%
Non-local	0.3%	0.1%	0.2%	0.2%
Driving for Pleasure - Local	0.4%	0.1%	0.3%	0.2%
Non-local	0.3%	0.1%	0.2%	0.1%
Snowmobiling - Local	2.1%	0.8%	1.6%	1.0%
Non-local	1.9%	0.7%	1.4%	0.9%
Other Motorized Activity - Local	0.3%	0.1%	0.2%	0.1%
Non-local	0.3%	0.1%	0.2%	0.2%
Total Motorized	**5.8%**	**2.3%**	**4.5%**	**2.8%**
All Other Use				
All Other Activities - *Local*	20.2%	9.4%	19.8%	11.0%
Non-local	31.7%	13.8%	30.6%	15.7%
Total Other	**51.7%**	**23.2%**	**50.4%**	**26.7%**
Totals	**69.7%**	**30.3%**	**64.5%**	**35.5%**
	100.0%		**100.0%**	

Table 3.11-13a. Total Employment and Labor Income Effects

		Employment Effects (full and part time jobs)	**Labor Income** (2008 dollars)
Total Non-Motorized Use	Local	**60**	**1,935,441**
	Non-Local	**157**	**4,942,909**
Total Motorized Use	Local	**53**	**1,697,010**
	Non-Local	**50**	**1,547,471**
Total All Other Use	Local	**373**	**13,647,240**
	Non-Local	**579**	**20,418,470**
Total	Local	**487**	**17,279,691**
	Non-Local	**786**	**27,008,850**
Total for Area		**1,272**	**44,288,540**

Table 3.11-13b. Percent of Total Area Employment and Total Area Labor Income Effects

		Employment Effects (full and part time jobs)	**Labor Income** (2008 dollars)
Total Non-Motorized Use	Local	**0.018%**	**0.012%**
	Non-Local	**0.049%**	**0.033%**
Total Motorized Use	Local	**0.009%**	**0.006%**
	Non-Local	**0.009%**	**0.006%**
Fishing	Local	**0.006%**	**0.004%**
	Non-Local	**0.011%**	**0.008%**
Hunting	Local	**0.002%**	**0.001%**
	Non-Local	**0.001%**	**0.001%**
Nature Related	Local	**0.004%**	**0.002%**
	Non-Local	**0.011%**	**0.008%**
Total All Other Use	Local	**0.074%**	**0.060%**
	Non-Local	**0.107%**	**0.085%**
	Total Use	**0.138%**	**0.088%**
	Study Area Total	**545,090**	**25,277,393,000**

Table 3.11-13a and 3.11-13b show the relationship of jobs and income generated from all recreation activities studied compared to total jobs and income in the 5 county area. All of the recreation jobs together only account for about 0.14% of the total jobs in the area, and the income generated is about 0.09% of the total labor income in the area studied.

Predictions about changes in the amount of recreational use that may occur 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 increase in the future by the same amount, 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 use would simply become more concentrated in those available areas. However, motor vehicle use is already concentrated in some areas of the Forest, so this effect may not be realized either during implementation. However, at some point some users may not attain the experience they desire and would likely seek other areas off-forest. The point at which this would occur is speculative.

Seasonal closures on NFTS native surface (dirt) roads and motorized trails in Alternatives 4, 5 and 6 are likely to have some level of impact to the local economy. Yet, this effect, again, is nearly immeasurable in relationship to the overall economy in the area. Any potential effects would likely impact gas stations, convenience stores, and other retail stores in local communities.

Environmental Justice

Community clusters are used to display how implementation of could affect people across the Region. Community clusters are groups of communities that share a common economic history and environmental setting. The following factors form the basis for community clusters: watershed and basin boundaries;

courses of highways, and proximity to the TNF. Table 3.11-14 displays those community clusters used in this analysis.

Table 3.11-14. Community clusters used to analyze economic and social impacts on communities

Community Cluster	ZIP Code	Community	Community Population
Eastern Sierra & Plumas Cos.	96015	Chilcoot	470
	96118	Loyalton	1500
	96124	Calpine	286
	96126	Sierraville	355
	96135	Vinton	Not Available
Grass Valley/Nevada City	95945	Grass Valley	21,263
	95946	Penn Valley	7603
	95949	Grass Valley	20,973
	95959	Nevada City	16,670
	95960	North San Juan	228
	95975	Rough and Ready	1811
	96977	Smartville	807
West I-80 Corridor/Auburn	95603	Auburn	32,535
	95631	Foresthill	4626
	95658	Newcastle	5998
	95701	Alta	751
	95703	Applegate	1898
	95713	Colfax	7344
	95714	Dutch Flat	533
	95715	Emigrant Gap	36
	95717	Gold Run	79
	95722	Meadow Vista	3314
Yuba River	95910	Alleghany	Not Available
	95918	Browns Valley	1297
	95919	Brownsville	1013
	95922	Camptonville	1090
	95935	Dobbins	1502
	95936	Downieville	46
	95941	Forbsetown	517
	95944	Goodyears Bar	377
	95962	Oregon House	Not Available
	95972	Rackerby	260
	95981	Strawberry Valley	242
	96125	Sierra City	311

Community Cluster	ZIP Code	Community	Community Population
East I-80 Corridor	89511	Reno (Rural Washoe)	16,421
	95724	Norden	316
	95728	Soda Springs	96
	9611	Floriston	169
	96161	Truckee	9544
	96162	Truckee	199

Assumptions and Limitations

Diverse data sources were used to analyze impacts related to social issues. One particularly important source is data from the U.S. Census Bureau. These data provide details about economic and social characteristics of individual communities or community clusters in the TNF at a finer scale than the county level. Unfortunately, the data are 9 to 10 years old. This limitation may mean that economic and social conditions have changed in the intervening time. However, collecting new information is not essential to discern differences among alternatives or required for a reasoned choice among options.

Environmental Justice: Affected Environment

Race, Cultural Heritage, Employment, and Income

The Tahoe National Forest community clusters have larger white populations than communities located just outside the Region. Table 3.11-15 shows percentages of people by racial composition and by Hispanic cultural heritage in the community clusters. None of the racial and cultural minorities when combined comprise more than 10 percent of a cluster's population in the TNF Region.

Table 3.11-15. Percentages of residents by race and Hispanic cultural heritage for Tahoe National Forest community clusters, 1990

Subregion and Community Cluster	White	Black	American Indian	Asian Pacific Islander	Other	Hispanic, All Races
Eastern Sierra & Plumas Cos.	96.0	0.0	2.8	0.0	1.2	4.7
Grass Valley / Nevada City	97.1	0.3	1.2	0.7	0.6	3.9
West I-80 Corridor / Auburn	95.7	0.4	1.5	1.4	1.0	4.7
Yuba River	91.8	1.1	4.1	1.4	1.6	5.9
East I-80 Corridor	96.0	0.3	1.2	1.4	1.1	5.3

Source: US Census Bureau, 1990 Census Data

Per capita income figures show that in general racial and cultural minority groups in the TNF Region earn less than their white neighbors. Table 3.11-16 displays per capita incomes of racial and cultural groups in each community cluster. Figures are in bold where race or heritage based per capita incomes fall below half the per capita incomes of whites. Per capita incomes of all minority groups combined (Black, American Indian, Asian and Pacific Islander, and others) are less than half the per capita incomes for whites in the Yuba River community cluster.

Table 3.11-16. Per capita incomes of residents in Tahoe National Forest community clusters by ethnicity and cultural heritage, 1989

Subregion and Community Cluster	White	Black	American Indian	Asian and Pacific Islander	Other	Combined Racial Minorities	Hispanic, All Races	Percent Jobs in Services Sector
	in 1989 dollars							
Eastern Sierra & Plumas Cos.	11,714	NA	8,683	NA	5,006	7,580	11,601	10.1
Grass Valley/ Nevada City	15,561	4,426	8,858	13,784	10,814	10,034	10,081	3.6
West I-80 Corridor/ Auburn	15,938	19,117	11,109	24,163	11,127	16,108	14,317	2.5
Yuba River	12,917	8,894	5,532	3,848	9,360	6,442	15,893	14.1
East I-80 Corridor	20,700	20,378	14,801	12,549	15,552	14,638	12,033	2.1

Source: US Census Bureau, 1990 Census

Community Clusters at Risk: Community clusters at risk from consequences stemming from the alternatives proposed in this EIS have certain characteristics related to poverty; poverty in relation to race or cultural heritage, historical unemployment, and types of employment. Community clusters of greatest socioeconomic concern meet at least one of the following four criteria:

1. More than 10 percent of the cluster's population is comprised of minority racial groups that combined have per capita incomes that are no more than half of whites' per capita income;
2. More than 10 percent of the cluster's population is comprised of Hispanics *and* Hispanic per capita income is no more than half of whites' per capita income;
3. Per capita income for whites in a community cluster is less than $10,350; (This figure is half of the per capita income of the community cluster (East I-80 Corridor) with the highest white per capita income ($20,700) in the TNF Region.)
4. More than 10 percent of the jobs in the cluster are in the services sector (as a surrogate for recreation).

These criteria identify elements of concern for social impacts in rural communities in several ways. Criteria 1 and 2 identify minority populations, comprising at least 10 percent of the total population that live under marked economic inequalities. Criterion 3 speaks to relative unevenness of wealth distributed across the Sierra Nevada Region for all people. Unemployment differs considerably among Sierra Nevada Region communities. Communities that currently have the highest unemployment have consistently had high unemployment (from 1990 to 1998) despite economic turnarounds in other parts of California. Forest Service opportunities for motorized wheeled vehicle recreation may influence employment in the services sectors in the community clusters. Criterion 4 identifies communities with a high dependence upon the services sector. The community clusters at risk based on these criteria are displayed in Table 3.11-17.

Table 3.11-17. Community clusters of concern based on income by ethnic or cultural heritage group, sources of employment, and percent unemployment

Community Cluster	Qualifying Criteria
Eastern Sierra and Plumas Cos.	1
Yuba River	2

Children in Poverty

Children are one population group that is disproportionately represented within low-income families. Table 3.11-20 shows U.S. Census Bureau estimates for all people living in poverty and for children living in poverty in counties of the TNF Region. Children are all people less than 18 years old. The U.S. Census Bureau defines poverty based on threshold incomes for families of different sizes. Thresholds change yearly and do not vary geographically.

The percentages of children living in poverty in the TNF Region are all below State averages with the exception of Yuba County. More than one-third of the children in Yuba County live in poverty. None of the counties in the TNF Region that have adults living in poverty comprise more than one-third of the total adult population.

The California Department of Education monitors the number of enrolled school children receiving supplemental benefits through Aid to Families with Dependent Children and through free or reduced-price meals. Table 3.11-20 summarizes data for school-age children at schools in the Tahoe National Forest Region.

Table 3.11-18. All people and all children living in poverty in the TNF Region counties, 1996

County	Number of All People Living in Poverty	Percent of People Living in Poverty	Number of Children Living in Poverty	Percent of Children Living in Poverty
Plumas	2,552	12.2	1,094	19.3
Sierra	326	9.4	102	10.6
Nevada	8,456	9.4	3,145	13.6
Placer	16,376	7.6	6,268	10.3
Yuba	13,964	22.8	7,279	34.0
All CA	**5,215,575**	**16.5**	**2,214,535**	**24.3**

Note: Children are considered to be all people less than eighteen years old.
Source: US Census Bureau (1999) based on a 1995 demographic model and 1996 populations.

Childhood Education

Table 3.11-19 presents the most recent available figures for primary and secondary public schools attended by pupils living in the Tahoe National Forest region. The table shows that, between the 1992-93 and 1997-98 school years, schools in the Region stabilized or reduced pupil-to-teacher ratios and also provided 2.3 percent more school meals to pupils for free or at a reduced price. These accomplishments occurred at the same time that many counties were seeing increases in their enrollments. For example, Placer County saw increases of 10 percent or more.

Table 3.11-19. Enrollment, poverty status, pupil-teacher ratios, and expenditures per pupil for schools attended by pupils living in Sierra Nevada Region

County	Enrolled Students			Children in Poverty*	Percent of Pupils in Families Receiving AFDC Payments			Pupil-to-Teacher Ratio			Per Pupil Spending
	1992-93	1997-98	Percent Change	1996	1992-93	1997-98	Percent Change	1992-93	1997-98	Percent Change	1996-97
Plumas	3,875	3,617	-6.7	18.2	13.0	10.4	-2.6	22.4	20.0	-2.4	5,500
Sierra	829	1,592	92.0	10.6	6.4	4.1	-2.3	18.1	16.8	-1.3	7,950
Nevada	12,644	13,378	5.8	12.4	9.2	7.6	-1.7	22.9	20.5	-2.3	5,330
Placer	17,607	20,098	14.1	9.8	7.7	6.0	-1.8	24.2	20.8	-3.4	5,108
Yuba	125	82	-34.4	20.2	23.2	28.0	4.8	23.0	17.1	-5.9	6,950

Source: US Census Bureau and California State Department of Education

* Pupils from parts of counties outside of the Sierra Nevada Region are not included in these totals. Some high schools attended by Sierra Nevada Region pupils, however, lie outside the Sierra Nevada Region. High schools attended by Sierra Nevada Region pupils are included in totals, except in Yuba County.

AFDC: Aid to Families with Dependent Children

Payments to the TNF Region counties from Forest Service timber sales, expressed in constant year dollars, have declined. Counties with declines of more than 70 percent between 1992 and 1997 include Plumas and Yuba. With growing enrollments and reduced funds from Forest Service revenues, these counties, in particular, may experience greater fiscal constraints to meet mandates and societal expectations for public school performance. Children, especially poor children, in these counties may receive diminished educational benefits.

To meet the shortfall in Forest Service receipts, President Clinton signed into law the Secure Rural Schools and Community Self-Determination Act of 2000 on 30 October 2000. This law gives counties the option, instead of 25 percent of current year receipts, of receiving annual payments from the U.S. Forest Service and other federal agencies based on the average of the three highest annual payments for the period 1986 to 1999. See Table 3.11-20. An annual increase above the three-year average adds value up to 50 percent of the annual increase in the National Consumer Price Index in each successive year.

Table 3.11-20. Changes in Forest Service payments (in 1995 dollars) to Sierra Nevada Region counties, 1992 and 1997

Subregion and County	Total Forest Service Payments		
	1992	1997	Percent Change
Plumas	9,521,606	1,659,323	-82.6
Sierra	1,723,426	874,447	-49.3
Nevada	664,716	405,126	-39.1
Placer	1,486,525	739,943	-50.2
Yuba	283,674	75,090	-73.5

USDA Forest Service Records of Payments to California and Nevada counties.

Results from Scholastic Aptitude Tests (SATs) provide one measure of how well public education prepares its students for higher education at colleges and universities. Many people are concerned about how reduced receipts to counties related to National Forest timber sales may have affected counties' spending on educational services for students and ultimately student performance. Table 3.11-21 ranks high schools attended by Sierra Nevada Region students attend based on each school's combined average scores in reading comprehension and mathematical skills.

Table 3.11-21. Combined Average Scholastic Aptitude Test (SAT) scores for High Schools Attended by Sierra Nevada Region Students

High School Name	High School Location (CA Unless otherwise noted)	Percent taking SAT 1989	Aver. Combined SAT Score 1989	Percentile Rank 1989	Percent taking SAT 1998	Aver. Combined SAT Score 1998	Percentile Rank 1998 All CA & NV	Change in Ranking
Nevada Union High	Grass Valley	33.3	1054	76	44.9	1094	82	6
Colfax High	Colfax	28.1	1067	80	46.2	1062	73	-6
Placer High (Char)	Auburn	24.7	1048	74	39.5	1059	72	-1
Tahoe Truckee High	Truckee	35.3	1020	64	51.9	1058	72	8
Del Oro High	Auburn	26.7	1070	81	40.7	1048	69	-11
Bear River High	Grass Valley	33.1	1012	61	46.2	1030	64	3
Loyalton High	Loyalton	32	969	47	51.6	1006	58	11
North Tahoe High	Truckee	44.8	1020	64	73	1003	57	-7
Downieville Junior-Senior High	Downieville	54.5	1086	86	75	936	39	-47

Community Needs for Fuel Wood

Fuel wood supplies are critical to rural people in California with low incomes. Data about fuel wood demand and supply in TNF Region counties are not available at present. Just outside the Region, in Trinity County, California, however, more than 70 percent of households rely on wood heating for their home (Celia Danks, Hayfork GIS Center, Hayfork, CA, personal communication April 1999). Smoke from domestic wood stoves may worsen local air quality during the winter and early spring that in turn may damage the health of children and elderly people nearby.

Environmental Justice: Environmental Consequences

Predictions about changes in the amount of recreational use that may occur 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 increase by the same amount in all alternatives 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 use would simply become more concentrated in those available areas. However, motor vehicle use is already concentrated in some areas of the Forest, so this effect may not be realized either during implementation. However, at some point some users may not attain the experience they desire and would likely seek other areas off-forest. The point at which this would occur is speculative.

Seasonal closures on NFTS native surface (dirt) roads and motorized trails in Alternatives 4, 5 and 6 are likely to have some level of impact to the local economy. Yet, this effect, again, is nearly immeasurable in relationship to the overall economy in the area. Any potential effects would likely impact gas stations, convenience stores, and other retail stores in local communities.

Race, Cultural Heritage, Employment, and Income

The potential impacts from changes in recreation use levels to minority and poor communities are likely to be greater in the Eastern Sierra and Yuba River clusters. These community clusters would be particularly sensitive to potential economic changes associated with the alternatives. These clusters are either the poorest community clusters in the Sierra Nevada Region and have traditionally had significant employment tied to the services industry or sizable minority populations.

Children in Poverty

Children may disproportionately suffer from economic decisions of the Forest Service if their parents lose jobs or must take lower paying jobs.

Childhood Education

The Secure Rural Schools and Community Self-Determination Act of 2000 gives the counties the option to receive payments based in the highest five years receipts from 1986 to 1999. This program is for five years, so during that period, county education budgets will not be impacted.

Other social and economic factors in communities or other Federal and State funding may have more influence more the ability of public education systems in the Region to prepare their students for higher education than the Forest Service.

Community Needs for Fuel Wood

Most individuals use wheeled motorized vehicles to gather personal use fire wood. Those alternatives which provide the largest miles of roads open to wheeled motor vehicles for the longest period would provide the greatest opportunity for fuel wood gathering. Table 3.11-22 shows the miles of roads available by vehicle class and season.

Table 3.11-22. Miles of roads available for fuel wood gathering opportunities by time of year

Access for Fuel wood Gathering Opportunities (miles)								
Class of Vehicle	**Season of Use**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Roads Open to Highway Legal Vehicles Only	All Year	351.4	141.4	351.4	348.1	141.4	230.2	348.1
Roads Open to Highway Legal Vehicles Only	Seasonal Restriction	265.3	76.9	265.3	265.3	76.9	251.5	265.3
Roads Open to All Vehicles	All Year	1044.0	1268.2	1044.0	0.0	132.6	4.6	1048.3
Roads Open to All Vehicles	Seasonal Restriction	406.9	586.0	406.9	1457.9	1801.1	1597.1	406.9

Summary of Environmental Justice in the Sierra Nevada Region

Table 3.11-23 summarizes Forest Service concerns for social impacts and environmental justice in Sierra Nevada community clusters analyzed in this EIS. Eastern Sierra and Plumas Counties are at risk for disproportional effects from the alternatives based on two criteria; 1) Race, cultural heritage and income and 2) Community Needs for Fuel Wood. The Yuba River community cluster is at risk for disproportional effects from the alternatives based on three criteria; 1) race, cultural heritage and income, 2) Children in Poverty and 3) Community Needs for Fuel Wood. There is no risk for disproportional effects from the alternatives based on any of criteria of any of the other community clusters.

Table 3.11-23. Summary of Forest Service Civil Rights Impact Analysis and environmental justice by community clusters in the Sierra Nevada Region

Subregion and Community Clusters	Race, Cultural Heritage, Employment, and Income	Children in Poverty	Childhood Education	Community Needs for Fuel Wood	Barriers to Communication
Eastern Sierra & Plumas Counties	Yes	No	No	Yes	No
Grass Valley/Nevada City	No	No	No	No	No
West I-80 Corridor/Auburn	No	No	No	No	No
Yuba River	Yes	Yes	Yes	Yes	No
East I-80 Corridor	No	No	No	No	No

Social Impact Analysis: Affected Environment

For the TNF, two social groups have been identified as likely to be affected by the Travel Management alternatives. These groups generally place different demands and have different values regarding management of motor vehicle use in the TNF. These groups were identified through a variety of sources including: The Public Collaboration Meetings held prior to the Notice of Intent (NOI), scoping comments received on the proposed action in the NOI, public meetings held during the scoping period, public comments received on the Draft EIS, public meetings held during the comment period on the Draft EIS, as well as various other meetings held with individuals or organizations. The identified groups are not mutually exclusive. They are, however, useful for analysis. The different social groups would be affected

differently by the various alternatives. Although grouping may produce some incorrect stereotyping, generally the following characteristics apply to these groups.

Motorized Use Advocates

One group perceived this action as restrictive in nature. They viewed the proposed action as unreasonably restricting motorized recreation use by prohibiting cross country travel and only adding 70.3 miles of additional NFTS motorized recreation opportunities. Concerns were raised that restricting cross country travel across the entire Forest severely impacts motorized recreation opportunities and unfairly restricts access for hunting, fishing, camping and a host of other outdoor activities. Several individuals commented on specific roads that they use and have used historically which they would like to have added to the NFTS.

Non-motorized Use Advocates

Another group of commenters expressed the desire to see the Forest be more restrictive and protective of the resources and that many of the motorized trails proposed for addition to the NFTS are poorly located and would cause adverse impacts to plants, wildlife, water quality, soils and other natural resources. Many commenters expressed concerns about impacts to a variety of natural resources, citing stream crossings, habitat fragmentation, wildlife disturbance, sedimentation, cultural resources, invasive weeds and other resources that would be impacted by motorized use or roads and trails. A group also expressed concerns that the proposed addition of motorized trails to Inventoried Roadless Areas would adversely affect roadless characteristics of these areas including opportunities for solitude, undisturbed landscapes and primitive, non-motorized recreation.

Social Impact Indicators

Lifestyles

This variable includes the ways people live; patterns of work and leisure, customs and traditions, and relationships with family and friends. Aesthetic amenities (e.g., open space, scenery, quiet) and recreation opportunities both motorized and non-motorized are affected by the Travel Management alternatives.

Attitudes, beliefs and values

This variable refers to the feelings, preferences, and expectations people have for the TNF and the management and use of certain areas. It may include the group’s sense of freedom or self-sufficiency and their feeling of certainty or uncertainty about the future. The former includes changes in perceived control by outside interests, perceived capability of local government to meet their needs, and the group’s sense of whether they can meet their recreation needs from the Forest. Feelings about the future may be affected by rates of change caused by Forest Service management and the predictability of consequences of the change.

Social Impact Analysis: Environmental Consequences

Social and economic consequences are closely related. (Income and employment effects are discussed earlier in this chapter) Social effects are expressed through the evaluation of lifestyles; attitudes, beliefs and values. The affected groups include motorized and non-motorized use advocates.

Implementing the alternatives would have social consequences. When the groups within the Forest sphere of influence differ significantly in their expectations for Forest recreation use and when the alternatives have different effects on the social groups, potential conflict exists. Generally, the smaller the range of alternative choices, the less the conflict between social groups.

For example alternatives which prohibit cross country travel are most beneficial to non-motorized use advocates. On the other hand, alternatives which emphasize motorized recreation opportunities are most acceptable to motorized use advocates.

The two social groups are the focus of the discussion that follows. Table 3.11-24 displays the social effects for each group by indicator measure and alternative.

Table 3.11-24. Summary of impacts to social groups by alternative

Indicator Measure	Social Group	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Lifestyles	Motorized Use Advocates	SS	GS	LS	LS	GS	GS	GS
	Non-motorized Use Advocates	LS	LS	GS	GS	LS	GS	GS
Attitudes, Beliefs and Values	Motorized Use Advocates	SC	GC	LC	LC	GC	GC	GC
	Non-motorized Use Advocates	LC	LC	GC	GC	LC	GC	GC

Legend

LS – Alternative provides "Little Support" for the lifestyle of the group
GS – Alternative "Generally Supports" the lifestyle of the group
SS – Alternative "Substantially Supports" the lifestyle of the group
LC – "Least Coincides" with the group's attitudes beliefs and values
GC – Generally Coincides with the group's attitudes beliefs and values
SC – "Substantially Coincides" with the group's attitudes beliefs and values

Direct and Indirect Effects

If the prohibition of cross country travel is implemented it may negatively impact motor vehicle users on the TNF. This action may affect the very young and the very old by preventing them from participating in activities that require strenuous walking for access. This same action may enhance the recreation opportunity for non-motorized users. This may cause resentment between user groups. The addition of roads and trails to the NFTS may appeal to users who recreate by driving or riding for pleasure. However, this may negatively affect the non-motorized users because of concerns of impacts to plants, wildlife, water quality, soils and other natural resources.

Cumulative Effects

Based on historic data and our best estimates, the Forest assumes that use would not change dramatically in the future because of this project; however, use could increase as population increases. It is also

assumed, that under all action alternatives, levels of use would increase by the same amount; although the use patterns may change. For example, even though cross country travel is prohibited in all of the action alternatives, the same levels of use would simply become more concentrated on roads.

Based on the current numbers and these assumptions, the possibility of conflict between user groups is probably the most constant cumulative effect socially and may be present regardless of which alternative is chosen.

Civil Rights Impact Analysis

USDA civil rights policy requires each agency to analyze the civil rights impact(s) of policies, actions, or decisions that will affect federally conducted and federally assisted programs and activities. A civil rights impact analysis (CRIA) facilitates the identification of the effects of eligibility criteria, methods of administration, or other agency-imposed requirements that may adversely and disproportionately impact employees or program beneficiaries based on their membership in a protected group. Protected groups include multiples of similarly situated persons who may be distinguished by their common race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetics, political beliefs, or receipt of income from any public assistance program.

Restrictions on motor vehicle use that are applied consistently to everyone are not discriminatory. However, some groups could be impacted more than others. This assessment addresses such concerns.

Public Involvement and Scoping

Public involvement concerning this proposal began with travel analysis that focused on the identification of unauthorized routes and assessing the effects of prohibiting cross country motorized travel on Forest users. This initial phase of public involvement began on October 19, 2006 and included six workshops to identify which routes and areas should become part of the “Proposed Action.” On October 19 (Nevada City), October 23 (Truckee), and October 26 (Foresthill), the public broke into three groups to review three different geographical areas and to discuss which of the routes should or should not become part of the proposal. Some of the groups continued to meet and/or to make field visits to review conditions on the ground. On November 15 (Grass Valley), December 5 (Truckee) and December 7 (Foresthill), the groups shared their ideas and their various concerns to the general public. Roughly 300 people participated in these workshops. In 2007, an e-mail update was issued sharing information on the meetings and outcome. These workshops were open to the general public including minorities, woman, and people with disabilities. The facilities where the workshops were held were ADA compliant.

Public scoping for this EIS began with a NOI published in the Federal Register on April 11, 2007. Scoping for the proposal was conducted through May 14, 2007. Scoping efforts included presentations to a variety of groups, phone calls, news releases, website postings and emails to alert the public of the opportunity to comment on the Proposed Action. Public meetings were held in Truckee (April 18, 2007), Foresthill (April 24, 2007) and Grass Valley (April 26, 2007) to explain the Proposed Action. Over 3,500 comments were received via e-mail and regular mail, most being e-mail form letters.

An 88-day comment period on the DEIS was completed on December 29, 2008. During the comment period public meetings were held in Nevada City (Oct. 1, 2008), Sierraville (Oct. 3), Olympic Valley (Oct. 7, 2008), and Auburn (Oct. 9, 2008) to discuss the DEIS. Over 7,000 comments were received via e-mail and regular mail, most being e-mail form letters.

Concerns and Mitigations Related to Potential Civil Rights Impacts

Through these public involvement efforts and interdisciplinary discussions, several concerns were raised and are addressed below.

Gathering Special Forest Products

It is known that many people, including members of protected groups, use motor vehicles to gather Special Forest Products including mushrooms, greenery, firewood, posts, poles, etc. Such products are gathered for both personal and commercial use. Some protected groups are known to be very active in gathering certain Special Forest Products. Concerns have been raised that the prohibition on cross country travel will restrict such activities to designated roads or trails, limit people's ability to gather such products and disproportionately impact protected groups.

Currently, under 36 CFR 261.6, removing any timber, tree or other forest product, except as authorized by a special-use authorization, timber sale contract, or Federal law or regulation is prohibited.

Gathering special forest products requires written authorization by the Forest Service. Such permitted activities are exempt from the prohibition on cross country travel in accordance with provisions of the permit (36 CFR 212.51 (8)). Such activities have been, and will continue to be, subject to separate, site-specific National Environmental Policy Act analysis, before permits are issued. This proposal does not change that policy. Permits will continue to be issued in accordance with law, regulation and policy regardless of this proposal. Therefore, it is not expected that gathering special forest products will be affected by this proposal or that any protected groups will be disproportionately affected.

Impacts on People with Disabilities and the Elderly

Throughout scoping, concerns have been raised about the impact of this project on people with disabilities and the elderly. Commenters have asserted that the proposal unfairly discriminates against these groups because they are more dependent on motor vehicles to access and enjoy our National Forests.

Comments from people with disabilities and the elderly, including references to specific sites or locations, were considered in the development of alternatives. Recreation opportunities and access needs for all users are some of the criteria used in the process of developing the selected alternative.

Implementation of the Travel Management Rule, Subpart B, including the prohibition of cross country travel, would be Forest-wide and applies to all Forest users equally. Changes to the NFTS would be largely limited to changes in vehicle class and season of use. Motorized access on NFTS routes is expected to be enhanced by the addition of unauthorized routes and the addition of vehicle classes on routes where such use has been prohibited.

There is no legal requirement to allow people with disabilities to use motor vehicles on roads, on trails, and in areas that are closed to motor vehicle use. Restrictions on motor vehicle use that are applied

consistently to everyone are not discriminatory. Generally, granting an exemption from designations for people with disabilities would not be consistent with the resource protection and other management objectives of travel management and would fundamentally alter the nature of the Forest Service's travel management program (29 U.S.C. 794; 7 CFR 15e.103).

Under section 504 of the Rehabilitation Act of 1973, no person with a disability can be denied participation in a Federal program that is available to all other people solely because of his or her disability. Consistent with 36 CFR 212.1, FSM 2353.05, and Title V, Section 507(c), of the Americans With Disabilities Act, wheelchairs and mobility devices, including those that are battery-powered, that are designed solely for use by a mobility-impaired person for locomotion and that are suitable for use in an indoor pedestrian area are allowed on all NFS lands that are open to foot travel.

Further, the Selected Alternative includes those additions to the NFTS that were identified as being of special importance to the elderly and disabled. These additions include ARM-3r (family oriented ATV/motorcycle), YRS-B5 (low difficulty motorcycle), TKN-J5 (4wd access to views along Sierra crest), access to the shoreline at Boca, Prosser and Stampede Reservoirs, and numerous routes accessing dispersed recreation sites.

Access by American Indians

Concerns were raised by American Indians and tribal representatives that this proposal would unduly restrict access to sacred sites or traditional gathering areas that are accessed via motorized cross country travel, including unauthorized routes. Elderly or infirm tribal members may be prevented from participating in tribal activities if motor vehicle access is denied. Such access has been traditionally granted as long as resource damage can be prevented.

Motor vehicle use that is specifically authorized under a written authorization issued under Federal law or regulations is exempt from route designations (36 CFR 212.51 (8)). Therefore, motor vehicle access to sacred sites or gathering areas may be authorized by the Forest Service and will not be affected by this proposal.

Further, throughout the Travel Management Project, comments were solicited but not received from federally recognized and unacknowledged tribes, intertribal organizations, and individuals. The following Table 3.11-25 is a summary of the communications to date with American Indian Tribes.

Table 3.11-25. American Indian Tribes Communications

Tribe	When
T'si-Akim Maidu, Donald Ryberg; Washoe Tribal Council, Brian Wallace; United Auburn Indian Community, Jessica Taverrs; Colfax-Todd Valley Consolidated Tribe, Richard Prout; Todd Valley Miwok-Maidu Cultural Foundation, Brigette Zellner; Greenville Rancheria, Lorie Jaimes; California Indian Basketweavers Association, Sara Greensfelder, and Wadatkuht Band of the Northern Paiutes of the Honey Lake Valley, Harold Dixon.	March 15, 2005 (letters, e-mails, and phone calls)
United Auburn Indian Community, Yolanda Chavez of Environmental Services	April 26, 2007 (phone call)
Ms. Shannon Brawley, Executive Director, California Indian Basket Makers Association	April 13, 2007 (letter)

Tribe	When
United Auburn Indian Community (UAIC), Yolanda Chavez of Analytical Environmental Services	July 5, 2007 (phone call)
United Auburn Indian Community (UAIC)	July 10, 2007 (meeting)
Mike DeSpain, Greenville Rancheria Environmental Coordinator	May 4, 2007 (phone call)
Waldo Walker, Washoe Tribe of Nevada and California	March 18, 2008 (letter)
Jessica Tavares, United Auburn Indian Community	March 18, 2008 (letter)
Lavina Suehead, Colfax Todd Valley Consolidated Tribe	March 20, 2008 (letter)
Don Ryberg, T'si-Akim Maidu	March 20, 2008 (letter)
Bridget Zellner, Todd Valley Miwok-Maidu Cultural Foundation	March 20, 2008 (letter)
Darrel Cruz, Washoe Tribe of Nevada and California	May 27, 2008 (phone call)
Darrel Cruz, Washoe Tribe of Nevada and California	July 3, 2008 (meeting)
Lorie James and Mike DeSpain, Greenville Rancheria; Don Ryberg, T'si Akim Maidu; Waldo Walker, Washoe Tribal Council; United Auburn Indian Community; Levina Suehead, Colfax-Todd Valley Consolidated Tribe; Brigette Zellner, Todd Valley Miwok-Maidu Cultural Foundation; Harold Dixon, Wadatkauht Band of the Northern Paiutes of the Honey Lake Valley.	February 12 , 2009 (letter)

Impacts on People with Limited English Proficiency

In California, people of Hispanic origin comprise a large part of the population and enjoy access to the National Forests for a variety of recreation and business pursuits. Many of these users speak English as a second language and therefore may have limited ability to read maps or other publications pertaining to travel management. In particular, the Forest Motor Vehicle Use Map (MVUM) is a concern since the MVUM will be the basis for enforcing vehicle restrictions. NFTS routes that are open for public use will be designated on the MVUM and users that leave designated routes will be subject to fines. There is a concern that people with limited English proficiency will be more vulnerable to citation if they are unable to read or understand the MVUM.

As the population of the Sierra Nevada Region grows, the ethnic composition of its residents will change as well. The population of the TNF Region is expected to more than double over the next 50 years. At the same time, the number of Hispanic residents is projected to grow at a greater rate than the number of white residents. Proportions of other ethnic groups, except whites, are expected to remain essentially the same. In order to lessen potential negative impacts to Spanish speaking people, the Tahoe National Forest will publish the MVUM in both Spanish and English.

Summary of Effects Analysis across All Alternatives

Table 3.11-26 summarizes the effects analysis for the social and economic environment by ranking each alternative regarding how well it provides for each of the indicators. This summary is not meant to convey that the indicators are equal in importance. The following rankings were used: A score of 7 indicates the alternative has the least impact for the social economic environment to the indicator. A score of 1 indicates the alternative has the most impact for the social economic environment related to the indicator. A score of 0 indicates the indictor does not apply.

Table 3.11-26. Comparison of Effects to the Social Economic Environment

Indicator	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Employment and Income	0	0	0	0	0	0	0
Environmental Justice	0	0	0	0	0	0	0
Motorized Use Advocate Lifestyles	7	5	1	2	6	4	3
Non-motorized Use Advocate Lifestyles	1	3	7	6	2	4	5
Motorized Use Advocate Attitudes, Beliefs and Values	7	5	1	2	6	4	3
Non-motorized Use Advocate Attitudes, Beliefs and Values	1	3	7	6	2	4	5
Civil Rights Impacts	0	0	0	0	0	0	0
Average	4.0	4.0	4.0	4.0	4.0	4.0	4.0

Chapter 4

Consultation and Coordination

Chapter 4: Consultation and Coordination

The public involvement process for the travel management process was designed to be open, inclusive, and interactive and to involve many diverse interest groups, individuals, agencies, and Native American Tribes. The public involvement process began in 2004 and continues through 2010. Public and group meetings, open houses, presentations, newsletters, web updates, news releases/interviews with media and personal discussions were all used to maintain regular communication with those interested/affected by this project. In addition, throughout this multi-year process, hundreds upon hundreds of public questions and concerns were answered and discussed with the public by the ID Team and other employees via the phone, in face-to-face meetings, field reviews, and through electronic or hard mail. Over 5,000 individual email addresses have been included in TNF/RO travel management mailing lists to receive updates on this process.

Truckee Pilot Project

Initially titled the Route Designation process, the Forest Service began travel management with a 95,000 acre area near Truckee as a pilot. In the summer of 2004, the Forest Service began public involvement regarding the project. Public meetings were held in Nevada City (November 8, 2004) and Truckee (November 10, 2004) to share maps of the inventoried trails, routes, and roads and answer questions. The public was requested to review the maps of the inventoried trails or routes and to identify any missing or incorrectly identified routes. Approximately 80 people attended the two public meetings and many requested additional time to review the maps. Presentations were also made to a variety of interest groups in the Truckee and Nevada City areas including motorcycle, four-wheel drive, mountain bike, and environmental groups. A poster explaining the process and map for review were distributed to a variety of bicycle, motorcycle, and sporting goods stores in the Truckee, Reno, Nevada City and Grass Valley areas for display. An e-mail list was initiated to share progress and information about this project.

Public Involvement Expanded to the Entire Forest

Due to an early snowfall and public requests for more time to review the maps, the pilot project was delayed. The schedule for the Truckee pilot was subsequently combined with the rest of the Forest for a forest-wide travel management planning effort.

In 2005, maps of the existing roads, trails, areas, and routes were placed on the Forest website. Five additional public meetings were held during the summer to provide an overview of the planning process and to obtain public review of maps. Meetings were held in Downieville (August 24, 2005), Sierraville (August 30, 2005), Truckee (August 29, 2005), Nevada City (August 31, 2005) and Foresthill (August 26, 2005). Approximately 115 people attended these meetings. Seventeen individuals commented in writing on errors or omissions of ninety routes. Another newsletter was issued and sent out electronically to explain the process and encourage review of the on-line maps.

Identifying Important Trail Criteria

In 2006, an on-line survey was initiated to identify trail users preference for trails – both motorized and non-motorized. Over 800 people participated in this survey. The information obtained from this survey helped the Forest Service better understand what trail criteria was most important for motorized and non-motorized trail users.

Designing Public Involvement for Helping Develop Proposed Action

During the summer, 2006, a variety of motorized and non-motorized trail users provided suggestions on designing a public participation process that would be meaningful to the public in helping identify a starting point from which to build the "Proposed Action." Approximately 20 individuals provided suggestions for this part of the public involvement process.

Workshops to Obtain Public Ideas on Proposed Action

In the fall, 2006, using the suggestions from the public on how to structure the public involvement, a series of six workshops were initiated to identify the routes and areas the public desired to be included in the "Proposed Action." The topic of "mixed use" was also introduced during these meetings. At the first session of the 2-part series, workshops were held in Nevada City (Oct 19, 2006), Truckee (Oct 2, 2006) and Foresthill (Oct 26, 2006). At these meetings, participants broke into three groups to review three different geographical areas and to discuss which of the unauthorized routes should or should not become part of the proposal. Some of the groups continued to meet and/or to make field visits to review conditions on the ground. Later in the fall, at the second set of workshops, the sub-groups presented their information back to the entire group at sessions in Grass Valley (Nov 15, 2006), Truckee (Dec 5, 2006) and Foresthill (Dec 7, 2006). Groups shared their ideas and their various concerns with other group proposals. Roughly 300 people participated in these workshops. In early 2007, an e-mail update was issued sharing information from the workshops and the outcome. Slides showing the groups recommended trails were posted on the website.

Proposed Action and Notice of Intent to Prepare an Environmental Impact Statement

In April, 2007, the Forest Service completed the "Proposed Action and Notice of Intent to Prepare an Environmental Impact Statement" based on comments from the meetings held in the fall. Public Scoping began on April 11, 2007. Presentations to a variety of groups, phone calls, news releases, website postings and email updates were used to alert the public of the opportunity to comment on the Proposed Action. Public meetings were held in Truckee (April 18, 2007), in Foresthill (April 24, 2007) and in Grass Valley (April 26, 2007) to explain the Proposed Action. Over 3,500 comments were received during April and May.

Additional newsletters were e-mailed to the individuals on the mailing list explaining the process used for reviewing the public scoping comments and requesting feedback as to how the public would like to review the Draft Environmental Impact Statement (hard copy, on line, or via CD). In May 2008, a meeting with motorized and non-motorized participants was held to listen to their suggestions as to the design of public meetings during the release of the Draft EIS. Additionally, small business cards were developed for field going personnel to give to OHV riders and other recreationists encountered in the field which described this process and invited their participation.

Draft Environmental Impact Statement

In the fall, 2008, the public was notified that the Draft EIS would be available for review and that open houses/meetings would be held. On September 26, news releases and email updates were mailed along with hard-copies of the DEIS to those that requested them. The document and maps were available as a hard copy, a CD, or on the web.

Four open houses along with corresponding public meetings were held in: Nevada City (Oct 1, 2008), Sierraville (Oct 3, 2008), Truckee/Olympic Valley (Oct 7, 2008), and Auburn (Oct 9, 2008). Open houses were held in the afternoon with the public meeting in the evenings. The open houses allowed for one-on-one discussions and questions while the public meetings were designed to provide an overview of the DEIS and the process used in developing and assessing the alternatives. A question-and-answer session was held at the end of each presentation. Approximately 600 - 700 people attended the various public meetings and open houses. In addition, presentations were made to the Nevada, Placer, and Sierra County Boards of Supervisors and several interest groups as requested.

Although a two-month comment period was initially announced, it was expanded for an additional month based on public and elected official requests for a total of three months. The comment period ended December 26, 2008, but comments were accepted through December 29 due to a Presidential Proclamation to close the office on Friday, December 26.

Over 7,000 letters, emails, map packets and other supporting material were received. The Forest Service then began the process of reviewing submitted comments and suggestions. This process involved sorting and grouping similar comments. Several of the comments questioned some of the data in the DEIS. The ID Team then went back to older NEPA documents to verify road and trail status decisions. A review of these earlier decisions caused the Forest Service to revise the numbers in the analysis in regard to National Forest System roads and trails and unauthorized roads and trails. The IDTeam also reviewed the current status of roads and trails across private land and found that some of these did not have valid rights-of-ways which was also corrected in the analysis and will be displayed in the Supplemental Draft Environmental Impact Statement.

Supplemental Draft Environmental Impact Statement

A 45-day comment period will be provided after the release of the Supplemental Draft Environmental Impact Statement (SDEIS) in 2010.

Relations with American Indian Tribes

Throughout the Travel Management Project, comments were solicited from federally recognized and unacknowledged tribes, intertribal organizations, and individuals. The following is a summary of the communications to date with American Indian Tribes. The communications displayed in Table 4-1 are in addition to the regular letters/meetings/email updates for the general public.

Table 4-1. American Indian Tribes summary of communications

Who	When
T'si-Akim Maidu, Donald Ryberg; Washoe Tribal Council, Brian Wallace; United Auburn Indian Community, Jessica Taverrs; Colfax-Todd Valley Consolidated Tribe, Richard Prout; Todd Valley Miwok-Maidu Cultural Foundation, Brigette Zellner; Greenville Rancheria, Lorie Jaimes; California Indian Basketweavers Association, Sara Greensfelder, and Wadatkuht Band of the Northern Paiutes of the Honey Lake Valley, Harold Dixon.	March 15, 2005 (letters, e-mails, and phone calls)
United Auburn Indian Community, Yolanda Chavez of Environmental Services	April 26, 2007 (phone call)
Ms. Shannon Brawley, Executive Director, California Indian Basketmakers Association	April 13, 2007 (letter)
United Auburn Indian Community (UAIC), Yolanda Chavez of Analytical Environmental Services	July 5, 2007 (phone call)
United Auburn Indian Community (UAIC)	July 10, 2007 (meeting)
Mike DeSpain, Greenville Rancheria Environmental Coordinator	May 4, 2007 (phone call)
Waldo Walker, Washoe Tribe of Nevada and California	March 18, 2008 (letter)
Jessica Tavares, United Auburn Indian Community	March 18, 2008 (letter)
Lavina Suehead, Colfax Todd Valley Consolidated Tribe	March 20, 2008 (letter)
Don Ryberg, T'si-Akim Maidu	March 20, 2008 (letter)
Bridget Zellner, Todd Valley Miwok-Maidu Cultural Foundation	March 20, 2008 (letter)
Darrel Cruz, Washoe Tribe of Nevada and California	May 27, 2008 (phone call)
Darrel Cruz, Washoe Tribe of Nevada and California	July 3, 2008
Lorie James and Mike DeSpain, Greenville Rancheria; Don Ryberg, T'si Akim Maidu; Waldo Walker, Washoe Tribal Council; United Auburn Indian Community; Levina Suehead, Colfax-Todd Valley Consolidated Tribe; Brigette Zellner, Todd Valley Miwok-Maidu Cultural Foundation; Harold Dixon, Wadatkauht Band of the Northern Paiutes of the Honey Lake Valley.	February 12 , 2009 (letter)

List of Preparers

The following is a list of contributors to this final environmental impact statement. Numerous other people have also contributed in many ways to this document.

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Gary Chase: EIS Layout and Publication, AA Forest Technology, 36 years

Joe Chavez: Yuba River Ranger District Public Service Officer, BS Forestry Resources Management, 21 years

Jan Cutts: American River District Ranger, BS Anthropology, 18 years

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Quentin L. Youngblood: Sierraville District Ranger, BS Forest Management, 21 Years

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