United States
Department of
Agriculture

Forest Service
Pacific Southwest
Region

Tahoe National Forest

R5-MB-170c
September 2008

Motorized Travel Management

Draft Environmental Impact Statement

Volume III: Chapter 3

Volunteers assisting Forest Service with maintenance of the Rubicon Jeep Trail

Motorized Travel Management
Draft Environmental Impact Statement

Nevada, Placer, Plumas, Sierra and Yuba Counties, California
September 2008

Volume III: Chapter 3

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Abstract: This Draft Environmental Impact Statement (DEIS) describes the environmental effects of a proposal by the Tahoe National Forest (TNF) to;

1. Prohibit cross country motorized travel off of National Forest Transportation System (NFTS) roads, NFTS trails and areas designated as "Open Areas" for motorized vehicle use,
2. Make limited motorized trail additions to the existing National Forest Transportation System.
3. Make limited changes to current prohibitions and allowances for public motorized vehicle travel by vehicle class and season of use.

The areas affected by this proposal are outside of congressionally designated wilderness areas. These actions are needed in order to implement the 2005 Travel Management Rule (36 CFR Part 261) while providing for a diversity of motorized vehicle recreation opportunities, and providing motorized access to dispersed recreation opportunities on the TNF. The DEIS discloses environmental impacts associated with the proposed action, a no action alternative and five additional action alternatives developed in response to issues raised by the public. Of the alternatives under consideration at this stage, Alternative 6 is the alternative preferred by the responsible official.

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Chapter 3: Affected Environment and Environmental Consequences

Introduction

An environmental impact statement (EIS) commonly describes the affected environment in Chapter 3 and the environmental consequences of proposed alternatives in Chapter 4. In this EIS, the affected environment and environmental consequences are combined in this single chapter to allow readers to find information about a particular topic of interest in one place and minimize repetition between chapters. The topics addressed in this chapter are aspects of the environment likely to be directly affected by the management actions proposed in the alternatives.

The "Affected Environment" section under each resource topic describes the existing, or baseline, condition against which environmental effects were evaluated and from which progress toward the desired condition can be measured. Environmental consequences form the scientific and analytical basis for comparison of alternatives, including the proposed action, through compliance with standards set forth in the *Tahoe National Forest Land and Resource Management Plan* (also referred to as the "Forest Plan"), as amended, and a summary of monitoring required by the *National Environmental Policy Act of 1969* (NEPA) and *National Forest Management Act of 1976* (see Appendix G (OHV Monitoring) of this EIS for the findings). The environmental consequences discussion centers on direct, indirect, and cumulative effects, along with applicable mitigation measures. Effects can be neutral, beneficial, or adverse. The "Irreversible and Irretrievable Commitments of Resources" section is located at the end of this chapter. These terms are defined as follows:

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.

Analysis Process

The environmental consequences presented in Chapter 3 address the impacts of the actions proposed under each alternative for the Tahoe National Forest. This effects analysis was done at the forest scale (the scale of the proposed action as discussed in Ch.1). However, the effects findings in this chapter are based on site-specific analyses of each road, trail and area proposed for addition to the National Forest Transportation System and any changes in vehicle class and/or season of use for existing NFS roads, trails and areas. Each affected road, trail and area proposed in the alternatives has been reviewed by resource specialists and their findings documented in Appendix A (Road Cards). Readers seeking information concerning the environmental effects associated with a specific road, trail or area are directed to Appendix A 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 discreet actions and then combined to provide the total direct and indirect effects of each alternative (see below). The combination of these discreet actions is then added to the past, present and reasonably foreseeable actions in the cumulative effects analysis. The three discreet actions common to all action alternatives are:

1. **Prohibition of cross-country motorized vehicle travel**. The direct and indirect effects of this action are described generally in each alternative, considering both current conditions and projected trends.
2. **Changes to class of vehicle and season of use on the existing NFTS**. Impacts caused by changes to vehicle class and season of use on the existing NFTS are described generally by alternative. For some impacts (for example public safety), impacts are also addressed by route. Where impacts associated with individual routes are warranted, the reader is directed to appendices or where this data is located.
3. **Addition of motorized trails to the National Forest Transportation System (NFTS) and designation of lands as "Open Areas."** As described above, the impacts of new facilities are addressed in sum total in this chapter while impacts of individual routes or areas are addressed in Appendix A (Road Cards). For most resources, one or more resource indicators are used to

measure the direct and indirect effects of each alternative. Both short and long-term impacts are presented.

Cumulative Effects

Cumulative effects are those impacts on the environment that result from the incremental effects of an action when it is added to other past, present, and reasonably foreseeable future actions, regardless of which agency or person undertakes them. (See 40 CFR Part 1508.7.)

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

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. 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 actions risks ignoring the important residual effects of past natural events which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects.
- Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions.
- Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, “agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.”

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

For this EIS, the following table summarizes the reasonably foreseeable future actions anticipated to occur on National Forest System lands. At a minimum all of these actions were considered in each resource section in chapter three. Additional actions were also considered in some sections if relevant to the cumulative effects associated with that resource.

Table 3.00-1. Reasonably Foreseeable Future Actions Considered in Cumulative Effects Analysis

Project	Description
Shady Flat Cabin	Special Use Permit to Sierra County Arts Council for use of cabin for interpretation of history of the area.
Renew Pacific Bell's expired phone line easements and special use permits	Renew phone line permits, including removing abandoned poles and cables and possible burying and/or co-locating phone lines with power lines in some areas.
Mohawk/Alchemist plan of operation	Operation of underground mine along the Middle Yuba River
Gold Valley resource protection plan	Implement actions proposed to improve Gold Valley and reduce erosion from specific roads/trails.
Forest City management plan	Establish management guidelines that maintain the historic character of the Townsite.
Carvin aspen enhancement	Remove conifers to improve condition of an aspen clone.
Canyon Forest Health	Reduce fuels, thin forest stands, decommission roads.
Tahoe Truckee Sanitary Agency permit renewal	Issue a special use permit to the Tahoe Truckee Sanitary Agency to operate and maintain a sewage interceptor and export conduit pipeline on a strip of NFS lands – 3.73 miles long and 20 feet wide.
Sugarplum	Remove dead, dying, and hazard trees near improvements, thin forest stands.
Legacy Trail	Construct non-motorized multiple use trail from private land in the town of Truckee to Glenshire subdivision.
Glenshire Drive re-alignment	Construct a portion of Glenshire Drive on NFS lands to make room for the repositioning of the railroad track.
Donner Summit PUD permit renewal	Renew/reissue a permit to Donner Summit PUD for operation/maintenance of the existing sewer treatment plant. Permit includes buildings on NFS lands which house PUD administrative offices and a fire station.
DMB Highlands Siller Ranch fire access road	Designate about 400 feet of an unauthorized road as a special use road to be used by Siller Ranch for emergency access to a subdivision.
Truckee Donner PUD Alder Creek road powerline tie	Construct about 500 feet of distribution powerline to connect existing systems both east and west of Highway 89 north to reduce the risk of spot outages.
Yuba Pass hazard tree	Remove hazard trees along NFS roads and state highway 49.
Phoenix	Thin and reduce fuels on about 5,058 acres in areas formerly analyzed in the Euro and Checkmate Project EAs using HFQLG direction.
Montez	Thin and reduce fuels on about 180 acres using HFQLG direction.
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.
Kangaroo	Mechanically thin 44 acres, group select 47 acres, thin 7 acres of conifer in an aspen clone, construct ½ mile of temporary road.
Jackson Meadows hazard tree	Remove hazard trees from campgrounds, along NFS and county roads from Jackson Meadows Reservoir to Little Truckee Summit.
Dinkum	Thin 229 acres, group select 72 acres; remove conifers form 7 acres of aspen, construct ¾ mile of temporary roads.
Coppins	Construct fish/frog passage at stream crossing below NFS road 07.
Carman II watershed restoration	Implement watershed restoration activities

Project	Description
Brumby	Mechanically thin 530 acres, group select 30 acres, remove conifers for 3 acres of aspen, construct 1.3 miles of new permanent road, and about 1 mile of temporary road.
Mears	Thin, salvage and sanitize dead and dying trees
Last Chance	Thin and reduce fuels as a collaborative project – Sierra Nevada Adaptive management project.
Foresthill genetic center plantation	Thin and remove surplus trees in the Foresthill Genetic Resource Center.
East Fork	Thin and remove trees.
Casa Loma	Hand thin trees and brush to reduce fuels
Sierra Pacific power line permit	Re-issue a special use permit for all existing Sierra Pacific power lines.
PG&E distribution line permit	Renew the special use permit for existing lines and facilities
BKS grazing allotment management plans	Update the allotment management plans for the Boca, Kyburz, Sagehen, Sierra Crest and Summit grazing allotments.
Designate energy corridors on federal land in 11 western states.	In accordance with section 368 of the Energy Policy Act of 2005, "The Sec. of Agriculture, Commerce, Defense, Energy and Interior, in consultation with FERC, States, tribal or local units of government will designate energy corridors on federal land."

Assumptions and Limitations

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

1. No NEPA decision is necessary to continue use of the NFTS (i.e. OHV and transportation) as currently managed under the No Action alternative. These decisions were made previously.
2. User-created roads, trails and areas are not NFTS facilities. They are unauthorized. Proposals to add these to the NFTS require a NEPA decision.
3. Temporary roads, trails and areas built to support emergency operations or temporarily authorized in association with contracts, permits or leases are not intended for public use. They are not NFTS facilities (e.g. they are unauthorized for public use). Any proposal to add these temporary roads to the NFTS will require a NEPA decision.
4. Maintenance Level 1 roads are currently closed to motorized use by the public. Any proposals to dual designate these roads as a motorized trail and allow public motorized use will require a NEPA decision.
5. Any unauthorized routes not included in the Proposed Action are not precluded from consideration for additions to the NFTS in future travel management actions.
6. The Agency will continue to make changes to the NFTS on an 'as needed basis'. It will also continue to make decisions about temporary roads or trails on an 'as needed' basis associated with contract, permit, lease or other written authorization.
7. Any activity associated with contract, permit, lease or other written authorization is exempt from designation under the Travel Management Rule (36 CFR 212.51 (a) (8) and should not be part of the proposal (i.e. fuelwood permits, motorized SUP permits, mining activity etc.). Such actions are subject to separate NEPA analysis.

8. 'Designation' is an administrative act which does not trigger NEPA. Designation technically occurs with printing of the Motor Vehicle Use Map (MVUM). NEPA is not required for printing a map.
9. For travel management, the federal action triggering NEPA, is any change to current restrictions or prohibitions regarding motorized travel by the public (for example: prohibiting cross-country travel, changing management - changing vehicle class or season of use, and any additions or deletions of facilities (roads, trails or areas) to the National Forest Transportation System (NFTS).
10. Previous decisions on the NFTS do not need to be revisited to implement the Travel Management Rule (TMR) or the Motor Vehicle Use Map (MVUM). That is, the NFTS contains existing facilities (roads & trails) that either underwent NEPA or predate NEPA. Allowing continued motorized use of the facilities in the NFTS in accordance with existing laws and regulations, does not require NEPA.
11. Dispersed recreation activities (i.e. activities which occur after the motor vehicle stops such as: camping, hunting, fishing, hiking etc.) are not part of the scope of the proposed action. The action and the analysis focus on motor vehicle use.
12. Travel analysis is a pre-NEPA planning exercise for transportation planning which informs travel management. Until new directives are published, the agency continues to follow existing policy related to transportation planning and analysis. For example, some Roads Analysis Process requirements in FSM 7700 and 7710 are still applicable.
13. Setting road maintenance levels and changing maintenance levels are administrative and not subject to NEPA. However, changes in allowed vehicle class, season of use, access, and proposals to reconstruct facilities are subject to NEPA.
14. The system will be maintained to standard and all additions or changes to the NFTS will meet standards prior to availability for public use.

Forest Plan Direction

The purpose of the TNF Land and Resource Management Plan (TNF LRMP 1990), as amended, is to direct the management of the TNF. Its goals are to ensure the wise use and protection of TNF resources, fulfill legislative requirements, and address local, regional, and national issues. This section identifies the management standards and guidelines in the TNF LRMP as amended that are applicable to:

- **The prohibition of cross-country motorized vehicle travel.**
- **Changes to class of vehicle and season of use on the existing NFTS.**
- **The addition of motorized trails to the National Forest Transportation System (NFTS) and designation of lands as "Open Areas."**

In addition, this section describes how the forest plan standards and guidelines are incorporated into all of the action alternatives considered in detail in this DEIS.

Forest Plan Management Standards and Guidelines

Wheeled Vehicles
(TNF LRMP as amended by the SNFPA ROD (2004), pg. 59)

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.

All of the action alternatives would prohibit wheeled motorized vehicle use off of designated roads, trails, and OHV "open areas."

OHV Motorized Use
(TNF LRMP, pg. V-19)

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.*

Extensive public involvement has been conducted for this project (refer to Chapter 1 "Purpose and Need for Action" and Chapter 4 "Public Involvement") to ensure the above items have been considered in developing the action alternatives. Mitigation measures to address concerns related to potential user conflicts, safety, and natural resource impacts have been developed for the proposed additions to the Tahoe National Forest's transportation system under each action alternative. These measures are summarized in the Mitigation Measures Table in Chapter 2 as well as in the Road Cards (Appendix A). The travel management project has been conducted in cooperation with California Department of Parks and Recreation, which has provided funding for the project.

OHV - Trail Development
(TNF LRMP, pg. V-19)

Consider the following factors when developing trails:

1. *Type of user.*
2. *Protection of resource.*
3. *Safe access to point of interest or experience.*
4. *Enforcement and manageability.*
5. *Protection of private land integrity.*
6. *Monitoring and evaluation capabilities.*

Each action alternative considers the above factors in proposing additions to the Tahoe National Forest's transportation system. Extensive public involvement efforts conducted for the project (refer to Chapter 1 "Purpose and Need for Action," Chapter 4 "Public Involvement," and Appendix F "Trail Use Survey") were aimed at identifying user preferences and access needs as well as public concerns relative to specific existing motorized trails un-authorized for motorized use. Mitigation measures designed to minimize potential impacts to natural resources due to changes in the Forest's transportation system are summarized in Chapter 2 and detailed in Appendix A "Road Cards." Potential impacts on private lands have been considered (refer to Chapter 3.10 "Adjacent Ownerships") in the environmental effects analysis. Law enforcement considerations are documented in Appendix T "Law Enforcement." Resource monitoring requirements under each action alternative are presented in the Monitoring Summary Table in Chapter 2 and described in Appendix G "Off Highway Vehicle Monitoring."

Urban/Rural/Wildland Interface
(TNF LRMP, pg. V-26)

Definition and Management Emphasis

Urban interface situations may occur when National Forest System lands are adjacent to private lands that have been, or may be, developed within this planning period for recreation, rural, residential, urban, or commercial uses. When National Forest management objectives differ from those of our neighbors, both parties may be impacted.

When such mutual impacts or conflicts are identified, the Forest will work with its neighbors to develop a balanced approach to meet public concerns and resource objectives. The project environmental analysis process will be used on a case-by-case basis to identify a range of issue-specific options and resolutions. Development of mutually beneficial solutions may involve the use of innovative resource practices to meet the needs of all parties involved.

Management Direction

When the Urban/Rural/Wildland Interface situation is determined to exist:

1. *Develop alternatives through the interdisciplinary process that address specific resource and public concerns and meet a reasonable balance of multiple use outputs and amenity values.*
2. *Plan for a significant amount of public involvement, higher costs, and greater time to complete the planning process when public concerns and resource management objectives are in conflict.*
3. *Includes all resource management concerns addressing the Urban/Rural/Wildland interface situation, as the issues can be quite varied. Resource concerns that may be involved include, but are not limited to, fuels management, controlling competing vegetation, insect and disease management, timber harvesting, visual resources, water quality, OHV use, special use permits, law enforcement, wildlife and habitat protection, noise, air quality, trespass, and fuel wood cutting.*

Extensive public involvement, described in Chapter 1 (Purpose and Need for Action) and Chapter 4 (Public Involvement) has been conducted for this project to identify and address potential conflicts with adjacent landowners as a result of changes in the Tahoe National Forest's transportation system.

Mitigation measures aimed at reducing potential conflicts with adjacent landowners are included in Appendix A (Road Cards). Chapter 3.10 (Adjacent Ownerships) identifies and discloses potential impacts to adjacent landowners under each of the seven alternatives analyzed in detail in this DEIS.

Endangered, Threatened, and Sensitive Species Management

Standards and Guidelines for California Spotted Owl PACs and Northern Goshawk PACs
(TNF LRMP as amended by the SNFPA ROD (2004), pg. 61)

Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites.

This project's seven alternatives are 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. (Refer to Chapter 3.03 "Terrestrial and Aquatic Species" under "Spotted Owl Nesting Habitat (PACs) and Nest Locations."

Standards and Guidelines for Fisher Den Sites
(TNF LRMP as amended by the SNFPA ROD (2004), pg. 62)

Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites.

Fishers are not known to occur on the TNF; hence, this standard and guideline does not apply. Potential impacts to suitable fisher denning habitat under each alternative are analyzed Chapter 3.03 "Terrestrial and Aquatic Species" under "American Marten and Pacific Fisher Environmental Consequences."

Standards and Guidelines for Marten Den Sites
(TNF LRMP as amended by the SNFPA ROD (2004), pg. 62)

Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites.

Martens occur on the TNF, although known den sites have not been identified. Chapter 3.03 "Terrestrial and Aquatic Species" under "American Marten and Pacific Fisher Environmental Consequences" presents a thorough analysis of the alternatives in terms of their potential to disturb suitable marten denning habitat.

Plant Management Emphasis
(TNF LRMP as amended by the SNFPA ROD (2004), pg. 66)

Conduct field surveys for threatened, endangered, proposed, and sensitive (TEPS) plant species early enough in the project planning process so 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.

Surveys for TEPS plant species have been conducted for this travel management project, as described in Chapter 3.06 "Plant Communities." The Mitigation Measures Table in Chapter 2 and the Road Cards

(Appendix A) display the mitigation measures developed to protect TEPS plant species for proposed motorized trail additions to the NFTS under each alternative.

Habitat Connectivity for Old Forest Associated Species
(TNF LRMP as amended by the SNFPA ROD (2004), pp. 53 - 54)

Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (particularly fisher and marten) in biological evaluations.

The analysis presented in Chapter 3.03 "Terrestrial and Aquatic Species" under "Old Forest Emphasis Areas" concludes that all of the action alternatives would reduce fragmentation of old forest habitat. The biological evaluation assesses the potential impacts of fragmentation on old forest associated species, including the California spotted owl, Northern goshawk, American marten, and the Pacific fisher.

Assess the potential impact of projects on the connectivity of habitat for old forest associated species.

Chapter 3.03 "Terrestrial and Aquatic Species" under "Late Seral Closed Canopy Forest Associated Species" presents an assessment of the potential impacts of this project's alternatives on the connectivity of habitat for old forest associated species.

Deer Habitat Management
(TNF LRMP, pg. V-30)

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.

This project is designed to minimize effects on key deer winter and summer ranges. Project design features include maintaining existing LRMP OHV seasonal restrictions for deer, prohibiting cross country motorized vehicle travel, and establishing wet weather seasonal restrictions for specified motorized trails and roads. The effects of these actions, combined with adding motorized trails to the NFTS and designating "open areas," are analyzed within key deer habitats for the major deer herds on the TNF, including the Downieville, Nevada City, Blue Canyon, and the Loyalton-Truckee herds. (Refer to Chapter 3.03 "Terrestrial and Aquatic Species" under "Ungulates – Mule Deer.")

Meadow Edge Habitat
(TNF LRMP, pg. V-31)

Locate roads away from meadow edges where alterative routes are available.

As described in Chapter 3.03 "Terrestrial and Aquatic Species," all the action alternatives considerably improve meadow function and connectivity for species that use meadow habitats. The project is designed to minimize impacts to meadows and riparian habitat through the implementation of wet weather seasonal restrictions, not proposing motorized trail additions within any occupied willow flycatcher meadows or sandhill crane breeding areas, and prohibiting existing and future cross country motorized travel on the TNF (including meadow habitat).

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 R "Riparian Conservation Objectives.") Appendix R 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 (Road Cards) for any motorized trail to be added to the National Forest Transportation or any lands to be designated as "Open Areas." These mitigation measures will 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 abandon roads in need of rehabilitation were identified in association with this project and documented in the project record. Project plans for restoration and improvement will 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 National Forest Transportation on extremely unstable lands requiring geotechnical investigation were excluded from consideration in all alternatives.

Unauthorized Activities - Facilities or Uses
(TNF LRMP, pg. V-39)

Take prompt and continued action to identify and resolve all unauthorized occupancy and use of lands administered by the TNF.

All of the action alternatives by prohibiting cross country travel off of designated NFTS roads, NFTS motorized trails and designated "Open Areas" is resolving unauthorized occupancy and use of lands administered by the TNF.

Transportation System Management
(TNF LRMP, pp. V-40 – V-41)

1. *Restrict road, trail, and off-highway use to the extent necessary for protection of:*
    a. *Threatened, endangered and sensitive plants or animals;*
    b. *essential wildlife functions;*

c. *cultural resources, and*

d. *riparian zones and wetlands.*

The effects on **Threatened, endangered and sensitive plants or animals; essential wildlife functions; cultural resources, and riparian zones and wetlands** are described Chapter 3.02 (Soil and Watershed), Chapter 3.03 (Terrestrial and Aquatic Species), Chapter 3.05 (Heritage Resources), Chapter 3.06 (Plant Communities), Appendix J (Plant Biological Evaluation), Appendix K (Management Indicator Species Report), Appendix N (Watch List Report) and Appendix R (Riparian Conservation Objectives). Mitigation measures necessary for the protection of these resources are specified in Appendix A (Road Cards). All of the action alternatives have additional restrictions on road, trail and off-highway use to increase protection of these resources.

2. *Eliminate motorized vehicle use in riparian areas and wetlands except on system roads and designated routes and stream crossings.*

   All of the action alternatives prohibit motor vehicle use off of National Forest Transportation System (NFTS) roads, NFTS motorized trails, and designated "Open Areas."

3. *Maintain the transportation system to a standard that is commensurate with user types and amount of use. Closure of roads and trails will be appropriate if the cost for maintenance and resource protection exceeds the benefits received or the financial ability of the Forest to pay for these services.*

   All of the alternatives included maintenance stands commensurate with the class of vehicles permitted on National Forest Transportation System (NFTS) roads and NFTS motorized trails.

4. *Seasonal road and trail restrictions are preferred over permanent closures.*

   Seasonal restrictions are considered in the different action alternatives.

5. *Before deciding to regulate using physical barriers, consider using signing and public announcements. Consider the risk to resource values and the magnitude of maintenance costs resulting from violations. If physical barriers are used, make sure that private land access needs and/or cooperative agreement requirements are met.*

   Enforcement of any of the action alternatives is described in Appendix T (Law Enforcement). All of the action alternatives using an Engineering, Education, Enforcement strategy. The primary method of enforcing the action alternatives will be accomplished through the Motor Vehicle Use Map. Physical barriers are only specified in Appendix A (Road Cards) as mitigation measures where needed to protect site specific resource concerns.

6. *Regulating for a single purpose use or to meet one group's desire is not an acceptable objective. A need to regulate because of user conflict will be evaluated on a case-by-case basis.*

   Regulating for single purpose uses or meeting one group's desire is outside of the scope of this project.

7. *Close roads and trails or regulate traffic when necessary to protect the safety of Forest users. Candidates for regulation or closure include roads with hazards such as avalanche, landslides, forest fires, flooding, timber operations, etc.*

Not motorized trails are added to the National Forest Transportation System (NFTS) in any of the action alternatives which present unacceptable levels of risk for Forest users. The safety of Forest users on the existing NFTS is described in Appendix S (Mixed Use). The Alternatives vary in the amount of regulation necessary to protect the safety of Forest users through specifying the class of vehicles allowed on the NFTS. The effects on the safety of Forest users are described in Chapter 3.08 (Transportation).

8. *Conduct a separate Forest-wide analysis to correlate land capability, user needs, and user or landowner conflicts with all dispersed recreation travel ways.*

   This Travel Management Project is the Forest-wide analysis correlating land capability, user needs, and user or landowner conflicts with all dispersed recreation travel ways.

9. *Consider the need to protect administrative or special-use facilities when deciding whether to close certain roads. Lookouts, guard stations, and transmission sites are examples of such facilities.*

   Mitigation measures necessary to protect administrative or special-use facilities are contained in Appendix A (Road Cards). If the protection of administrative or special use facilities could not be accomplished through mitigation measures, these routes were excluded from consideration in all of the action alternatives.

10. *Consider the quality of dispersed recreation opportunities when deciding whether to close a road. For example, it may be beneficial to separate four-wheeled motorized recreation use from other forms of motorized recreation, especially when simultaneous use diminishes the quality of the recreation experience for both users.*

    The quality of dispersed recreation opportunities is described in Chapter 3.07 (Recreation) and Chapter 3.09 (Roadless and Special Areas).

Noxious Weeds Management
(TNF LRMP as amended by the SNFPA ROD (2004), pp. 54-55)

As part of project planning, conduct a noxious weed risk assessment to determine risks for weed spread (high, moderate, or low) associated with different types of proposed management activities. Refer to the weed prevention practices in the Region 5 Noxious Weed Management Strategy to develop mitigation measures for high and moderate risk activities.

The Weed Risk Assessment is contained in Appendix M. Mitigation Measures for noxious weeds are contained in Appendix A (Road Cards).

Forest Plan Management Area Direction

Table 3.00-2 presents TNF LRMP direction unique to specific management areas regarding motor vehicle use. This direction is incorporated into all of the alternatives considered in detail.

As shown in Table 3.00-3, each management area is assigned to one or more Recreation Opportunity Spectrum (ROS) classes. (The ROS provides a means of classifying and managing recreation opportunities based on physical setting, social setting, and managerial setting.) Forest-wide standards and guidelines for managing the six different ROS classes are described below.

ROS – Primitive
(TNF LRMP, pg. V-20)

Manage area to meet the recreation opportunity spectrum (ROS) objective of primitive (P). Area is characterized by an essentially unmodified natural environment of fairly large size. Interaction among users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted. Users should have an extremely high probability of experiencing the area as it is described above.

No motorized use is allowed in any of the alternatives in lands allocated to the Primitive ROS class.

ROS – Semi-Primitive Non-motorized
(TNF LRMP, pg. V-20)

Manage area to meet the ROS objective of semi-primitive non-motorized (SPNM). Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Interaction among users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but is subtle. Public motorized use is not permitted. Users should have a high, but not extremely high probability of experiencing the area as it is described above. Temporary vehicle use may be authorized based on special needs, but only for the duration of the project, roads would then be obliterated. Examples of special needs are insect or fire salvage, vehicle and equipment access (supported by an escaped fire situation analysis), and placement or removal of facilities under special-use permit.

No motorized use is allowed in any of the alternatives in lands allocated to the Semi-Primitive Non-Motorized ROS class.

ROS – Semi-Primitive Motorized
(TNF LRMP, pg. V-21)

Manage area to meet the ROS objective of semi-primitive motorized (SPM). Area is characterized by a predominantly natural or natural-appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but is subtle. Public motorized use is permitted. Roads constructed and projects planned for resource utilization will strive to maintain the character of the ROS class. Following resource utilization, roads will be closed to public use or put-to-bed unless the road meets a specific recreation use in keeping with the ROS class. Users should have a moderate probability of experiencing the area as it is described above, except that there is a high degree of interaction with the natural environment. Opportunity is available to use motorized equipment while in the area.

All of the motorized use in lands allocated to the Semi-Primitive Motorized ROS class is consistent with this direction in all alternatives.

ROS – Roaded Natural
(TNF LRMP, pg. V-21)

Manage area to meet the ROS objective of roaded natural (RN). Area is characterized by a predominantly natural-appearing environment with moderate evidences of the sights and sounds of humans. Such evidences usually harmonize with the natural environment. Interaction among users may be low to moderate, but evidence of other users is prevalent. Resource modification and utilization practices are *evident, but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities. Users should have about equal probability to either experience affiliation with other user groups or be isolated from sights and sounds of people. Opportunity exists to have a high degree of interaction with the natural environment. Challenge and risk opportunities associated with more primitive type of recreation are not very important. Practice and testing of outdoor skills might be important. Opportunities for both motorized and non-motorized forms of recreation are possible.*

All of the motorized use in lands allocated to the Roaded Natural ROS class is consistent with this direction in all alternatives.

ROS – Rural
(TNF LRMP, pp. V-21 – V-22)

Manage area to meet the ROS objective of rural (R). Areas characterized by substantially modified natural environment. Resource modification and utilization practices are primarily to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by large numbers of people. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. Facilities for intensive motorized use and parking are available. Users should be able to experience affiliation with individuals and groups, sites and opportunities are convenient. Human Interaction and convenience are generally more important than the setting of the physical environment. Opportunities for wildland challenges, risk taking, and testing of outdoor skills are generally unimportant except for specific activities like downhill skiing, for which challenge and risk taking are important elements.

All of the motorized use in lands allocated to the Roaded Natural ROS class is consistent with this direction in all alternatives.

Table 3.00-2. Tahoe National Forest Land Management Plan Management Area direction regarding motor vehicle use

MA #	MA Name	Motor vehicle use	Recreation Opportunity Spectrum
1	Carman	Designated routes only	Roaded natural
2	Ida	Designated routes only	Rural
3	Coobrith	Motor vehicle travel on designated routes only, in summer. Closed in winter.	Roaded natural
4	Sunnyside	Designated routes only summer	Semi-primitive motorized except along the main haul route - Roaded natural.
5	Lavezzola	Designated routes only summer	Roaded natural and semi-primitive motorized in the Sierra Buttes area.
6	Canyon	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle (OHV) use areas.	Roaded natural, except the inner gorge along Canyon Creek, which is semi-primitive motorized.
7	Calpine	Designated routes only	Roaded natural
8	Chapman	Designated routes only, summer	Roaded natural
9	Lakes Basin	Designated routes only summer	Roaded natural except for semi-primitive motorized in the Sierra Buttes area.

MA #	MA Name	Motor vehicle use	Recreation Opportunity Spectrum
10	Cal Ida	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle use areas	Roaded natural
11	Smithneck	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle use areas. Designated routes only in Bear end Jones Valleys for protection of winter deer range and watershed research protection.	Roaded natural
12	Antelope	Closed to all motorized vehicle use from November 1 - May 1 during the critical wildlife life cycle. Designated routes only in summer season. This restriction can be amended if weather conditions are such that deer are not on the winter range.	Roaded natural
13	Forty-Niner	Designated routes only.	Roaded natural except for a small portion of semi-primitive motorized in the Sierra Buttes area.
14	Devils Postpile	Closed	Semi-primitive non-motorized.
15	Harding	Closed	Roaded natural.
16	Babbitt	Closed	Semi-primitive non-motorized.
17	*Not used*		
18	Henness	Designated routes OHV in summer	Roaded natural
19	Eighty-Nine	Designated routes only, summer	Rural around residential areas and developed site at southern end of MA: all other areas Roaded natural.
20	Cornish	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle (OHV) use areas	Roaded natural Semi-primitive motorized within Middle Yuba gorge.
21	Sardine-Worn	Designated routes only, summer\	Roaded natural
22	Goodyears	Designated routes only.	Rural
23	Pendola	Designated routes only, except closed south of the Long Point Road because of key winter deer range (between November I and May 1). This restriction can be amended d weather conditions are such that deer are not on the winter range.	Roaded natural
24	Oregon	Designated routes only, except closed in wildlife areas such as Plum Valley, Lohman Ridge, and Studhorse Canyon (November 1 ~ May 1). This restriction can be amended if weather conditions are such that deer are not on the winter range.	Roaded natural
25	Milton-Jackson	OHV travel on designated routes only	Roaded natural
26	Galloway	Designated routes only	Rural
27	*Not used*		
28	Pinoli	Macklin Creek Drainage and Austin Meadows are closed. Designated routes only from Pinole Peak and Pyramid Peak on the west to the eastern boundary of the Management Area. Seasonal closure in the deer holding area when the deer are using the area The western third of the Management Area will prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle use areas.	Roaded natural except semi-primitive motorized along Middle Yuba River.
29	Pass	Designated routes only	Rural
30	Ruby	Designated routes only	Rural
31	Kyburz	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle use areas.	Roaded natural
32	Stampede-Boca	Designated routes only in summer	Roaded natural
33	Lola	Designated routes only	Roaded natural with rural around ski base facilities if developed.
34	Bullards Bar	Designated routes only	Rural in developed sites, Roaded Natural in all other areas.

MA #	MA Name	Motor vehicle use	Recreation Opportunity Spectrum
35	Independence	Closed	Semi-primitive non-motorized.
36	Sagehen Basin	Designated routes only, summer. Suggested routes winter (Open).	Roaded natural
37	Meadow Lake	Designated routes only	Semi-primitive motorized
38	Billy	Designated routes only	Roaded natural and rural
39	Bowman	Designated routes only	Semi-primitive motorized.
40	Moonshine	Designated routes only	Rural
41	Grouse	Closed	Semi-primitive non-motorized.
42	South Yuba	Designated routes only. Southwest of Bloody Run Creek and the Graniteville Road is closed November 1 to May 1. This restriction can be amended if weather conditions are such that deer are not on the winter range.	Roaded natural except semi-primitive motorized along the Middle Yuba River, part of South Yuba River, and Canyon Creek from Holbrook Flat to Windy Point Cliff.
43	Sagehen Station	Closed	Roaded natural
44	Castle	The Pacific Crest Trail is closed. Designated routes only, summer.	Semi-primitive motorized
45	Meadow	Restricted - motor vehicle travel on designated routes only	Roaded natural
46	Prosser Hill	Designated routes only, summer	Roaded natural
47	Fordyce	Designated routes only summer	Semi-primitive motorized.
48	Red	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle (OHV) use areas. Selected OHV routes will be promoted for the 'Adopt a Trail' program.	Semi-primitive motorized except Roaded natural in western half of section 18, T.17.N, R.13 E.
49	Magonigal	Designated routes only	Roaded natural except semi-primitive motorized in vicinity of upper Lola Montez Lake.
50	Prosser Reservoir	Designated routes only, summer	Rural in developed sites and Roaded natural elsewhere.
51	Hirschdale	Designated routes only, summer	Rural
52	Fuller	Designated routes only	Rural
53	Donner	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle use areas.	Rural or Roaded natural. See element map for detail.
54	Truckee	Closed in developed administrative sites. Designated routes only for remainder.	Rural
55	Boreal Ridge	Closed	Rural
56	Donner Pass	Designated routes only	Rural and Roaded natural per the initial inventory.
57	Spaulding	Designated routes only in vicinity of Cisco Grove and Big Bend Remainder of MA prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle use areas	Rural
58	Steephollow	Designated routes only	Roaded natural
59	Casa Loma	Designated routes only. Seasonal closure on key winter deer range November 1 to May 1, when deer are using the area.	Roaded natural
60	Summit	Closed summer. Open in winter, except for special-use permit areas.	Rural with portions Roaded natural.
61	Twenty	Designated routes only	Roaded natural
62	Queens	Designated routes only winter and summer.	Semi-primitive motorized
63	Emigrant	Designated routes only	Rural
64	East Orchard	Closed	Rural

MA #	MA Name	Motor vehicle use	Recreation Opportunity Spectrum
65	Chalk	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle (OHV) use areas. OHV use restricted in Burlington Ridge area and Greenhorn Road November 1 to May 1. This restriction can be amended if weather conditions are such that deer are not on the winter range.	Roaded natural
66	Yuba Gap	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle use areas	Rural
67	Mears	Designated routes only	Roaded natural
68	Sawtooth	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle use areas.	Roaded natural.
69	Truckee River	Designated routes only	Rural
70	Pole	Designated routes only summer	Roaded natural
71	Tinkers	Designated routes only, summer	Rural for Squaw Valley, rural for Sugar Bowl and Upper Cold stream Canyon, semi-primitive non-motorized for Lower Shirley Canyon, Roaded natural for the balance of the area.
72	Glacier Meadows	Closed	Semi-primitive non-motorized.
73	Monumental	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle use areas	Roaded natural
74	Martis	Closed	Roaded natural
75	Onion	Closed	Semi-Primitive non-motorized within most of the area. Roaded natural appearing along Soda Springs Riverton Road. Both are subject to research objectives.
76	Loch Leven	Designated routes only	Roaded natural
77	Cisco Butte	Closed	Rural
78	Blue	Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle use areas.	Adjacent to 1-80, rural; other areas Roaded natural.
79	Cedars	Designated routes only	Roaded natural and semi-primitive motorized in the western portion and semi-primitive non-motorized in the eastern portion.
80	Granite Chief	Closed	Primitive
81	Snow	Closed except for designated routes	Semi-primitive non-motorized, semi-primitive motorized, and Roaded natural.
82	North Fork	Closed	Semi-primitive non-motorized
83	Wabena-Steamboat	Designated routes only summer	Roaded natural
84	Humbug-Sailor	Designated routes only. All routes into the American (MA 067) and the North Fork of the American River (MA 062) are closed to motorized vehicles. Permits may be granted for exceptions. On key winter deer 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.	Roaded natural.
85	Sugar Pine Point	Closed.	Semi-primitive non-motorized.
86	Scott	Designated routes only, winter and summer, except as otherwise authorized by special-use permit.	Roaded natural; rural for base facilities of ski areas and for the private land within the area.
87	American	Closed	Semi-primitive non-motorized
88	Squaw Peak	Closed	Rural

MA #	MA Name	Motor vehicle use	Recreation Opportunity Spectrum
89	French	Designated routes only summer	Rural for developed sites. Roaded natural for all other areas.
90	Divide	Designated routes only summer	Roaded natural
91	Sunflower	Designated routes only, summer	Semi-primitive non-motorized in Duncan Creek and Little Robinson Valley. Roaded natural in other areas.
92	Peavine	Designated routes only in summer	Roaded natural for those areas with vegetation management, and semi-primitive motorized for the steep canyon lands.
93	Ward	Closed	Rural
94	Elliot	Closed	Roaded natural
95	Macy	Closed	Roaded natural
96	Sugar Pine	Designated routes only summer, and open in winter.	Roaded natural
97	Big	Designated routes only in summer	Roaded natural
98	Eldorado	Designated routes only in summer	Roaded natural for the areas with vegetation management and semi-primitive motorized for the steep canyon lands.
99	Mosquito	Designated routes only summer	Roaded natural
100	Lyon Peak/ Needle Lake	Closed	Semi-primitive, non-motorized.
101	Brimstone	Designated routes only	Roaded natural
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 precipitation, this area will be closed. This restriction can be amended if weather conditions are such that deer are not on the holding area.	Roaded natural for most of the area and semi-primitive motorized in the Middle Fork of the American River Canyon.
103	West Seed Orchard	Designated routes only	Roaded natural
104	Grouse Falls	Closed	Semi-primitive non-motorized.
105	Barker	Designated routes only summer	Roaded natural, Semi-primitive motorized for the southwest portion of the MA.
106	Big Oak	Designated routes only in summer. Closed November 1 to May 1. This restriction can be amended if weather conditions are such that deer are not on the winter range.	Roaded natural.
107	Big Tree	Closed	Roaded natural
108	Little Oak	Designated routes only in summer. On key winter deer 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.	Roaded natural and semi-primitive motorized in the Middle Fork of the American River Canyon.
109	Berry	Designated routes only in summer	Roaded natural

Other Policies

The Forest Service and other agencies have a number of ongoing or recently finalized rulemaking and policy efforts that are relevant to this Motorized Travel Management EIS.

Forest Service Transportation Policy

Travel Management rule (36 CFR 212, 251, 261 and 295): The alternatives in this EIS are designed specifically to implement the requirements of the November 5, 2005, rule for travel management; *Designated Routes and Areas for Motor Vehicle Use*. In particular it addresses the requirements of *36 CFR § 212 Designation of roads, motorized trails, and motorized areas* which states in part *"Motor vehicle use on National Forest System roads, on National Forest System trails, and in areas on National Forest System lands shall be designated by vehicle class and, if appropriate, by time of year by the responsible official on administrative units or Ranger Districts of the National Forest System."*

Roadless Rule

On September 19, 2006, the U.S. District Court, Northern District of California set aside the 2005 State Petitions Rule and re-instated the 2001 Roadless Rule. Key points from the 2001 Roadless Rule include:

Roads: Roads may not be constructed or reconstructed except when needed to protect human health and safety from an imminent fire or flood or other catastrophic event:

- Associated with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, activities
- Needed to protect access provided by treaty or statute
- Needed protect an existing road from creating irreparable damage
- Reconstruction is needed for safety as demonstrated by accidents
- Associated with the renewal or continuation of a mineral lease

Road Maintenance: Road maintenance is permissible

Motorized Trails: Construction/Reconstruction/Maintenance of existing and new NFS motorized trails is not prohibited by the 2001 Roadless Rule

The proposed action is fully consistent with 2001 Roadless Rule.

Other Regional Plans and Initiatives

Fish and Wildlife Listing of Species

Bald Eagle: The bald eagle was listed by the USDI Fish and Wildlife Service as a federally endangered species in 1978. On July 12, 1995, this species was reclassified to Threatened status in the lower 48 states. It was proposed for de-listing on July 6, 1999, but remains protected unless de-listing is finalized. Following de-listing, the species was placed on the Region 5 Regional Forester's Sensitive Species List (USDA Forest Service 1999). The species' status as "Sensitive" in Region 5 would be re-evaluated at the end of the five-year monitoring period that is identified in the U.S. Fish and Wildlife Service's Final Rule for de-listing the species, as published in the Federal Register; or if there is a change in the species' status under the ESA during this period (for example, if the USFWS initiated re-listing due to information gathered from monitoring).

On August 9, 2007, the bald eagle was removed from the federal list of threatened and endangered species. 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 continue to prevent bald eagle “take” resulting from human activities.

California Red-legged Frog: On June 24, 1996, the California red-legged frog, *Rana aurora draytonii*, was listed as federally threatened (USDI Fish and Wildlife Service 1996). The Final *California Red-legged Frog Recovery Plan* was released on September 12, 2002 (Federal Register, Vol. 67, No. 177, pgs. 57830-57831) (USDI Fish and Wildlife Service 2002). On April 13, 2004, the USFWS proposed designation of critical habitat, none of which occurs within the Tahoe National Forest (Federal Register, Vol. 69, No. 71, pgs. 19620-19642). The recovery objective is to reduce threats and improve the population status of the California red-legged frog sufficiently to warrant de-listing. The strategy for recovery includes protecting existing populations by reducing threats, restoring and creating habitat that will be protected and managed in perpetuity, surveying and monitoring populations, conducting research on the biology of the species and threats to the species, and re-establishing populations of the species within the historic range.

Lahontan Cutthroat Trout: The Lahontan cutthroat trout (LCT) was listed by the U.S. Fish and Wildlife Service 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 (USDI Fish and Wildlife Service 1995).

The USFWS is in the process of revising the 1995 *Recovery Plan for the Lahontan Cutthroat Trout*. As part of the recovery effort, technical teams have been assembled to develop restoration and recovery plans for the Truckee and Walker River basins. A primary purpose of the plan is to identify and prioritize actions for the improvement of ecosystem function to facilitate the restoration/recovery of LCT. The USFWS believes that the establishment of lacustrine populations in both Pyramid and Walker lakes, and in Lake Tahoe is necessary for the recovery of LCT in the Western DPS.

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.

In addition the TRRIT has drafted a Short-term Action Plan for Lahontan cutthroat trout in the Truckee river Basin (August 2002). This draft short-term (5 year) action plan includes a description of the elements needed for recovery, goals and objectives, timeline and priorities, actions needed and stakeholder participation plan.

State Plans and Initiatives

Water quality regulations: The California State Water Resources Control Board (SWRCB) has responsibility for enforcing requirements of the Clean Water Act within the state of California. To meet the provisions of the Act, the SWRCB have designated "water quality limited" streams. The States of California will study these watersheds and the listed waterbodies to address point and non-point sources of pollution. The states will use these analyses to set Total Maximum Daily Loads (TMDLs) for pollution sources. The SWRCB will assign sediment "loads" to land owners within the watersheds that encompass these streams. This could affect management on national forest lands by requiring management activities to not exceed the assigned sediment "load." This could impact activities on national forest lands if the sediment loads assigned to the national forest lands restricts needed restoration activities.

Air quality regulations: In July 1997, the EPA revised the existing national air quality standards for ozone and particulate matter. The new standards for particulate matter and ozone are as follows:

The standard for PM_{10} remains essentially unchanged, while a new standard for $PM_{2.5}$ is set at an annual limit of 15 micrograms per cubic meter, with a 24-hour limit of 65 micrograms per cubic meter.

The ozone standard was updated from 0.12 parts per million of ozone measured over one hour to 0.08 parts per million measured over eight hours, with the average fourth highest concentration over a three-year period determining whether an area is out of compliance.

The new standards will not become effective until the state and the EPA have determined the attainment designation, and the state has developed an attainment State Implementation Plan (SIP). Until that time, standards currently in use will remain in effect. The effects of new standards are unknown.

Local Plans and Initiatives

County plans, zoning plans: All county Plans in the state of California affect all private roads within county boundaries. In the counties in the Tahoe National Forest, national forest lands and 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 decision from this EIS. County zoning and regulations are only peripherally affected by Tahoe National Forest 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 Tahoe National Forest, so the cumulative effects of this EIS on county plans and the effect of county plans on this decision are minimal.

Corporate Forested lands: Sierra Pacific Industries (SPI) manages more than 250,000 acres in the Sierra Nevada. They are largest corporate landowner in the Tahoe National Forest. SPI has stated that they are opposed to public OHV use on their lands. The assumption has been made in estimating environmental effects in this EIS that corporate forest roads will not be available for use by the public.

Other Private Lands

Other lands within the boundaries of the Tahoe National Forest are owned by parties that are not primarily engaged in timber production. Large landholders, such as utility and water districts, as well as many small landowners, own these lands. Landowners generally manage these forests in a custodial manner with diverse objectives for investment, watershed protection, recreation, home sites and personal retreats, and organizational camps (e.g., church and Scout camps). On some larger landholdings, such as lands owned and managed by utility districts, some form of multiple-use management is practiced, usually focusing on recreation.

As stated in the section above, the cumulative effects to private land from this EIS and to National Forest management from private land timber harvesting are the same as discussed above.

There has been significant conversion of private land from agricultural use to housing and commercial developments but most of this has been in the foothill communities adjacent to the Tahoe National Forest as discussed later in this EIS. This has been within the existing county plans and zoning regulations.

Bureau of Land Management

Most of the land managed by BLM is foothill woodlands, and grassland vegetation types with only a small portion in conifer forests. Forested lands administered by BLM are managed primarily under uneven-aged timber management or by custodial maintenance through salvage harvest of dead and dying trees. In the Folsom Resource Area, most timber harvest is salvage of dead trees with management emphasizing wildlife and vegetation objectives (R. Cooper, BLM, personal communication).

Other Federal Lands

The Bureau of Land Management (BLM) 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 BLM.

Private Lands

State and county agencies regulate private land use. For example, timber harvest is regulated by State Forest Practice Rules. Other uses of private lands are regulated by county ordinances and zoning laws as discussed previously. For purposes of evaluating environmental consequences, it is assumed that private landowners will continue to obey State laws and local ordinances, but that considerable discretion will be afforded landowners in choosing how they manage their properties.

Conversion of wildland to residential or other developed uses is likely to be concentrated in areas of greatest projected population growth. The most significant increased in population are in the foothills of the Tahoe National Forest. This is primarily in Nevada and Placer counties. The population is increasing as well on the eastside of the Tahoe National Forest. These changes could have cumulative effects on species with habitats that occur primarily in foothill zones as discussed later in this chapter.

Major effects on other lands that can be evaluated at this broad geographic scale are changes primarily related to urban development. Expansion of the urban zones with increasing populations will, in many cases, cause conflicts between private lands and national forests. This will necessitate the Forest Service to better identify urban intermix zones and modify management in response to conflicts in recreation. Much of the expansion of these areas depends on how individual county plans address zoning and expansion into rural areas.

Decisions made from this EIS could influence Federal and State regulatory agencies in developing conservation and other agreements with private landowners.

State Lands

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.

Cumulative Effects and Implications from Actions on Other Lands

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.

Law Enforcement

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

Enforcement Assumptions:

- 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. It is assumed:
    - Users in communities adjacent to the Forest will comply within 1-2 years.
    - Frequent users but further in distance from the Forest will comply within 2-3 years.
    - Infrequent users regardless of distance may take up to 5 years to comply.
- Law enforcement officer and agency personnel’s presence and enforcement actions will positively affect OHV users’ behaviors and attitudes.

- The Travel Management Rule and associated motor vehicle use map clearly define the designated routes; therefore, making violations to the rule unequivocal.
- 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.
- Forest Protection Officers spend a large percentage of their time on Travel Management issues, estimates range from 30 to 50 percent. Law Enforcement Officers spend approximately 10-20% of their time on enforcement of off-highway vehicle issues.
- The proposal to provide additional facilities to the NFTS through some action alternatives is anticipated to assist enforcing the shift from an ‘open to cross country motor vehicle travel’ management situation to one where such use is prohibited. These actions provide opportunities and access where such use was occurring in key popular dispersed locations based upon recreation analysis and public input. Providing opportunities in popular, key areas will help relieve pressure to travel off of designated routes.

Road/Trail Cards

During the planning stages of the travel management project for the Tahoe National Forest (TNF), members of the public recommended additions to the existing NFTS. Comments regarding specific roads and trails were also received during the public scoping period for the NOI. The disposition of these roads and trails fell into two categories: 1) Roads and trails brought forward for detailed study in alternative(s), and 2) roads and trails eliminated from detailed study. These decisions were made by the responsible official based upon the purpose and need, the scope of the EIS, and issues raised by the public and the IDT. Road and trail cards were developed for all routes considered in alternative(s). These road/trail cards are located in Appendix A (Road Cards).

A number of the recommended routes are proposed to be added to the NFTS under one or more of the action alternatives. For these routes, the route card identifies the alternative(s) under which the route is proposed, the type of vehicles allowed, and the season when the road or trail would be open as well as any resource concerns and mitigation measures that would be implemented. Regular operation and maintenance activities (e.g. brushing, signing, cleaning and maintaining existing drainage structures patrolling routes, etc.) are a part of regular maintenance and management strategies for the NFTS and covered under separate NEPA.

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.

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.

3.01. Air Quality

Regulatory Framework

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

Federal Clean Air Act

The Federal Clean Air Act (CAA) is the federal law passed in 1970, and last amended in 1990, (42 U.S.C. §7401 et seq.) which is the basis for national control of air pollution.

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

The Regional Haze Rule requires states to demonstrate "reasonable progress" toward improving visibility in each Class I area over a sixty-year period (to 2064), during which visibility should be returned to natural conditions. Class I areas include wilderness or National Parks greater than 5000 acres which existed on August 7, 1977.

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

U.S. EPA passed the final General Conformity rule in 1993. Under 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).

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

California adopted the California Clean Air Act (CCAA) in 1988. The Act provides the basis for air quality planning and regulation in California independent of federal regulations, and establishes ambient air quality standards for the same criteria pollutants as the federal clean air legislation (CARB, 2007).

CARB Off-Road Recreational Vehicle Emissions Standards Rulemaking

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

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 TNF are the major reasons that air pollution is an issue on the TNF. Mountain ranges that encircle cities create conditions where air is trapped. Therefore, the pollution created by population growth and its supporting infrastructure in those cities is often trapped. 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 a forest can impact the forest 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 California Clean Air Act 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 that are produced in part by motorized vehicle use 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 primarily in the form of fugitive dust.
- **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) to the air in the native regime were from microbial activity, lightning and wildfires. The historical levels 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 nonroad engines 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 present in small quantities in the native regime; 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. 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 that can affect the health of TNF resources can be the result of natural or human processes. Natural 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 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 timber sales. 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 volatile organic compounds 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 ORVs 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.

Fugitive Dust and PM_{10}: Motorized vehicle use of native surface roads/trails/areas also has the potential to create fugitive dust and increase PM_{10} concentrations. The amount of fugitive dust and PM_{10} 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.

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: 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 their health is at risk. 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 deposited on vegetation surfaces. These chemicals are then washed to the soil floor 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}		Ozone	
	Federal	State	Federal	State
Nevada	A	N	A	N
Placer	A	N	N	T
Plumas	A	N	A	U
Sierra	A	N	A	U
Yuba	A	N	A	N

A – Attainment
N - Non-attainment
T – transitional
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. Project Forest monitoring 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 sites are still 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 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 will be affected by nitrogen compounds, ozone and sulfur compounds. The TNF is at a higher risk than northern forests.

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 Tahoe National Forest. 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 range from less than 1% up to about 25%, 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 with 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 Tahoe National Forest: To evaluate the geology of the Tahoe National Forest and the likelihood of the presence of NOA, information on geologic units and soils units was reviewed. Areas most likely to contain NOA are distributed principally in the Foresthill region. Their distribution in the Tahoe National Forest is shown in Figure 3.01-2.

Soils derived from asbestos-bearing rocks may contain free asbestos. 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.

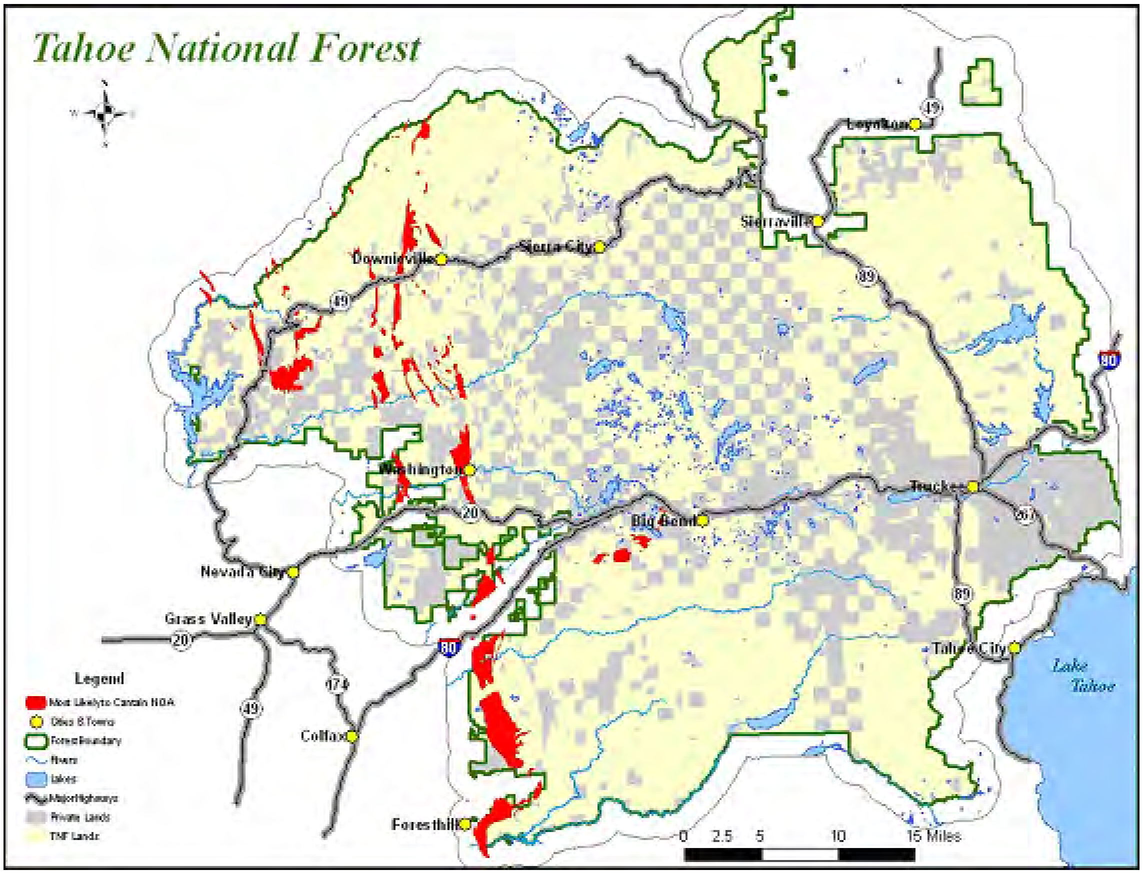

Figure 3.01-2. Areas "Most Likely" to Contain Naturally Occurring Asbestos

Potential Human Effects: Motorized vehicle users on native surface roads and trails with 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. 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 areas "most likely" to contain naturally occurring asbestos

Category	Amount
Cross Country Travel	
Area (acres)	1,660
Routes un-authorized for motor vehicle use (miles)	50
Roads open to all vehicles (miles)	33
Trails open to high clearance trail vehicles (miles)	3
Trails open to ATVs and motorcycles (miles)	10
Trails open to motorcycles (miles)	4

Environmental Consequences

Emissions: Predictions about changes in total amount of emissions (sulfur compounds, nitrogen compounds and carbon oxides) generated from 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. Hence, 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 nonroad engines – recreational vehicles (motorized vehicles). New standards to reduce hydrocarbon (HC) emissions from gasoline powered nonroad recreational vehicles where adopted by EPA in 2002. These new emission standards for new gasoline powered recreational nonroad vehicles where 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 will 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 nonroad equipment (recreational vehicles are a part of nonroad equipment) emits large amounts of nitrogen oxides as well as HC, CO, it is likely that regulations will be developed to reduce the amounts of nitrogen oxides produced from recreational gasoline powered vehicles also. New nonroad 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 will go up or down over time.

Table 3.01-3. 2006 Estimated Annual Average Emissions for Off-Road Recreational Vehicles

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

TOG - Total organic gases
ROG – Reactive organic gas
CO – Carbon monoxide
NO_2 – Nitrogen oxides
SO_2 – Sulfur oxides

Ozone: As mentioned previously, the Placer 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* and are thus exempt from conformity determination. This statement is based on a 1991 nonroad 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 overtime with levels of wet and dry N deposition in the Sierra Nevada also increasing. However, levels are still below saturation levels in the northern forests (SNFPA 2001) and nonroad recreational vehicles are not considered a significant source of ozone precursors at this time. New emission regulations will further reduce contributions from nonroad 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 are expected to contribute the greatest amount of 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 will 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 will produce the greatest amount of fugitive dust. Refer to Table 3.01-4.

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

Category	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Acres	717,900	0	0	0	0	0	0
Routes un-authorized for motorized use (miles)	1389	0	0	0	0	0	0
Roads open to all vehicles (miles)	1896	2316	1899	1900	2316	2142	1900
Trails open to high clearance trail vehicles (miles)	189	233	189	203	434	227	214
Trails open to ATVs and motorcycles (miles)	18	20	18	20	29	29	20
Trails open to motorcycles (miles)	128	153	128	142	154	149	145
Unclassified roads/trails on private land (miles)	1585	1584	1585	1585	1574	1584	1584
Open Areas (acres)	<100	2700	<100	<100	<100	<100	<100
Total							
Acres	**717,900**	**2700**	**<100**	**<100**	**<100**	**<100**	**<100**
Miles	**5205**	**4307**	**3819**	**3850**	**4508**	**4131**	**3864**

Alternative 1 poses the greatest risk of impacts to air quality due to the continuation of country travel on 717,900 acres including 1,389 miles of roads and trails un-authorized for motorized use. All of the action alternatives reduce the effects to air quality by prohibiting cross country travel and use of those un-authorized routes not being added to the National Forest Transportation System. These benefits to air quality in the action alternatives out way any potential negative impacts created by adding motorized trails to the National Forest Transportation System and any changes being made to the class vehicle or season use being made in the action alternatives.

It is anticipated that implementation of Alternative 1 would generate the greatest amount of motorized vehicle use and would therefore have the highest amounts of fugitive dust. Implementation of Alternative 1 would contribute to air quality degradation more than any of the action alternatives. All of the action alternatives would improve air quality.

Alternative 1

- **Cross Country Travel**: Cross country travel is not 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 approximately 1,400 miles of unauthorized routes on native surfaces. This use would contribute to increase air quality degradation.
- **Additions to the National Forest Transportation System**: There or no additions of any roads trails or areas to the National Forest Transportation System in Alternative 1. Since there are no additions, there will be no adverse impacts on air quality from this element.
- **Changes to Class of Vehicles and/or Season of Use**: There are no changes to the class of vehicles or season of use allowed on the existing road system in this alternative.

Alternative 2

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 2. This will stop the proliferation of new un-authorized routes with native surfaces. The prohibition of cross country travel also results in prohibiting use of all un-authorized roads, trails and areas not added to the National Forest Transportation System. The result is the reduction of native surface roads and trails available for use by motor vehicles 17% from 5,205 to 4,307 miles. These changes will have a positive effect on air quality conditions.
- **Additions to the National Forest Transportation System**: Alternative 2 will add an additional 72.5 miles of native surface trails and 5 OHV Open Areas to the National Forest Transportation System. These additional trails and OHV Open Areas will contribute to air quality degradation.
- **Changes to Class of Vehicles and/or Season of Use**: There are no changes to the season of use allowed on the existing road system in this alternative.
  - The class of vehicles allowed on the existing road system is changed from “Open to highway legal vehicles only” to “Open to all vehicles” on 481 miles of road. These changes to class of vehicle could increase the potential for additional fugitive dust being generated.
- **Cumulative Effects**: Alternative 2 improves air quality by prohibiting cross country travel and reducing the total amount of native surface roads and trails available for motorized vehicles by 898 miles. These benefits to air quality in this alternative out way the potential negative impacts created by adding 72.5 miles of trails and 5 OHV open areas to the National Forest Transportation System and changing 481 miles of the existing system from “Open to highway legal vehicles only” to “Open to all vehicles.”

Alternative 3

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 3. This will stop the proliferation of new un-authorized routes on native surfaces. The prohibition of cross country travel also results in the prohibition of motorized use of all un-authorized roads, trails and areas not added to the National Forest Transportation System. The result is the reduction of native surface roads and trails available for use by motor vehicles 27% from 5,205 to 3,819 miles. These changes will have a positive effect on air quality conditions. The prohibition of cross country travel will result in the prohibition of motorized use of Eureka Diggings, Greenhorn Creek, Prosser Reservoir, Boca Reservoir, and Stampede Reservoir as OHV Open Areas. These prohibitions will also have a positive effect on air quality.

- **Additions to the National Forest Transportation System**: Alternative 3 will not add any additional native surface trails or OHV Open Areas to the National Forest Transportation System (NFTS). The lack of any additions to the NFTS will maintain current air quality conditions.
- **Changes to Class of Vehicles and/or Season of Use**: There are no changes to the season of use or class of vehicles allowed on the existing road system in this alternative.
- **Cumulative Effects**: Alternative 3 improves air quality by prohibiting cross country travel and reducing the total amount of native surface roads and trails available for motorized vehicles by 1,386 miles.

Alternative 4

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 4. This will stop the proliferation of new un-authorized routes on native surfaces. The prohibition of cross country travel also results in prohibiting motorized use of all un-authorized roads, trails and areas not added to the National Forest Transportation System. The result is the reduction of native surface roads and trails available for use by motor vehicles 26% from 5,205 to 3,850 miles. These changes will have a positive effect on air quality conditions. The prohibition of cross country travel will result in prohibiting use of Eureka Diggings, Greenhorn Creek, Prosser Reservoir, Boca Reservoir, and Stampede Reservoir as OHV Open Areas. These prohibitions will also have a positive effect on air quality.
- **Additions to the National Forest Transportation System**: Alternative 4 will add an additional 31.2 miles of native surface trails to the National Forest Transportation System. These additional trails will contribute to air quality degradation.
- **Changes to Class of Vehicles and/or Season of Use**: Wet weather seasonal restrictions will be applied to all native surface roads and motorized trails. This change may have a slight improvement on air quality conditions in terms of emissions from vehicles during the winter months. The wet weather seasonal restrictions will have no benefit in terms of the amount of fugitive dust produced on native surface roads and trails during the dry season.
  - The class of vehicles allowed on the existing road system is changed from “Open to highway legal vehicles only” to “Open to all vehicles” on 3.4 miles of road. These limited changes will have no effect on current air quality conditions.
- **Cumulative Effects**: Alternative 4 improves air quality by prohibiting cross country travel, imposing wet weather seasonal restrictions and reducing the total amount of native surface roads and trails available for motorized vehicles by 1,355 miles. These benefits to air quality in this alternative out way the potential negative impacts created by adding 31.2 miles of trails to the National Forest Transportation System and changing 3.4 miles of the existing system from “Open to highway legal vehicles only” to “Open to all vehicles.”

Alternative 5

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 5. This will stop the proliferation of new un-authorized routes on native surfaces. The prohibition of cross country travel also results in prohibiting motorized use on all un-authorized roads, trails and areas not added to the National Forest Transportation System. The result is the reduction of native surface roads and trails available for use by motor vehicles 13% from 5,205 to 4,508 miles. These changes will have a positive effect on air quality conditions. The prohibition of cross country travel will result in prohibiting motorized use of Eureka Diggings, Greenhorn Creek, Prosser Reservoir, Boca Reservoir, and Stampede Reservoir as OHV Open Areas. These prohibitions will also have a positive effect on air quality.
- **Additions to the National Forest Transportation System**: Alternative 5 will add an additional 282.5 miles of native surface trails to the National Forest Transportation System. These additional trails will contribute to air quality degradation.
- **Changes to Class of Vehicles and/or Season of Use**: Wet weather seasonal restrictions will be applied to all native surface roads and motorized trails. This change may have a slight improvement on air quality conditions in terms of emissions from vehicles during the winter months. The wet weather seasonal restrictions will have no benefit in terms of the amount of fugitive dust produced on native surface roads and trails during the dry season.
    - The class of vehicles allowed on the existing road system is changed from “Open to highway legal vehicles only” to “Open to all vehicles” on 481 miles of road. These changes to class of vehicle could increase the potential for additional fugitive dust being generated.
- **Cumulative Effects**: Alternative 5 improves air quality by prohibiting cross country travel, imposing wet weather seasonal restrictions and reducing the total amount of native surface roads and trails available for motorized vehicles by 696 miles. These benefits to air quality in this alternative out way the potential negative impacts created by adding 282.5 miles of trails to the National Forest Transportation System and changing 481 miles of the existing system from “Open to highway legal vehicles only” to “Open to all vehicles.”

Alternative 6

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 6. This will stop the proliferation of new un-authorized routes on native surfaces. The prohibition of cross country travel also results in prohibiting motorized use of all un-authorized roads, trails and areas not added to the National Forest Transportation System. The result is the reduction of native surface roads and trails available for use by motor vehicles 21% from 5,205 to 4,131 miles. These changes will have a positive effect on air quality conditions. The prohibition of cross country travel will result in prohibiting use of Eureka Diggings, Greenhorn Creek, Prosser Reservoir, Boca Reservoir, and Stampede Reservoir as OHV Open Areas. These prohibitions will also have a positive effect on air quality.

- **Additions to the National Forest Transportation System**: Alternative 6 will add an additional 70.3 miles of native surface trails to the National Forest Transportation System. These additional trails will contribute to air quality degradation.
- **Changes to Class of Vehicles and/or Season of Use**: Wet weather seasonal restrictions will be applied to all native surface roads and motorized trails. This change may have a slight improvement on air quality conditions in terms of emissions from vehicles during the winter months. The wet weather seasonal restrictions will have no benefit in terms of the amount of fugitive dust produced on native surface roads and trails during the dry season.
  - The class of vehicles allowed on the existing road system is changed from "Open to highway legal vehicles only" to "Open to all vehicles" on 276 miles of road. These changes to class of vehicle could increase the potential for additional fugitive dust being generated.
- **Cumulative Effects**: Alternative 6 improves air quality by prohibiting cross country travel, imposing wet weather seasonal restrictions and reducing the total amount of native surface roads and trails available for motorized vehicles by 1,074 miles. These benefits to air quality in this alternative out way the potential negative impacts created by adding 70.3 miles of trails to the National Forest Transportation System and changing 276 miles of the existing system from "Open to highway legal vehicles only" to "Open to all vehicles."

Alternative 7

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 7. This will stop the proliferation of new un-authorized routes on native surfaces. The prohibition of cross country travel also results in prohibiting motorized of all un-authorized roads, trails and areas not added to the National Forest Transportation System. The result is the reduction of native surface roads and trails available for use by motor vehicles 26% from 5,205 to 3,864 miles. These changes will have a positive effect on air quality conditions. The prohibition of cross country travel will result in prohibition of motorized use of Eureka Diggings, Greenhorn Creek, Prosser Reservoir, Boca Reservoir, and Stampede Reservoir as OHV Open Areas. These prohibitions will also have a positive effect on air quality.
- **Additions to the National Forest Transportation System**: Alternative 7 will add an additional 45.1 miles of native surface trails to the National Forest Transportation System. These additional trails may have a slight increase in air quality degradation.
- **Changes to Class of Vehicles and/or Season of Use**: There are no changes to the season of use allowed on the existing road system in this alternative.
  - The class of vehicles allowed on the existing road system is changed from "Open to highway legal vehicles only" to "Open to all vehicles" on 3.4 miles of road. These limited changes will have no effect on current air quality conditions.
- **Cumulative Effects**: Alternative 7 improves air quality by prohibiting cross country travel and reducing the total amount of native surface roads and trails available for motorized vehicles by 1,341 miles. These benefits to air quality in this alternative out way the potential negative impacts created by adding 45.1 miles of trails to the National Forest Transportation System and changing

3.4 miles of the existing system from "Open to highway legal vehicles only" to "Open to all vehicles."

- **Naturally Occurring Asbestos (NOA)**: 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.

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

Category	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel							
Area (acres)	1,660	0	0	0	0	0	0
Routes un-authorized for motor vehicle use (miles)	50	0	0	0	0	0	0
Roads open to all vehicles (miles)	33	36	33	33	36	35	33
Trails open to high clearance trail vehicles (miles)	3	4	3	3	8	4	3
Trails open to ATVs and motorcycles (miles)	10	13	10	13	13	13	13
Trails open to motorcycles (miles)	4	4	4	4	4	4	4
Roads on private lands	18	18	18	18	18	18	18
Total							
Area	**1,660**	**0**	**0**	**0**	**0**	**0**	**0**
Miles	**118**	**76**	**68**	**71**	**79**	**74**	**72**

Alternative 1 poses the greatest potential risk of human exposure to airborne asbestos due to the continuation of country travel on 1,660 acres "Most Likely" to contain naturally occurring asbestos. This includes 50 miles of trails un-authorized for motorized use. All of the action alternatives reduce the potential human exposure to asbestos by prohibiting cross country travel and use of those un-authorized routes not being added to the National Forest Transportation System. This reduction in potential exposure to asbestos in the action alternatives out way any potential negative impacts created by adding motorized trails to the National Forest Transportation System and any changes being made to the class vehicle or season use being made in the action alternatives.

Alternative 1

- **Cross Country Travel**: Cross country travel is not 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 use of approximately 50 miles of unauthorized routes on native surfaces "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 National Forest Transportation System**: There or no additions of any roads trails or areas to the National Forest Transportation System in Alternative 1. Since there are no additions, there will be no increased risks to asbestos exposure from this element.

- **Changes to Class of Vehicles and/or Season of Use**: There are no changes to the class of vehicles or season of use allowed on the existing road system in this alternative.
- **Cumulative Effects**: Alternative 1 poses the greatest potential risk of human exposure to airborne asbestos due to the continuation of country travel on 1,660 acres "Most Likely" to contain naturally occurring asbestos. This includes 50 miles of trails un-authorized for motorized use.

Alternative 2

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 2. This will stop the proliferation of new un-authorized routes on areas "most likely" to contain naturally occurring asbestos. The cross country travel ban also results in prohibiting use of all un-authorized trails not added to the National Forest Transportation System located on these lands. The result is the reduction of native surface roads and trails available for use by motor vehicles 36% from 118 to 76 miles on lands "most likely" to contain naturally occurring asbestos. These changes will reduce the risk of human exposure to airborne asbestos.
- **Additions to the National Forest Transportation System**: Alternative 2 will add an additional 4 miles of native surface trails to the National Forest Transportation System on land "most likely" to contain naturally occurring asbestos. These additional trails would increase the potential risk of human exposure to asbestos.
- **Changes to Class of Vehicles and/or Season of Use**: There are no changes to the season of use allowed on the existing road system in this alternative.

  The class of vehicles allowed on the existing road system is changed from "Open to highway legal vehicles only" to "Open to all vehicles" on 3 miles of road on land "most likely" to contain naturally occurring asbestos. These changes to class of vehicle would increase the potential risk of human exposure to asbestos.
- **Cumulative Effects**: Alternative 2 reduces the risk of human exposure to airborne asbestos by prohibiting cross country travel and reducing the total amount of native surface roads and trails available for motorized vehicles by 42 miles on lands "most likely" to contain naturally occurring asbestos. This overall reduction in risk in this alternative out way the potential negative impacts created by adding 4 miles of trails to the National Forest Transportation System and changing 3 miles of the existing system from "Open to highway legal vehicles only" to "Open to all vehicles" on lands "most likely" to contain naturally occurring asbestos.

Alternative 3

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 3. This will stop the proliferation of new un-authorized routes on areas "most likely" to contain naturally occurring asbestos. The cross country travel ban also results in prohibiting use of all un-authorized trails not added to the National Forest Transportation System located on these lands. The result is the reduction of native surface roads and trails available for use by motor vehicles 42% from 118 to 50 miles on lands "most likely" to contain naturally occurring asbestos. These changes will reduce the risk of human exposure to airborne asbestos.

- **Additions to the National Forest Transportation System**: Alternative 3 will not add any additional miles of native surface trails to the National Forest Transportation System on land "most likely" to contain naturally occurring asbestos. This would not increase the potential risk of human exposure to asbestos.
- **Changes to Class of Vehicles and/or Season of Use**: There are no changes to the class of vehicle or season of use allowed on the existing road system in this alternative.
- **Cumulative Effects**: Alternative 3 has the greatest reduction in risk of human exposure to airborne asbestos by prohibiting cross country travel and reducing the total amount of native surface roads and trails available for motorized vehicles by 50 miles on lands "most likely" to contain naturally occurring asbestos.

Alternative 4

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 4. This will stop the proliferation of new un-authorized routes on areas "most likely" to contain naturally occurring asbestos. The cross country travel ban also results in prohibiting use of all un-authorized trails not added to the National Forest Transportation System located on these lands. The result is the reduction of native surface roads and trails available for use by motor vehicles 40% from 118 to 47 miles on lands "most likely" to contain naturally occurring asbestos. These changes will reduce the risk of human exposure to airborne asbestos.
- **Additions to the National Forest Transportation System**: Alternative 4 will add an additional 3 miles of native surface trails to the National Forest Transportation System on land "most likely" to contain naturally occurring asbestos. These additional trails would increase the potential risk of human exposure to asbestos.

  Changes to Class of Vehicles and/or Season of Use: Wet weather seasonal restrictions will be applied to all native surface roads and motorized trails. The wet weather seasonal restrictions will have no benefit in terms of reducing the risk of human exposure to airborne asbestos on native surface roads and trails during the dry season.

  There no changes to the class of vehicles allowed on the existing road system on lands "most likely" to contain naturally occurring asbestos.
- **Cumulative Effects**: Alternative 4 reduces the risk of human exposure to airborne asbestos by prohibiting cross country travel and reducing the total amount of native surface roads and trails available for motorized vehicles by 47 miles on lands "most likely" to contain naturally occurring asbestos. This overall reduction in risk in this alternative out way the potential negative impacts created by adding 3 miles of trails to the National Forest Transportation System.

Alternative 5

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 5. This will stop the proliferation of new un-authorized routes on areas "most likely" to contain naturally occurring asbestos. The cross country travel ban also results in prohibiting use of all un-authorized trails not added to the National Forest Transportation System located on these lands. The result is the reduction of native surface roads and trails available for use by motor vehicles 33% from 118 to 38 miles on lands “most likely” to contain naturally occurring asbestos. These changes will reduce the risk of human exposure to airborne asbestos.

- **Additions to the National Forest Transportation System**: Alternative 5 will add an additional 8 miles of native surface trails to the National Forest Transportation System on land “most likely” to contain naturally occurring asbestos. These additional trails would increase the potential risk of human exposure to asbestos.

  Changes to Class of Vehicles and/or Season of Use: Wet weather seasonal restrictions will be applied to all native surface roads and motorized trails. The wet weather seasonal restrictions will have no benefit in terms of reducing the risk of human exposure to airborne asbestos on native surface roads and trails during the dry season.

  The class of vehicles allowed on the existing road system is changed from “Open to highway legal vehicles only” to “Open to all vehicles” on 3 miles of road on land “most likely” to contain naturally occurring asbestos. These changes to class of vehicle would increase the potential risk of human exposure to asbestos.
- **Cumulative Effects**: Alternative 5 reduces the risk of human exposure to airborne asbestos by prohibiting cross country travel and reducing the total amount of native surface roads and trails available for motorized vehicles by 38 miles on lands “most likely” to contain naturally occurring asbestos. This overall reduction in risk in this alternative out way the potential negative impacts created by adding 8 miles of trails to the National Forest Transportation System and changing 3 miles of the existing system from “Open to highway legal vehicles only” to “Open to all vehicles” on lands “most likely” to contain naturally occurring asbestos.

Alternative 6

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 6. This will stop the proliferation of new un-authorized routes on areas “most likely” to contain naturally occurring asbestos. The cross country travel ban also results in prohibiting use of all un-authorized trails not added to the National Forest Transportation System located on these lands. The result is the reduction of native surface roads and trails available for use by motor vehicles 37% from 118 to 43 miles on lands “most likely” to contain naturally occurring asbestos. These changes will reduce the risk of human exposure to airborne asbestos.
- **Additions to the National Forest Transportation System**: Alternative 2 will add an additional 4 miles of native surface trails to the National Forest Transportation System on land “most likely” to contain naturally occurring asbestos. These additional trails would increase the potential risk of human exposure to asbestos.

  Changes to Class of Vehicles and/or Season of Use: Wet weather seasonal restrictions will be applied to all native surface roads and motorized trails. The wet weather seasonal restrictions will have no benefit in terms of reducing the risk of human exposure to airborne asbestos on native surface roads and trails during the dry season.

  The class of vehicles allowed on the existing road system is changed from “Open to highway legal vehicles only” to “Open to all vehicles” on 2 miles of road on land “most likely” to contain naturally occurring asbestos. These changes to class of vehicle would increase the potential risk of human exposure to asbestos.

- **Cumulative Effects**: Alternative 6 reduces the risk of human exposure to airborne asbestos by prohibiting cross country travel and reducing the total amount of native surface roads and trails available for motorized vehicles by 43 miles on lands “most likely” to contain naturally occurring asbestos. This overall reduction in risk in this alternative out way the potential negative impacts created by adding 4 miles of trails to the National Forest Transportation System and changing 2 miles of the existing system from “Open to highway legal vehicles only” to “Open to all vehicles” on lands “most likely” to contain naturally occurring asbestos.

Alternative 7

- **Cross Country Travel**: Cross country travel is prohibited in Alternative 7. This will stop the proliferation of new un-authorized routes on areas “most likely” to contain naturally occurring asbestos. The cross country travel ban also results in prohibiting use of all un-authorized trails not added to the National Forest Transportation System located on these lands. The result is the reduction of native surface roads and trails available for use by motor vehicles 39% from 118 to 46 miles on lands “most likely” to contain naturally occurring asbestos. These changes will reduce the risk of human exposure to airborne asbestos.
- **Additions to the National Forest Transportation System**: Alternative 2 will add an additional 3 miles of native surface trails to the National Forest Transportation System on land “most likely” to contain naturally occurring asbestos. These additional trails would increase the potential risk of human exposure to asbestos.
- **Changes to Class of Vehicles and/or Season of Use**: There are no changes to the season of use allowed on the existing road system in this alternative.
  There no changes to the class of vehicles allowed on the existing road system on lands “most likely” to contain naturally occurring asbestos.
- **Cumulative Effects**: Alternative 7 reduces the risk of human exposure to airborne asbestos by prohibiting cross country travel and reducing the total amount of native surface roads and trails available for motorized vehicles by 46 miles on lands “most likely” to contain naturally occurring asbestos. This overall reduction in risk in this alternative out way the potential negative impacts created by adding 3 miles of trails to the National Forest Transportation System.

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, draft, May 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), designate "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.

There is a close connection between aquatic and riparian ecosystem conditions and the condition of upland watersheds in which they are located. Effects of land management activities move down slope and downstream, merging below each stream confluence in an additive manner. Impacts may result from vegetation removed during timber harvesting, road building, grazing, mining, recreational use, reservoir construction, and wildfire. The level to which watershed conditions are affected relates to the size, intensity, and location of impacts. The "natural sensitivity" of a watershed strongly influences the potential for watershed condition changes as well. Factors influencing natural sensitivity include soil properties, geology, average watershed slope, channel type, climate, precipitation regime, watershed shape, drainage density, vegetation type, and past history of natural disturbances. This analysis focuses on the effects of roads, motorized trails and "Open Areas" on soil and watershed resources.

The information used in this analysis comes from several sources including: the Tahoe National Forest (TNF) Soil Resource Inventory, TNF GIS analysis, existing NEPA project documents, Ecosystem Management Decision Support modeling (EMDS, see Appendix B, Modeling) and field observations and/or inventories. Information in this analysis has been summarized at a variety of scales, including: forest level, river basin and sub-basin, the Hydrologic Unit Code 7 (HUC7) scale (approximately 2,500-

10,000 acres in size), and site-specifically by motorized trail (where available). The HUC7 subwatershed is the scale usually used for cumulative watershed effects for projects on the TNF.

The TNF took a two tiered approach to the analysis in this document. First modeled risk assessments are presented in this chapter. Second, more site specific review of the existing motorized trails un-authorized for motorized use being proposed for addition to the National Forest Transportation System (NFTS) can be found in the Appendix A, Road Cards. The TNF GIS staff compiled and analyzed much of the information presented in this section. The TNF also contracted with University of California, Davis to build a risk assessment model for potential effects of routes on soil and watershed resources. The Ecosystem Decision Support Model (EMDS, Appendix B, Modeling) was used to assess the potential impacts to soil erosion, water quality, and stream channels. The parameters used to assess soil erosion risk were; presence of geo-debris slides, soil erosivity, slope, and precipitation. The risk to water quality and stream channels was based on stream crossing density, route-steam proximity, and position on slope. The modeled risks to soil watershed resources were used in the analysis of the soil and watershed risk assessments. This analysis also uses the results of field observations and inventories taken by TNF specialists (ecologist, soil scientist, hydrologist, and/or fisheries biologist; 2003 - 2007). The field observations used the Green, Yellow, Red (GYR) Trail Condition Rating and Best Management Practices protocols to assess impacts caused by routes currently being used by public, motorized vehicles.

Land Ownership Patterns

There are some HUC7 watersheds within the boundaries of the Tahoe National Forest that are owned primarily by the Forest Service, some are mixed Forest Service 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 NFTS motorized roads and trails below 5.5 miles per square mile at the HUC7 watershed scale.

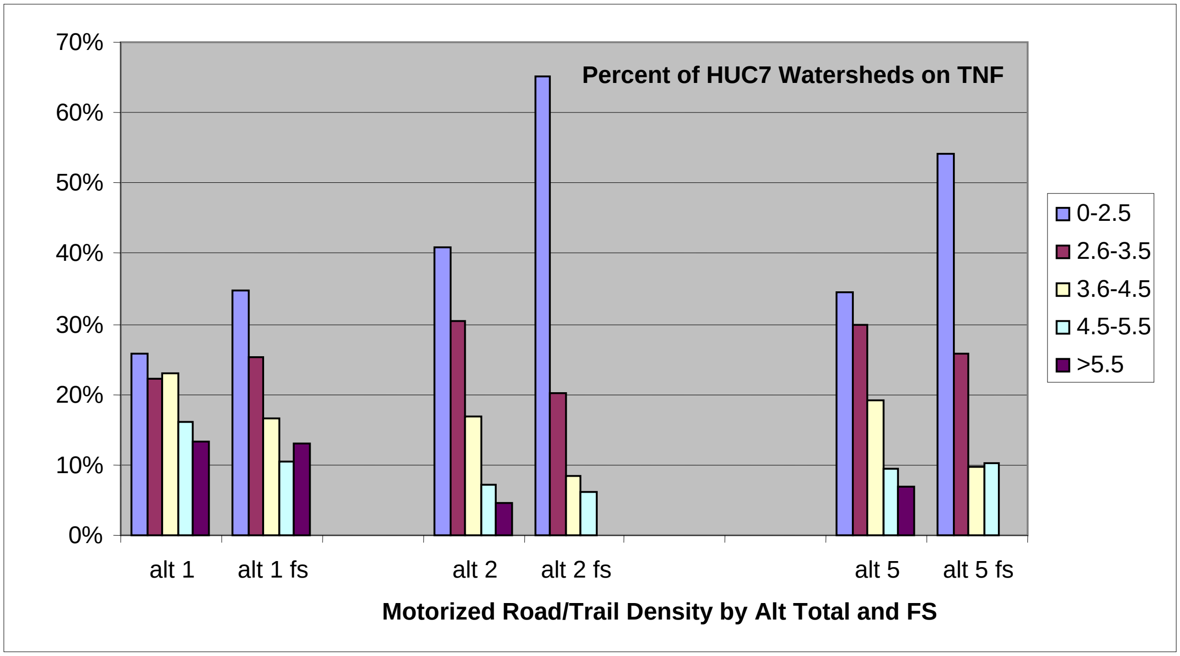

Figure 3.02-1. Total Route Density and Forest Service Route Density for Alternatives 1, 2 and 5

Geology

Introduction. Geological resources affect all aspects of national forest lands. Geological resources include cave resources, paleontological resources, geological special interest areas, and ground water resources. Geological hazards can impact public safety on national forest 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

1. **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.
2. **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.

3. **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.
4. **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.
5. **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.
6. **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.
7. **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.
8. **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.
9. **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.
10. **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.

11. **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.
12. **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.
13. **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.
14. **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.
15. **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.
16. **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.)
17. **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.
18. **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.

19. **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.
20. **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.

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

FSM-2880.12 - Executive Orders

1. **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.
2. **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

Introduction

Physiography, Relief and Drainage

The Tahoe National Forest 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, paleontological resources, geological special interest areas, 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 Tahoe National Forest. Neither of these caves is within ¼ mile of road or motorized trail.

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

Paleontological resources on the Tahoe National Forest include plant and animal fossils and petrified wood. There are six known Paleontolocal sites currently identified on the Tahoe National Forest. These sites are listed below in Table 3.02-1.

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

Site	Description	Potential Impacts
1	Fossilized mastodon remains	One motorized trail un-authorized for motorized use
2	Petrified Wood	One existing NFTS road
3	Petrified Wood	One existing NFTS Motorized Trail
4	Petrified Wood	One motorized trail un-authorized for motorized use
5	Paleo Botanical Fossils	One motorized trail un-authorized for motorized use and one existing NFTS road
6	Paleo Botanical Fossils	One motorized trail un-authorized for motorized use

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 seven motorized trails un-authorized for motorized use and one un-authorized "Open Area" 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 Motorized Trails Un-Authorized for Motorized Use

Trail ID	Ground Water Resource
ARM-13	Spring near trail
TKN-J5	Seep at beginning of trail
SV-005	Stringer meadows near trail
TKS-11	Adjacent to wet meadow complex and several wetlands
YRS-SF5	Adjacent wetland
TKN-003	Begins at wetland
TKN-J2	Seasonal wetland/vernal pool at the end of the trail
Eureka Diggings	Seasonal wetlands/vernal pool

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 Soils part of this 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 96 AML sites currently identified on the TNF that are within 100 feet of roads or motorized trails. Fifty-eight sites are along existing National Forest Transportation System (NFTS) roads or NFTS motorized trails. The other thirty-eight of these AML sites are along motorized trails un-authorized for motorized use.

Geology Environmental Consequences

Cave Resources, Geologic Special Interest Areas, and Paleontological Resources

There are two known caves on the Tahoe National Forest. Neither of these caves is within ¼ mile of a road or motorized trail and therefore will not be affected by any of the alternatives.

No changes in management of the Geologic Special Interest Areas (GSIA) will 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 will not be impacted by motorized vehicle activity. There are no environmental consequences associated with GSIAs in any of the alternatives.

Paleontological resources on the Tahoe National Forest include plant and animal fossils and petrified wood. There are six known Paleontolocal sites currently identified on the Tahoe National Forest. 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 Tahoe National Forest 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 soils section and in the Road Cards (Appendix A). Given the scale of this project, there would be little measurable effect of this project to water quality of groundwater resources. All motorized trail additions to the National Forest Transportation System (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

Trail ID	Ground Water Resource	Mitigation Measure Required	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
ARM-13	Spring near trail	None, no impact to spring	X	X			X	X	X
TKN-J5	Seep at beginning of trail	Redirect water flow	X	X			X	X	X
SV-005	Stringer meadows near trail	Barriers placed to protect meadows	X	X			X		
TKS-11	Adjacent to wet meadow complex and several wetlands	Drainage structures and barriers placed to protect meadows	X	X			X	X	X
YRS-SF5	Adjacent wetland	Barriers placed to protect meadows	X	X		X	X	X	X
TKN-003	Begins at wetland	None, no impact to wetland	X	X			X	X	
TKN-J2	Seasonal wetland/vernal pool at the end of the trail	Barriers placed to protect wetland/vernal pool	X	X		X	X	X	X
Eureka Diggings	Seasonal wetlands/vernal pool	None, No impact to wetland/vernal pool	X						
		Total Number of Mitigations	8	7	0	2	7	6	5

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 96 AML sites within 100 feet of roads and motorized trails. Those alternatives with the greatest number of AML sites with 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 has the lowest number of AML sites near motorized roads and trails. All other action alternatives would add three motorized trails to the National Forest Transportation System (NFTS) near AML sites. Mitigation measures to assure public safety are included in Appendix A (Road Cards) 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 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'	96	61	58	61	61	61	61

Abandoned Mine Land Sites (AML)

Prohibition on Cross Country Travel: All of the action alternatives prohibit cross country travel. This prohibition will reduce the public risk caused by the presence of abandoned mine land features across the forest. It would also prevent the proliferation of any new motorized trails un-authorized 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' of roads and motorized trails resulting from the prohibition on cross country travel are displayed in Table 3.02-6.

Table 3.02-6. Changes in the number Abandoned Mine Land Sites within 100' 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'	0	-38	-38	-38	-38	-38	-38

Additions to the National Forest Transportation System (NFTS): There are no motorized trail additions to the NFTS under Alternative 1. The action alternatives would add between 31.2 and 282.8 miles of motorized trails to the NFTS. Addition of motorized trails to the NFTS within 100 feet of abandon mine land (AML) sites would have minimal new effects to public safety. Appendix A, Road Cards, has mitigations needed to add the routes to the NFTS with minimal impacts to user safety. The changes in abandoned mine land sites within 100 feet resulting from the additions to the NFTS are displayed in Table 3.02-7.

Table 3.02-7. Changes in Abandoned Mine Land Sites within 100 feet of roads and motorized trails due to Additions to the National Forest Transportation System

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

Changes to Class of Vehicles and/or Season of Use: Changing the class of vehicle allowed to use a particular National Forest Transportation System (NFTS) road or motorized trail or the season of use does not change the impacts to and from abandoned mine land sites.

Cumulative Effects: All action alternatives would result in a decrease in public health and safety risks associated with motorized access to abandon mine land sites. Alternatives 3 would decrease the number of AML sites within 100 feet of roads and motorized trails by 38 sites. The rest of the action alternatives would decrease the number of AML sites adjacent to roads and motorized trails by 35 sites. The cumulative effects to public health and safety from abandoned mine lands are displayed in Table 3.02-8.

Table 3.02-8. Abandoned Mine Land Sites within 100 feet of motorized roads and trails

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of AML Sites within 100’	96	61	58	61	61	61	61

Soil Resources

Introduction

Soil Erosion Related to Roads and Trails

Kattelmann (1996) characterized Sierra Nevada landscapes as having relatively low, natural surface erosion rates. Sierra Nevada soils generally have high infiltration rates. In undisturbed forests, surface erosion is usually minimal because infiltration rates are generally greater than rainfall or snowmelt rates, and water is absorbed into the soil.

Roads are considered the principal cause of accelerated erosion in forests throughout the western United States (California Division of Soil Conservation 1971, California Division of Forestry 1972, Reid and Dunne 1984, McCashion and Rice 1983, Furniss and others 1991, Harr and Nichols 1993). The locations of roads determine the degree of potential impacts, making some roads more environmentally sensitive than others. The presence of roads can increase the frequency of slope failures compared with the rate for undisturbed forest by hundreds of times (Sidle and others 1985). A single, poorly designed trail on a highly erosive soil could cause unacceptable soil loss, but result in no impact to water quality if not delivered to a stream. A very high density of trails on a moderately erosive soil in an area with a high stream density could be unacceptable for water quality (the likelihood of delivery is high), but not necessarily a major impact to the soil resource.

There are two types of soil loss on roads and trails. First is the loss of soil from the tread itself. Because the road or trail surface is a dedicated use of the land, this is really not so much a soil productivity issue as it is a loss of facility function. Loss of soil productivity occurred when the road or trail was constructed as part of the transportation system. In the case of user created trails, the loss of soil productivity occurred as the trail became more compacted and established over time. The second type of erosion is the loss of soil that occurs when concentrated water from the road or trail surface creates a gully or some other erosion features downslope. This reduces soil productivity, vegetative growth and water quality when sediment is delivered to a watercourse.

Concentrated runoff is the primary agent of erosion on native surfaced roads and motorized trails. Mechanical displacement of soil by traffic is also important, although most mechanically displaced soil is ultimately transported by concentrated runoff. Mechanical displacement becomes more significant as road or trail gradients become steeper. Mechanical erosion and soil loss by dusting are problems on user created trails because treads in surface soils are high in organic matter and generally not well compacted.

Road and Motorized Trail Characteristics

The characteristics of roads and motorized trails are important in defining the affected environment for soil and watershed resources and for analyzing the effects of the proposed actions. Some roads and motorized trails are a lower risk to soil and watershed resources than others. Lower-risk roads and motorized trails tend to be more stable and generally have less surface soil loss and a lower potential for sediment delivery to streams. Native surface motorized roads and trails generally have a higher risk of surface erosion and sediment delivery. The following definitions of Lower Risk Routes and Higher Risk Routes are used throughout the remainder of this chapter.

- **Lower Risk Routes**
  "Lower Risk Routes", such as, surfaced National Forest Transportation System (NFTS) roads, non-motorized trails, over-snow routes, and county and state roads have been grouped as lower risk in this assessment because these routes have generally been engineered, are not subject to mechanical erosion by motorized vehicles, and/or have regular maintenance schedules. These types of routes are generally less prone to surface erosion and sediment production/transport to streams or lakes.
- **Higher Risk Routes**
  "Higher Risk Routes" include three categories based on their potential for soil loss and potential sediment delivery to streams, lakes, or other water bodies. These categories are: native surface National Forest Transportation System (NFTS) roads, NFTS motorized trails, and motorized trails un-authorized for motorized use.

  Native Surfaced National Forest Transportation System Roads. The majority of native surfaced National Forest Transportation System (NFTS) roads were originally constructed for hauling timber. These roads have a cut slope, a road prism, and a fill slope. NFTS native surface roads generally have well-compacted prisms, and constructed watercourse crossings with culverts and fills. Drainage is provided by inside ditches with culvert cross drains and by rolling dips. Long sustained gradients are common, although gradients are usually not steep. Maintaining drainage structures is the key to minimizing erosion on these roads. Drainage structures on NFTS native surface roads are particularly susceptible to damage by wet season use.

National Forest Transportation System (NFTS) motorized trails. There are two types of NFTS motorized trails: (1) those constructed specifically for OHV use, and (2) those converted from roads. Trails specifically designed and constructed for OHV use are narrow, have minimal cuts and fills, and have meandering alignments without long sustained gradients. Rolling the grade and constructing OHV rolling dips provide drainage. Unless constructed by hand, treads are usually cut into the subsoil and have compaction adequate for a good running surface. Most of the NFTS motorized trails, however, are road-to-trail conversions and were not originally designed and constructed for OHV use. The well-compacted road prisms do provide a firm running surface, but the compacted surface also makes maintaining rolling dips difficult during wet season use. NFTS motorized trails converted from roads require more attention to drainage because of` their long sustained gradients.

Motorized trails un-authorized for motorized use. Motorized trails un-authorized for motorized use fall into two general categories, user created motorized trails and National Forest Transportation System (NFTS) Maintenance Level 1 and temporary roads that the Forest Service attempted to close to motorized use and which have continued to be used by the public.
Many user-created motorized trails originated as wheel tracks made by users seeking access to a destination with no engineering input. User-created motorized trails have usually no drainage, roll the grade only by chance, and often include unsustainably steep gradients. User-created motorized trails were not constructed, so their treads are in loose surface soils rather than well-compacted subsoil which better supports traffic and resists mechanical erosion. As topsoil is eroded, user-created motorized trails become entrenched. This concentrates runoff, causing additional entrenchment and erosion. Most user-created motorized trails either are eroded, or will be eroded if not drained.

Most National Forest Transportation System (NFTS) Maintenance Level 1and temporary roads were originally constructed for hauling timber. Some of these roads have a cut slope, a road prism, and a fill slope. NFTS roads have been engineered and generally have well-compacted prisms, and constructed watercourse crossings with culverts and fills. Drainage is provided by inside ditches with culvert cross drains and by rolling dips. Long sustained gradients are common, although gradients are usually not steep. Maintaining drainage structures is the key to minimizing erosion on these roads. Drainage structures on NFTS Maintenance Level 1 and temporary roads with native surfaces are particularly susceptible to damage by wet season use. These roads are generally less of a risk for causing soil erosion than true user created motorized trails because initially they were engineered and they have had drainage control installed.

Regulatory Framework: Compliance with the Forest Plan and Other Regulatory Direction

For forest plan direction for soil, watershed and geology resources, refer to Chapter 3.00. Other Regulatory 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.

Affected Environment

Soil Resources

Soils on 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 the 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 Rock outcrop 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.

Existing 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 high native-surfaced, motorized route density does not mean that there will be negative effects to soil and watershed resources. But the presence of both high erosion risks and high motorized route density 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 Tahoe National Forest (TNF) was assessed using the Ecosystem Management Decision Support Model (EMDS. See Appendix B, Modeling). 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 length of roads and motorized trails in each HUC7 watershed was grouped by modeled erosion hazard to define the potential erosion risks on the watersheds on the TNF. The EMDS risk assessment is internally referenced to the soils on the TNF. This means that the highest erosion risk score modeled using TNF data was defined as the highest potential erosion risk possible on the TNF and the lowest score was defined as the lowest potential erosion risk possible on the TNF. The result is a relative risk value assigned between 0 (highest risk) and 1 (lowest risk) for each 300 meter segment of every road and motorized trail. So the highest risk modeled is the highest erosion risk on the TNF and the lowest risk modeled is the lowest risk on the TNF.

In general, modeled risk of erosion was higher than actual amount of resource damage found during field inventories. However, the GIS analysis predicted more 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.

Figure 3.02-2 shows a map of the TNF with the EMDS landscape erosion risk averaged by HUC7. The modeled erosion is “Higher” to “Highest” on much of the west slope of the TNF. This is due to the steeply sloping topography of many of the watersheds, the presence of geo-debris slides, higher precipitation values, and finer-textured, more erosive soils. The modeled risk is “Lower” or “Lowest” on the east-side of the TNF due to coarser textured soils and less steep slopes.

HUC 7 Watersheds were used to compile information about the potential impacts to soil and watershed resources because this the scale generally used for cumulative watershed effects analysis on the Tahoe National Forest. 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. Because HUC7 watersheds range from 2,500 to 10,000 acres in size, density (e.g., miles of road & trails/acre of HUC7 or number of crossings/acre of HUC7) 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 as well as number of crossings. For the purposes of this assessment HUC7 watersheds with Higher to Highest EMDS erosion risk and high to moderately high route density (focused routes as explained below) were used to select HUC7 watersheds at highest risk of adverse effects due to motorized travel on native surface roads and motorized trails. For a more site specific scale, see Appendix A, Road Cards, for trail-specific erosion mitigation measures.

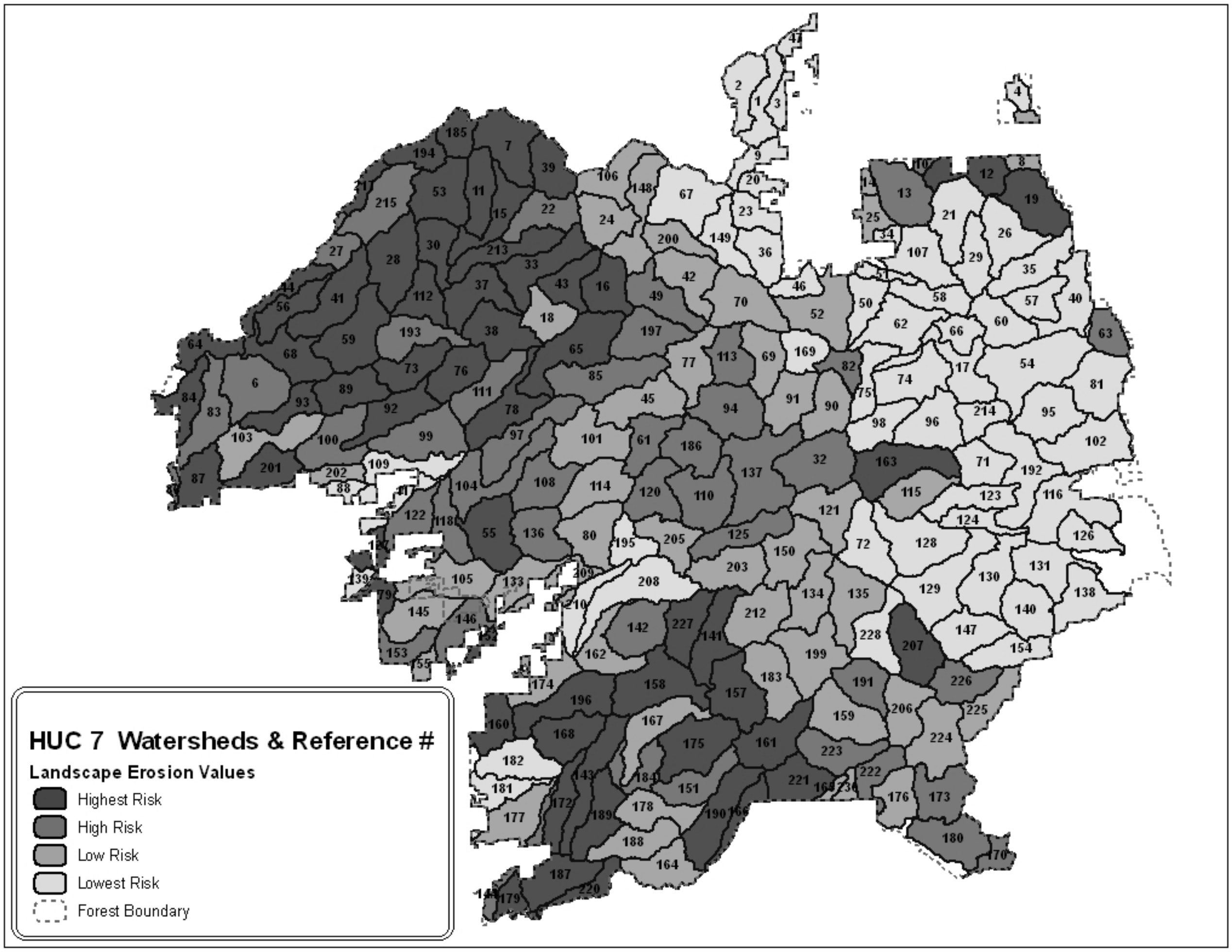

Figure 3.02-2. EMDS Erosion Risk by HUC7 Watersheds.

Soil Risk Assessment Based on Density of Existing "Higher Risk Routes" in TNF Watersheds

This analysis focuses on "Higher Risk Routes" defined as native surface (dirt) roads and motorized trails. Not incorporated in the focused analysis were "Lower Risk Routes" defined as surfaced roads, non-motorized trails, over-snow routes, and county and state roads because these routes tend to be more stable. To do this analysis watershed were separated into quartiles based on the density of miles open for motorized use of "Higher Risk Routes" as described earlier. These categories are shown in Table 3.02-9 below.

Table 3.02-9. "Higher Risk Route" density categories (mi. /sq. mi.)

Level of Risk Category	"Higher Risk Route" density (mi. /sq. mi.)
Highest	3.6 Plus
High Risk	2.8 to 3.5
Low Risk	2.0 to 2.7
Lowest Risk	0 to 1.9

These groupings are 0-1.9, 2.0-2.7, 2.8-3.5, and more than 3.6 mi/sq mi of "Higher Risk Routes" per HUC7 watershed.

The highest density category represents

the highest potential risk to the soil and watershed resources and was used in conjunction with the EMDS Erosion Risk rating to identify the HUC7 watersheds on the TNF with the highest risk of negative effects due to motorized travel.

Existing Soil Risk Assessment based on EMDS Erosion Risk and "Higher Risk Route" density in Watersheds

The following table shows percentage of watersheds on the forest according to the combination of EMDS Erosion Risk and "Higher Risk Route" density.

Table 3.02-10. Percent of HUC7 Watersheds on Tahoe National Forest by "Higher Risk Route" density categories and EMDS Erosion Risk category

"Higher Risk Route" density Mi/ Sq Mi by HUC7				
EMDS Erosion Risk category	**0-1.9**	**2.0-2.7**	**2.8-3.7**	**3.8-8.6**
Lowest	3%	5%	6%	10%
Lower	6%	5%	7%	7%
Higher	7%	6%	8%	3%
Highest	9%	9%	3%	5%

The shaded cells in Table 3.02-10 represent the percent of HUC7 watersheds on the TNF with the highest potential erosion risk to soil and watershed resources from motorized travel on "Higher Risk Routes."

Table 3.02-11 shows the HUC7 watersheds that were identified as having both Higher or Highest EMDS Erosion Risk class and "Higher Risk Route" density in the existing environment analysis above. Currently the TNF has 37 HUC7 watersheds or 18% of the TNF HUC7s with either "Higher" or "Highest" EMDS Erosion Risk potential, and highest or higher densities of "Higher Risk Routes."

Figure 3.02-3 shows the location of the watersheds listed in Table 3.02-7. Two of the HUC7 watersheds identified as high risk are on the east-side of the TNF, Squaw Creek and East Martis Creek. The major portions of both Squaw Creek (76 percent) and East Martis Creek (99 percent) are privately owned. The rest of the high risk watersheds are on the west-side of the TNF in the Yuba (8 – North Yuba; 7 – Middle Yuba; 6 – South Yuba), Bear (2), or American River (9 – Middle Fork American; 3 North Fork American) basins. All of these watersheds have at least fifty percent Forest Service ownership.

Table 3.02-11. HUC7 Watersheds with both higher to highest EMDS Erosion Risk and higher to highest density of "Higher Risk Routes"

HUC7	**Watershed Name**	**River Basin**	**"Higher Risk Route" density** (mi/sq. mi)	**EMDS Erosion Risk**
16050102010102	Squaw Creek	Truckee	5.1	0.37
16050102010404	East Martis Creek	Truckee	4.6	0.06
18020125010404	Upper Pauley Creek	North Yuba	2.8	0.41
18020125010505	Fiddle Creek	North Yuba	4.7	0.34
18020125010506	Cherokee Creek	North Yuba	4.8	0.39
18020125010507	North Yuba River-Indian Creek	North Yuba	3.3	0.33
18020125020103	Canyon Creek-Morristown Ravine	North Yuba	4.3	0.40
18020125020104	Little Canyon Creek	North Yuba	3.8	0.45
18020125020302	North Yuba River-Lost Creek	North Yuba	3.2	0.38

HUC7	**Watershed Name**	**River Basin**	**"Higher Risk Route" density** (mi/sq. mi)	**EMDS Erosion Risk**
18020125020305	Willow Creek	North Yuba	3.2	0.45
18020125030202	East Fork Creek	Middle Yuba	3.5	0.44
18020125030301	Middle Yuba River-National Gulch	Middle Yuba	4.5	0.41
18020125030302	Wolf Creek	Middle Yuba	3.2	0.46
18020125030402	Oregon Creek-Miller Creek	Middle Yuba	4.3	0.40
18020125030403	Oregon Creek-Marion Creek	Middle Yuba	3.1	0.46
18020125030501	Upper Kanaka Creek	Middle Yuba	3.0	0.27
18020125030506	Lower Middle Yuba River	Middle Yuba	3.1	0.43
18020125040106	South Yuba River-Pierce Meadow	South Yuba	3.0	0.45
18020125040404	Canyon Creek-Texas Creek	South Yuba	2.9	0.46
18020125040405	Lower Canyon Creek-South Yuba River	South Yuba	3.7	0.45
18020125040501	Upper Poorman Creek	South Yuba	4.9	0.44
18020125040502	Lower Poorman Creek	South Yuba	3.4	0.44
18020125040601	South Yuba River-Jefferson Creek	South Yuba	3.2	0.42
18020126010101	Headwaters Bear River	Bear	3.4	0.43
18020126010102	Bear River-Stump Canyon	Bear	3.6	0.40
18020128010104	Middle Fork American River-Dolly Creek	American	4.2	0.40
18020128010106	Middle Fork American River-Chipmunk Creek	American	3.2	0.41
18020128010202	Lower Duncan Canyon	American	3.9	0.34
18020128030101	Screwauger Canyon	American	3.7	0.45
18020128030102	Deep Canyon	American	5.0	0.42
18020128030103	Secret Canyon	American	3.1	0.43
18020128030201	North Fork of Middle Fork American River-Bear Wallow	American	2.9	0.45
18020128030202	Grouse Creek	American	4.2	0.37
18020128040102	Volcano Canyon	American	3.1	0.36
18020128050302	Humbug Canyon	American	3.9	0.34
18020128050402	Upper East Fork North Fork of North Fork American River	American	3.1	0.47
18020128050405	North Fork of North Fork American River-Blue Canyon	American	2.8	0.44

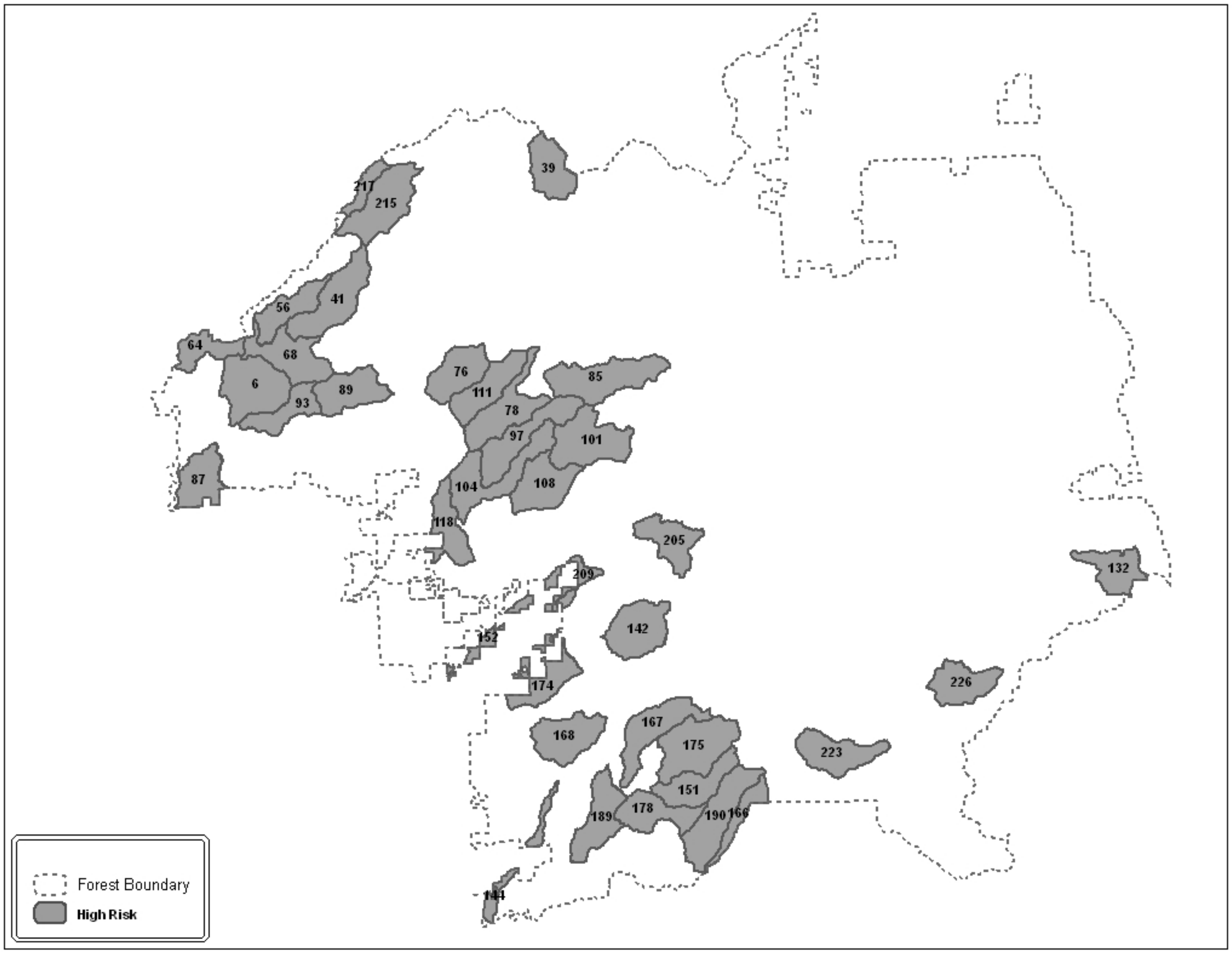

Figure 3.02-3. High Risk Watersheds based on EMDS Erosion Risk and density of "Higher Risk Routes"

Table 3.02-12 shows the average EMDS Erosion Risk rating and the existing "Higher Risk Route" 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 Basin has the second highest existing density of "Higher Risk Routes." The Bear River has the highest existing density of "Higher Risk Routes" and is in the higher potential EMDS Erosion Risk quartile. The Yuba River basin is in the highest EMDS Erosion Risk class, with the South Yuba having a slightly lower EMDS Erosion Risk than the rest of the basin. The existing density of "Higher Risk Routes" in the Yuba River Basin averages 2.6 miles/ square mile. The Middle Yuba has the highest density (2.8 mi/sq mi) and the North Yuba ha the lowest (2.5 mi/sq mi). The American River basin is in the highest EMDS Erosion Risk quartile. "Higher Risk Route" density averages 2.6 mi/sq mi. The Middle Fork American River has a density of 3.2 mi/sq mi and the North Fork American River has a density of 2.2 mi/sq mi.

Table 3.02-12. EMDS Erosion Risk rating and density of "Higher Risk Routes" by major river basin

River Basin	HUC 7 Acres	EMDS Erosion Risk (Risk Quartile)	Density of "Higher Risk Routes" (miles/sq. mi.)
Truckee	200,500	0.65 (Lowest)	3.7
Feather	112534.28	0.63 (Lower)	2.7
North Yuba	*229,995*	*0.39 (Highest)*	2.5
Middle Yuba	*126,370*	*0.44 (Highest)*	2.8
South Yuba	*170,886*	*0.46 (Higher)*	2.7
Subtotal Yuba	**527,252**	**0.42 (Highest)**	**2.6**
Bear	20,108	0.50 (Higher)	3.9
Middle Fork American	*146,533*	*0.42 (Highest)*	3.2
North Fork American	*133,107*	*0.44 (Highest)*	2.2
Subtotal American	**279,639**	**0.43 (Highest)**	**2.6**

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

Field surveys were completed for motorized trails using the GYR OHV Trail Condition Rating protocol. Stream crossings were evaluated using the GYR protocol and R-5 Best Management Practices Evaluation Protocol (BMPEP). 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 motorized trails are generally in functional order with minimal resource issues, but may need maintenance of drainage structures. The yellow condition class means motorized trails are still useable but maintenance needs to prioritized for these sections. The red condition class means the trail condition is serious enough to be brought to the immediate attention of management. Trails rated red are to be repaired or closed within six months. The R-5 BMPEP protocol looks at erosion on route, sediment movement on route and off, route/stream crossings, etc. The surveys show that many trail systems have some sort soil erosion or watershed impacts (some green condition class trails have erosion, but the erosion is not leaving the trail). 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 3.02-13 shows that approximately five percent of the inventoried routes have some resource impacts; 11 percent are overgrown; and 85 percent are in an acceptable condition (some of these routes need drainage structure reconstruction/maintenance).

Table 3.02-13. 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%

Other Results from Green, Yellow and Red Route Condition Ratings

Approximately half of the motorized trails un-authorized for motorized use that were inventoried had erosion identified as an issue somewhere along the trail. Ten percent of the trails inventoried had wetland issues (e.g., are within wetland buffers or could impact wetland hydrology). Twenty percent of the trails were incised up to 6 inches (two routes up to 12 inches).

Sixty seven percent of the trails inventoried had no stream crossings. The thirty three percent of inventoried trails that did have crossings had a total of 40 stream crossings. Twenty-three of the inventoried crossings are in a "green" condition (indicating an acceptable level of resource impacts). Fourteen of the inventoried crossings are in a "yellow" condition (indicating that the crossing is contributing some level of sediment to the adjacent stream) and need some type of drainage control work. Three crossings were rated as red, indicating that the crossing needs repair. Two crossings with failed culverts on TKS-6 and one crossing on SV-P15 are in a red condition. Appropriate mitigation measures required to allow these motorized trails to be added to the National Forest Transportation System (NFTS) are specified in Appendix A (Road Cards).

Most of the impacts seen in surveys for this project can be mitigated, although some of the mitigations could be quite expensive. Unless survey information indicated otherwise, user created trails are assumed to be eroded and in poor condition, or have a high risk of accelerated erosion because they were not designed/located properly and lack drainage.

Existing Seasonal Closures

The condition of native surface roads and motorized trails ("Higher Risk Routes") 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 to wet season use. "Higher Risk Routes" are most susceptible to damage by motor vehicles when wet. As noted above, 20 percent of these routes inventoried had trail incision. One of the primary causes of route incision was use when soils were saturated. "Higher Risk Route" use when soils were saturated and soil strength was low is also a contributing factor in the inventoried routes with erosion. Currently there are 3,388.7 miles of National Forest Transportation System (NFTS) native surface roads and motorized trails that are open year round. Two hundred and thirty one miles of roads and motorized trails are closed seasonally (primarily wildlife closures). The areas that are seasonally closed for wildlife also function to reduce wet season damage to routes, soils, and watershed resources.

Existing Cross Country Travel

As discussed above, many user-created motorized trails were not constructed to National Forest Transportation System (NFTS) standards. These trails are generally not maintained and are higher risk routes in terms of erosion and water quality risks. Generally, the more un-maintained, motorized trails un-authorized for motorized use there are in a watershed, the higher the risk to soil and watershed resources. Cross-country travel has resulted in 1,389 miles of motorized trails un-authorized for motorized use on the TNF. As discussed above in the inventory results section, some routes are stable and others need maintenance/mitigation.

Soil Environmental Consequences

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

Cross-country motorized vehicle travel increases the amount of native surface motorized trails un-authorized for motorized use on the Tahoe National Forest. The motorized trails un-authorized for motorized use being considered for addition to the NFTS are native surface trails that currently exist on the ground, so the hydrologic footprint of the trails already exists. The primary change 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. Therefore, the effects of route designation on soil and watershed resources focuses on native surface NFTS roads and motorized trails, motorized trails un-authorized for motorized use and non-private roads (with native surface) within the National Forest boundary. These are the routes where effects on soil and watershed resources are most likely to occur. Surfaced roads are not included because generally soil loss by erosion is very low on them.

Direct and Indirect Effects to Soil Resources

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 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 compacted and generally lack vegetation. Runoff from the surface is collected and discharged as potentially erosive flows at points below the road. 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 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. It should be noted that most roads and motorized trails on the Tahoe National Forest have some site specific risk to soil and water resources. Many of these risks can be mitigated.

Prohibiting motorized use on native surface roads and trails may result in less erosion to the extent that recurrent disturbance of the soil surface by motor vehicle 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 roads and trails some erosion and sediment transport could continue to occur.

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 the loss of soil depth, infiltration capacity and permeability or in other words, a reduction in the soil hydrologic function**.** 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 deliver and storage as well as channel form. Because this document covers existing wheel tracks, the direct impacts to soil productivity, hydrologic function, and buffering capacity have already taken place.

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.

The most serious impacts of roads occur where roads are in close proximity to streams or wetlands (See Riparian Conservation Objective Analysis, Appendix R). 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-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, roadside 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 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.

None of the proposed alternatives includes decommissioning or restoration for motorized trails not designated for motorized use. A recent field study (Poff, 2005) suggests that providing adequate drainage - along with effective closure - is a critical element in effectively restoring OHV-damaged areas. Without adequate drainage, many trails would continue to erode even if they could be effectively closed. Some motorized trails not designated for motorized would most likely start to recover from the edges and slowly close in to some extent. Others would be used by other 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 to heavy soil compaction (within the wheel tracks) will take more than five years to recover vegetation (develop native forb or shrub cover). Some stable, moderately used trails will recover within twenty years. In some cases, native shrubs growing along the sides of the trail will lean into the trail. However, the bare, compacted soils established by motorized vehicle use will remain un-vegetated and subject to erosion. The most severely disturbed sites are not likely to recover without some type of active restoration. The disposition of motorized trails un-authorized for motorized use that are not added to the system will be dealt with in future NEPA documents.

The type of trail to be rehabilitated affects the potential for recovery without treatment. Without treatment, National Forest Transportation System (NFTS) Maintenance Level 1 and temporary roads would recover very slowly. Most fill slopes and cut slopes would re-vegetate in time, but road prisms are compacted in lifts and do not recover without a physical treatment to break up the compaction. Generally all roads and trails can be assumed to be compacted to the point where natural recovery would take decades. NFTS Maintenance Level 1 and temporary roads also alter natural slope drainage and concentrate runoff. Roads and trails in poor condition are unlikely to improve on their own. On most roads, restoration to a fully productive state would require decommissioning.

By contrast, user created motorized trails are not constructed and have the potential to recover faster. Compaction is not as deep, less topsoil has been displaced, and natural soil profiles have not been disturbed. All this is quite variable, mostly depending upon side slope gradients. It doesn't take many trips to physically displace the top soil. Generally all roads and motorized trails can be assumed to be compacted to the point where natural recovery would take decades. However, actively eroding user created motorized trails will continue to erode without adequate drainage.

User created motorized trails that occur on shallow soils and lack forest or brush cover would be more difficult to close effectively and would recover very slowly.

Projected Effects on Soils on the Tahoe National Forest

The inherent risk of erosion of the soils within the Tahoe National Forest (TNF) was assessed using the Ecosystem Management Decision Support Model (EMDS Model. See Appendix B, Modeling). 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. "Higher Risk Route" (native surface roads and motorized trails) density and EMDS Erosion Risk are used to asses the cumulative effects of this project on soils on the TNF.

Projected Soil Risk Assessment Based on Density of "Higher Risk Routes" in the Watershed

"Higher Risk Routes" were previously defined as native surface roads and motorized trails. The density of "Higher Risk Routes" by major river basin by alternative is shown in Table 3.02-14. The No Action alternative (Alternative 1) has the highest density of "Higher Risk Routes" used by motorized vehicles. All action alternatives would result in lower densities of "Higher Risk Routes" than in the existing condition (Alt. 1). Alternatives 3, 4 and 7 would have the lowest route density of "Higher Risk Routes." Alternative 6 densities would be slightly higher than alternatives 3, 4 and 7. Alternatives 2 and 5 would result in the highest density of "Higher Risk Routes."

Table 3.02-14. Density of "Higher Risk Routes" by major river basin and alterative (mi, /sq. mi.)

River Basin	HUC 7 Watershed Acres	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7
Truckee River	200,500	3.7	3.2	3.0	3.0	3.3	3.1	3.0
Feather River	112,534.28	2.7	2.3	2.0	2.0	2.3	2.2	2.0
North Yuba River	*229,995*	2.5	1.9	1.5	1.5	2.1	1.6	1.5
Middle Yuba River	*126,370*	2.8	2.2	2.1	2.1	2.3	2.2	2.1
South Yuba River	*170,886*	2.7	2.3	2.0	2.0	2.4	2.2	2.0
Subtotal Yuba	**527,252**	**2.6**	**2.1**	**1.8**	**1.8**	**2.2**	**2.0**	**1.8**
Bear River	20,108	3.9	3.3	2.8	2.9	3.3	3.3	2.9
North Fork American River	*146,533*	3.2	2.6	2.3	2.3	2.9	2.5	2.3
Middle Fork American River	*133,107*	2.2	1.7	1.6	1.6	1.8	1.7	1.6
Subtotal American	**279,639**	**2.6**	**2.1**	**1.9**	**1.9**	**2.3**	**2.1**	**1.9**
TNF Total		**2.8**	**2.3**	**2.1**	**2.1**	**2.5**	**2.2**	**2.1**

The existing "Higher Risk Routes" density by HUC7 watershed was separated into quartiles. These groupings are 0-1.9, 2.0-2.7, 2.8-3.7, and more than 3.8 mi/sq mi of "Higher Risk Routes" per HUC7 watershed. The highest density category represents the highest risk to the soil and watershed resources and was used in conjunction with the EMDS Erosion Risk rating to identify those HUC7 watersheds on the TNF with the highest risk of negative effects due to motorized travel. The following table shows the percent of HUC7 watersheds on Tahoe National Forest by "Higher Risk Route" density and EMDS Erosion Risk class.

Table 3.02-15. Percent of HUC7 Watersheds on Tahoe National Forest by density of "Higher Risk Routes" and EMDS Erosion Risk class

Route Density Mi/Sq Mi by HUC7				
EMDS Risk Class	**0-1.9**	**2.0-2.7**	**2.8-3.5**	**3.6-8.6**
Lowest	2%	4%	7%	9%
Lower	6%	5%	9%	5%
Higher	7%	7%	7%	3%
Highest	10%	9%	3%	4%

The shaded cells in Table 3.02-15 represent the HUC7 watersheds on the TNF with the highest potential erosion risk to soil and watershed resources from motorized travel on "Higher Risk Routes." These higher risk watersheds were used in the focused assessment discussed in the next section.

"Higher Risk Route" density

"Higher Risk Route" densities will be used to track changes in effects of this project proposal. Table 3.02-15 shows the density of "Higher Risk Routes" by Alternative. The Truckee River Basin has the second highest existing "Higher Risk Route" density (3.7 mi/sq mi). The Bear River watershed has the highest existing "Higher Risk Route" density (3.9 mi/sq/mi). The existing "Higher Risk Route" density in the Yuba River Basin averages 2.6 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 has an existing "Higher Risk Route" density of 2.6 mi/sq mi. The Middle Fork American River has a density of 3.2 mi/sq mi and the North Fork American River has a density of 2.2 mi/sq mi.

Table 3.02-16 shows the density of “Higher Risk Routes” by major river basin by alternative. The No Action alternative (Alternative 1) has the highest densities of “Higher Risk Routes” used by motorized vehicles. All action alternatives would result in lower densities of “Higher Risk Routes” than in the existing condition (Alt. 1). Alternatives 3, 4 and 7 would have the lowest route density of motorized use on “Higher Risk Routes.” 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.

Additions of motorized trails to the National Forest Transportation System (NFTS) would have minimal effects to soil resources, because these trails are already part of the disturbance footprint. Appendix A, Road Cards, have mitigations that are needed to add the motorized trails to the NFTS with minimal impacts to soil resources. NFTS motorized trails have standards that need to be met and can be maintained.

Table 3.02-16. Density of ““Higher Risk Routes”” by major river basin by alterative (mi./sq. mi.)

River Basin	Basin Acres	EMDS Erosion Risk (risk quartile)	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	200,500	0.65 (Lowest)	3.7	3.2	3.0	3.0	3.3	3.1	3.0
Feather River	112,534	0.63 (Lower)	2.7	2.3	2.0	2.0	2.3	2.2	2.0
North Yuba River	*229,995*	*0.39 (Highest)*	2.5	1.9	1.5	1.5	2.1	1.6	1.5
Middle Yuba River	*126,370*	*0.44 (Highest)*	2.8	2.2	2.1	2.1	2.3	2.2	2.1
South Yuba River	*170,886*	*0.46 (Higher)*	2.7	2.3	2.0	2.0	2.4	2.2	2.0
Subtotal Yuba	**527,252**	**0.42 (Highest)**	**2.6**	**2.1**	**1.8**	**1.8**	**2.2**	**2.0**	**1.8**
Bear River	20,108	0.50 (Higher)	3.9	3.3	2.8	2.9	3.3	3.3	2.9
North Fork American River	*146,533*	*0.42 (Highest)*	3.2	2.6	2.3	2.3	2.9	2.5	2.3
Middle Fork American River	*133,107*	*0.44 (Highest)*	2.2	1.7	1.6	1.6	1.8	1.7	1.6
Subtotal American	**279,639**	**0.43 (Highest)**	**2.6**	**2.1**	**1.9**	**1.9**	**2.3**	**2.1**	**1.9**
TNF Total	**1,946,924**	**0.49 (Higher)**	**2.8**	**2.3**	**2.1**	**2.1**	**2.5**	**2.2**	**2.1**

“Higher Risk Route” density

Prohibition on Cross Country Travel: All of the action alternatives prohibit cross country travel. This prohibition will reduce the density of “Higher Risk Routes” in all watersheds across the forest. It would also prevent the proliferation of any new motorized trails un-authorized for motorized use which would increase the density of “Higher Risk Routes.” The impacts on the density of “Higher Risk Routes” resulting from the prohibition on cross country travel are displayed in Table 3.02-17. All action alternatives would decrease the density of “Higher Risk Routes” by 1.1 miles per square mile or less. The largest decreases in all action alternatives are found in the North Yuba River and Bear River. Decreases in “Higher Risk Route” density average 0.8 miles/square mile in the Feather and Yuba River Basins and 0.6 miles/square mile in the American River Basin. Prohibition of cross country travel would also decrease the average “Higher Risk Route” density cross the Tahoe National Forest by 0.5 mi/ square mile.

Table 3.02-17. Changes in density of "Higher Risk Routes" by River Basin due to the prohibition of cross country travel

River Basin	Basin Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	200,500	0.0	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
Feather River	112,534	0.0	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
North Yuba River	*229,995*	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Middle Yuba River	*126,370*	0.0	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
South Yuba River	*170,886*	0.0	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
Subtotal Yuba	**527,252**	**0.0**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**	**-0.8**
Bear River	20,108	0.0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
North Fork American River	*146,533*	0.0	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
Middle Fork American River	*133,107*	0.0	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
Subtotal American	**279,639**	**0.0**	**-0.6**	**-0.6**	**-0.6**	**-0.6**	**-0.6**	**-0.6**
TNF Total	**1,946,924**	0.0	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5

Motorized Trail Additions to the National Forest Transportation System (NFTS): All of the motorized trail additions to the NFTS being considered in the alternatives are native surface trails which fall under the "Higher Risk Route" category. There are no motorized trail additions to the NFTS under Alternative 1 and 3. The other action alternatives would add between 31.2 and 282.8 miles of native surface, motorized trails to the NFTS. These additions to the system would have minimal effects to soil resources, because these motorized trails are already part of the disturbance footprint and would be managed according to TNF trail and resource standards. Appendix A, Road Cards, have mitigations that are needed to add these motorized trails to the NFTS with minimal impacts to soil resources. The impacts on the density of "Higher Risk Routes" resulting from the additions to NFTS are displayed in Table 3.02-18. Alternatives 1 and 3 would result in no change in the density of ""Higher Risk Routes"." Alternatives 4 and 7 would add 0.1 mi/square mile of "Higher Risk Routes" in the Bear River basin. Alternative 6 would add 0.1-0.2 miles/square mile of "Higher Risk Routes" in all river basins. Alternative 2 would add 0.1-0.3 miles/square mile of "Higher Risk Routes" in all river basins. Alternative 5 would add 0.1-0.6 miles/square mile of "Higher Risk Routes" in all river basins.

Table 3.02-18. Changes in the density of "Higher Risk Routes" due to motorized trail additions to the National Forest Transportation System (NFTS) (mi./sq. mi.)

River Basin	Basin Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	200,500	0.0	0.1	0.0	0.0	0.2	0.1	0.0
Feather River	112,534	0.0	0.1	0.0	0.0	0.2	0.2	0.0
North Yuba River	*229,995*	0.0	0.3	0.0	0.0	0.6	0.1	0.0
Middle Yuba River	*126,370*	0.0	0.1	0.0	0.0	0.1	0.1	0.0
South Yuba River	*170,886*	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Subtotal Yuba	**527,252**	**0.0**	**0.2**	**0.0**	**0.0**	**0.4**	**0.1**	**0.0**
Bear River	20,108	0.0	0.2	0.0	0.1	0.3	0.2	0.1
North Fork American River	*146,533*	0.0	0.1	0.0	0.0	0.3	0.1	0.0
Middle Fork American River	*133,107*	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Subtotal American	**279,639**	**0.0**	**0.1**	**0.0**	**0.0**	**0.2**	**0.1**	**0.0**
TNF Total	**1,946,924**	**0.0**	**0.1**	**0.0**	**0.0**	**0.2**	**0.1**	**0.0**

Changes to Class of Vehicles and/or Season of Use: Changing the class of vehicle allowed to use a particular National Forest Transportation System (NFTS) road could change the impacts to soil and watershed resources due to the change in road surface. Therefore, these roads are considered "Higher Risk Routes" 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. 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 for resource needs no matter what maintenance level.

Native surface roads and motorized trails ("Higher Risk Routes") are most susceptible to damage by motor vehicles when wet. The condition of "Higher Risk Routes" can quickly decline during winter or wet weather use due to rutting. Wet season use of ""Higher Risk Routes"" 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 would reduce rutting and subsequent channeling of surface water runoff. Seasonal closures would decrease the potential effects of motorized vehicle use on "Higher Risk Routes" by decreasing erosion and sedimentation. The benefits of seasonal closures would be equal to the prohibition on cross country travel and would by far exceed adding between 31.2 and 282.8 miles of "Higher Risk Routes" (with an existing disturbance footprint) into the NFTS.

Alternatives 1, 2, 3 and 7 all have the vast majority of "Higher Risk Routes" open year round and, therefore, have a higher risk to soil resources. The wet weather seasonal closures imposed in Alternatives 4, 5 and 6 would result in all of the "Higher Risk Routes" being closed to motorized use during the wettest time of the year, thus greatly reducing potential negative impacts to soil resources and to water quality. Table 3.02-19 displays changes in the density of native surface roads and trails (“Higher Risk Routes”) due to change in class of vehicles by alternative. Alternatives 1, 3, 4, and 7 would result in no change in the density of “Higher Risk Routes.” Alternatives 2, 5 and 6 would result in adding 0.1-0.2 miles/square mile of “Higher Risk Routes” in all river basins.

Table 3.02-19. Changes in the density of “Higher Risk Routes” due to changes in class of vehicles

River Basin	Basin Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	200,500	0.0	0.1	0.0	0.0	0.1	0.1	0.0
Feather River	112534	0.0	0.2	0.0	0.0	0.2	0.2	0.0
North Yuba River	*229,995*	0.0	0.1	0.0	0.0	0.1	0.1	0.0
Middle Yuba River	*126,370*	0.0	0.1	0.0	0.0	0.1	0.1	0.0
South Yuba River	*170,886*	0.0	0.1	0.0	0.0	0.1	0.1	0.0
Subtotal Yuba	**527,252**	**0.0**	**0.1**	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**
Bear River	20,108	0.0	0.2	0.0	0.0	-0.2	0.2	0.0
North Fork American River	*146,533*	0.0	0.1	0.0	0.0	0.1	0.1	0.0
Middle Fork American River	*133,107*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal American	**279,639**	**0.0**	**0.1**	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**
TNF Total	**1,946,924**	**0.0**	**0.1**	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**

Cumulative Effect: This project would not change the footprint of current wheel-tracks on the Tahoe National Forest. It would decide which “Higher Risk Routes” are authorized for motorized use. All action alternatives would result in a net reduction in the density of “Higher Risk Routes” in all river basins. All action alternatives would result in a slight decrease in the risk of negative cumulative effects to watersheds. The cumulative impacts on the density of “Higher Risk Routes” resulting from this project are displayed in Table 3.02-20. Alternative 1 represents the existing condition. Alternatives 2 through 7 represent the density of “Higher Risk Routes after twenty years (when routes not designated for motorized use would have recovered hydrologically). Alternatives 3, 4, and 7 have the same cumulative reductions in the density of “Higher Risk Routes” after 20 years. Alternative 6 has a larger density of “Higher Risk Routes” after the same period. The seasonal closures proposed in Alternatives 4, 5 and 6 would decrease the risk of erosion on and adjacent to “Higher Risk Routes” by reducing the rutting and channeling of surface water flow.

Table 3.02-20. "Higher Risk Route" density after cumulative effects of all proposed actions (year 20)

River Basin	Basin Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	200,500	3.7	3.2	3.0	3.0	3.3	3.1	3.0
Feather River	112534	2.7	2.3	2.0	2.0	2.3	2.2	2.0
North Yuba River	*229,995*	2.5	1.9	1.5	1.5	2.1	1.6	1.5
Middle Yuba River	*126,370*	2.8	2.2	2.1	2.1	2.3	2.2	2.1
South Yuba River	*170,886*	2.7	2.3	2.0	2.0	2.4	2.2	2.0
Subtotal Yuba	**527,252**	**2.6**	**2.1**	**1.8**	**1.8**	**2.2**	**2.0**	**1.8**
Bear River	20,108	3.9	3.3	2.8	2.9	3.3	3.3	2.9
North Fork American River	*146,533*	2.4	2.0	1.8	1.8	2.2	1.9	1.8
Middle Fork American River	*133,107*	2.1	1.7	1.6	1.6	1.8	1.7	1.6
Subtotal American	**279,639**	**2.3**	**1.9**	**1.7**	**1.7**	**2.0**	**1.8**	**1.7**
TNF Total	**1,946,924**	**2.8**	**2.3**	**2.0**	**2.1**	**2.4**	**2.2**	**2.1**

Projected Cumulative Effects on Soils

The cumulative effects on soils have been analyzed at several scales: HUC7 watershed, River Basin, and Forest level. 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 trails, maintenance, the effectiveness of closures, and recovery of closed routes. Cumulatively, these actions influence tread wear and soil erosion. The maintenance backlog has allowed drainage structures to deteriorate, putting some native surface roads at a higher risk of failure under a major storm event. National Forest funding for OHV trail maintenance has been inadequate, and grants for trail maintenance from the State OHV Commission have been inconsistent resulting in a backlog of deferred maintenance needs. National Forest appropriated funding cannot be spent to maintain roads and motorized trails that are not part of the National Forest Transportation System (NFTS). The cumulative effect of these actions has been some erosion and deterioration of roads and motorized trails and an increased risk of failures.

Fuels treatments open up stands, create fire lines and temporary roads, and generally create opportunities for unauthorized motorized use. This has been and would continue to be a problem in urban-interface areas and in other areas with easy access to the Forest. The foothills-Forest-urban interface is one of the most rapidly growing areas in the State, and OHV registrations in this area are increasing at an even faster rate (Widell, 2002). There is an increasing demand for motorized recreation, especially on ATVs. All of this increasing demand will increase use levels on NFTS roads and motorized trails and also increase the pressure to create non-FS routes.

This analysis includes NFTS roads and motorized trails as well as motorized trails un-authorized for motorized use. Projects listed in Appendix Q (Wildlife Cumulative Effects) have been incorporated into this analysis. Most fuels and vegetation management projects include road maintenance as a part of the proposal. Some projects include decommissioning of unnecessary routes. Projects listed in Chapter 3.00 as reasonably foreseeable actions have also been considered in this analysis.

This project does not propose or change the current road or trail-related disturbance footprint. Although route designation would have very limited direct effects on watersheds, route designation would indirectly (1) affect the amount, type and season of use (motorized vs. non-motorized) of *traffic* on routes; (2) allow or prohibit use of routes by motorized vehicles in areas of highly erosive soils; (3) affect maintenance levels; and (4) affect the potential for recovery and restoration.

Route designation identified in the project record those roads and trails that need reroutes or restoration. Reroutes would require some new construction that would cause soil disturbance and a temporary loss of vegetation. Restoration of damaged areas and road decommissioning would also cause soil disturbance. To the extent these actions are implemented in the future, the long term effects of these actions would be reduced soil erosion.

As discussed above, over a 5-30 year period vegetative recovery would decrease the erosion impacts of some trails not added to the NFTS. Even if these trails are used for non-motorized purposed, there most likely would be some decrease in erosion and sediment as the route closes in from the sides and compaction of the tread decreases.

The cumulative effect of the proposed actions would be to decrease the density of “Higher Risk Routes” on soils on the TNF. Table 3.02-21 shows the proposed decrease in the density of “Higher Risk Routes” by major river basin. The density of “Higher Risk Routes” would decrease by 0.3-0.6 miles/square mile in the Truckee and Feather River basins; 0.3-.08 in the Yuba and American River basins; and 0.6-1.0 in the Bear River basin. The smallest decreases are associated with Alternative 5 and the largest with Alternative 3. Table 3.02-20 shows the percent of the acres on the Tahoe National Forest by the density of “Higher Risk Routes” by alternative.

Table 3.02-21. Density of “Higher Risk Routes” by Alternative (Percent of Acres on Tahoe National Forest)

“Higher Risk Route” density	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
0-1.9 (mi./sq.mi.)	24.5%	41.7%	52.5%	50.5%	36.8%	44.1%	50.5%
2.0-2.7(mi./sq.mi.)	26.0%	29.4%	25.0%	23.0%	30.4%	28.4%	26.5%
2.8-3.5(mi./sq.mi.)	23.5%	14.7%	13.2%	15.7%	14.7%	14.2%	12.3%
3.6-8.6(mi./sq.mi.)	26.0%	14.2%	9.8%	10.8%	17.6%	13.2%	10.8%

Soil Risk Assessment Based on EMDS Erosion Risk and density of “Higher Risk Routes” in HUC 7 watersheds

This analysis focuses on “Higher Risk Routes” defined as native surface roads and motorized trails. Not incorporated in the focused analysis were surfaced roads, non-motorized trails, over-snow routes, private roads and county and state roads because these tend to be more stable. To do this analysis, watersheds were separated into quartiles based on the density of miles open for motorized use of “Higher Risk Routes” as described earlier. These categories are shown in Table 3.02-22 below:

Table 3.02-22. "Higher Risk Route" density categories (mi./sq. mi.)

Level of Risk Category	"Higher Risk Route" density (mi./sq. mi.)
Highest	3.6 Plus
High Risk	2.8 to 3.5
Low Risk	2.0 to 2.7
Lowest Risk	0 to 1.9

Table 3.02-23 lists the HUC7 watersheds within the highest level of risk category based on the density of "Higher Risk Routes." Two of the HUC7 watersheds identified in the highest level of risk category are on the east-side of the TNF, Squaw Creek and East Martis Creek. The rest are on the west-side of the TNF in the North Yuba (8); Middle Yuba (7) ; South Yuba (7)), Bear (2), Middle Fork American (6); or North Fork American (5) basins. Two watersheds (Squaw Creek and East Martis Creek) show very little to no change through all alternatives. These two watersheds are primarily private and have no proposed motorized trail additions to the National Forest Transportation System (NFTS) or change in class vehicles in this project. All other action alternatives would decrease the density of "Higher Risk Routes" in the watersheds with the highest potential erosion risk except for four Westside watersheds in Alternative 5. Alternative 5 would have "Higher Risk Route" densities equal to or more than the existing condition in the Cherokee Creek, East Fork Creek, Deep Canyon and Grouse Creek HUC7 watersheds.

Table 3.02-23. Density of "Higher Risk Routes" by alternative for high risk HUC7 watersheds

HUC7	HUC7 Name	Landscape Erosion Risk TV	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
16050102010102	Squaw Creek	0.37	5.1	5.1	5.1	5.1	5.1	5.1	5.1
16050102010404	**East Martis Creek**	**0.06**	**4.6**	**4.6**	**4.6**	**4.6**	**4.6**	**4.6**	**4.6**
18020125010404	Upper Pauley Creek	0.41	2.8	2.5	2.2	2.2	2.6	2.4	2.3
18020125010505	Fiddle Creek	0.34	4.7	2.3	2.3	2.3	4.6	2.4	2.3
18020125010506	Cherokee Creek	0.39	4.8	0.9	0.7	0.7	5.1	2.0	0.7
18020125010507	North Yuba River-Indian Creek	0.33	3.3	2.1	2.0	2.0	2.3	2.1	2.0
18020125020103	Canyon Creek-Morristown Ravine	0.40	4.3	1.9	1.9	1.9	4.3	1.9	1.9
18020125020104	Little Canyon Creek	0.45	3.8	1.9	1.9	1.9	3.6	1.9	1.9
18020125020302	North Yuba River-Lost Creek	0.38	3.2	2.3	2.3	2.3	2.6	2.3	2.3
18020125020305	Willow Creek	0.45	3.2	2.2	2.1	2.2	2.4	2.2	2.1
18020125030202	East Fork Creek	0.44	3.6	3.3	3.1	3.1	3.3	3.3	3.1
18020125030301	Middle Yuba River-National Gulch	0.41	4.5	3.5	3.5	3.5	3.6	3.5	3.5
18020125030302	Wolf Creek	0.46	3.2	2.5	2.5	2.5	2.6	2.5	2.5
18020125030402	Oregon Creek-Miller Creek	0.40	4.3	3.3	3.3	3.3	3.5	3.3	3.3
18020125030403	Oregon Creek-Marion Creek	0.46	3.1	2.1	2.1	2.1	2.5	2.1	2.1
18020125030501	Upper Kanaka Creek	0.27	3.0	1.6	1.6	1.6	1.8	1.6	1.6
18020125030506	Lower Middle Yuba River	0.43	3.1	1.6	1.6	1.6	1.9	1.6	1.6
18020125040105	Rattlesnake Creek	0.40	3.2	2.9	2.8	2.8	2.9	2.9	2.8
18020125040106	South Yuba River-Pierce Meadow	0.45	3.0	2.4	2.3	2.3	2.4	2.4	2.3
18020125040404	Canyon Creek-Texas Creek	0.46	3.0	2.4	2.3	2.3	2.4	2.4	2.3

HUC7	HUC7 Name	Landscape Erosion Risk TV	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
18020125040405	Lower Canyon Creek-South Yuba River	0.45	3.7	2.7	2.7	2.7	2.9	2.7	2.7
18020125040501	Upper Poorman Creek	0.44	4.9	3.9	3.9	3.9	4.2	3.9	3.9
18020125040502	Lower Poorman Creek	0.44	3.4	2.7	2.7	2.7	2.8	2.7	2.7
18020125040601	South Yuba River-Jefferson Creek	0.42	3.2	2.5	2.5	2.5	2.5	2.5	2.5
18020126010101	Headwaters Bear River	0.43	3.3	1.6	1.6	1.6	2.1	1.6	1.6
18020128010104	Middle Fork American River-Dolly Creek	0.40	4.2	3.3	3.3	3.3	4.1	3.3	3.3
18020128010106	Middle Fork American River-Chipmunk Creek	0.41	3.2	2.6	1.4	1.4	2.6	2.5	1.4
18020128010202	Lower Duncan Canyon	0.34	3.9	3.0	2.9	2.9	3.3	2.9	2.9
18020128020501	Screwauger Canyon	0.45	7.5	3.9	3.9	3.9	7.5	3.9	3.9
18020128030101	Deep Canyon	0.42	3.7	2.8	2.8	2.8	3.2	2.8	2.8
18020128030102	Secret Canyon	0.43	5.0	4.1	4.1	4.1	5.0	4.1	4.1
18020128030104	North Fork of Middle Fork American River-Bear Wallow	0.45	3.8	3.2	3.2	3.2	3.4	3.2	3.2
18020128030201	Grouse Creek	0.37	2.9	1.7	1.7	1.7	1.7	1.7	1.7
18020128030204	West Branch El Dorado Canyon	0.35	3.4	2.8	2.8	2.8	2.9	2.6	2.8
18020128050302	Humbug Canyon	0.34	3.8	3.3	3.1	3.3	3.5	3.3	3.3
18020128050402	Upper East Fork North Fork of North Fork American River	0.47	3.4	2.3	1.8	1.8	2.6	2.3	1.8

Figure 3.02-4 displays the change in “Higher Risk Route” density in the watersheds identified above Figure 3.02.4 shows that all action alternatives increase the percent of watersheds with “Higher Risk Route” densities of 1.9 miles/sq mile or less and decrease the percent of watersheds with “Higher Risk Route” densities greater than 3.6 mi/sq mile.

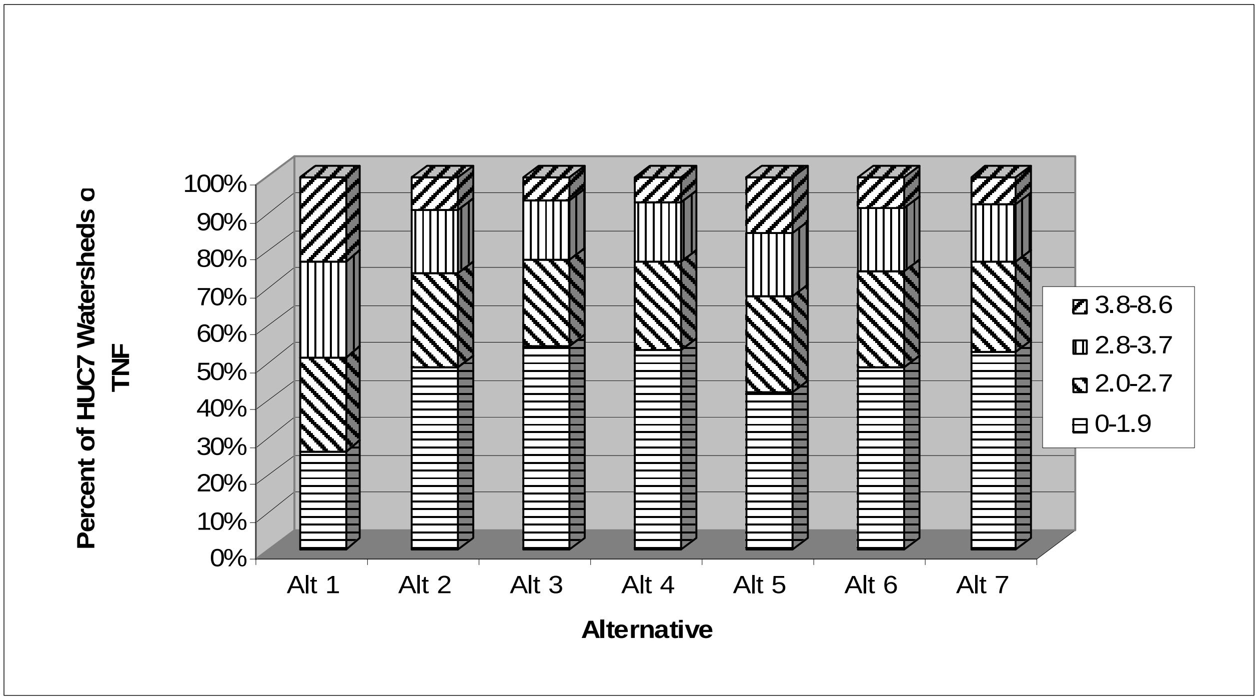

Figure 3.02-4. Change in percent of watersheds in "Higher Risk Route" density categories

Cumulative Effects to soils based on EMDS Erosion Risk and "Higher Risk Route" density

Prohibition on Cross Country Travel: All of the action alternatives prohibit cross country travel. It would also prevent the proliferation of any new motorized trails un-authorized for motorized use which would increase number of high risk watersheds. The impacts on "Higher Risk Route" density in high risk watersheds resulting from the prohibition on cross country travel are displayed in Table 3.02-24. This prohibition will reduce the "Higher Risk Route" density in HUC7 watersheds with a moderately high to high erosion potential. The largest reduction is in the Cherokee Creek HUC7 (North Yuba River). The smallest reductions are found in the Truckee River in East Martis Creek (0.0 mi/sq mi) and Squaw Creek (0.1 mi/sq mi). These two watersheds are the only HUC7s with high EMDS Erosion Risk and high "Higher Risk Route" density on the eastside of the TNF. These two HUC7s are also primarily under private ownership. The other Westside watersheds show reductions of 0.4 to 4.2 miles per square mile in the Action Alternatives.

Table 3.02-24. Changes in "Higher Risk Route" density in high risk watersheds (mi,/sq. mi.)

HUC7 Watershed	HUC7 Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Squaw Creek	5113	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
East Martis Creek	4632	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upper Pauley Creek	5078	0.0	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
Fiddle Creek	7814	0.0	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4
Cherokee Creek	4572	0.0	-4.2	-4.2	-4.2	-4.2	-4.2	-4.2
North Yuba River-Indian Creek	6651	0.0	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3
Canyon Creek-Morristown Ravine	1888	0.0	-2.3	-2.3	-2.3	-2.3	-2.3	-2.3

HUC7 Watershed	HUC7 Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Little Canyon Creek	7671	0.0	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8
North Yuba River-Lost Creek	3471	0.0	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
Willow Creek	8192	0.0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
East Fork Creek	8450	0.0	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
Middle Yuba River-National Gulch	6687	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Wolf Creek	5551	0.0	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
Oregon Creek-Miller Creek	5657	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Oregon Creek-Marion Creek	4244	0.0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Upper Kanaka Creek	5458	0.0	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4
Lower Middle Yuba River	4997	0.0	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4
South Yuba River-Pierce Meadow	4928	0.0	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
Canyon Creek-Texas Creek	7929	0.0	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
Lower Canyon Creek-South Yuba River	6156	0.0	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9
Upper Poorman Creek	6917	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Lower Poorman Creek	7932	0.0	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
South Yuba River-Jefferson Creek	4673	0.0	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Headwaters Bear River	2494	0.0	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7
Bear River-Stump Canyon	594	0.0	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2
Middle Fork American River-Dolly Creek	5787	0.0	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9
Middle Fork American River-Chipmunk Creek	2742	0.0	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8
Lower Duncan Canyon	7817	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Screwauger Canyon	8537	0.0	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9
Deep Canyon	5343	0.0	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9
Secret Canyon	6526	0.0	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
North Fork of Middle Fork American River-Bear Wallow	5937	0.0	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2
Grouse Creek	5264	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Volcano Canyon	2371	0.0	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2
Humbug Canyon	6100	0.0	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
Upper East Fork North Fork of North Fork American River	6651	0.0	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6
North Fork of North Fork American River-Blue Canyon	4359	0.0	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5

Additions to the National Forest Transportation System (NFTS): There are no additions to the NFTS under Alternative 1. The action alternatives would add between 31.2 and 282.8 miles of “Higher Risk Routes” to the (NFTS). Additions to the (NFTS) would have minimal effects to soil resources, because these motorized trails un-authorized for motorized use are already part of the disturbance footprint and would be managed according to TNF trail and resource standards. Appendix A, Road Cards, has mitigations that are needed to add the motorized trails to the NFTS with minimal impacts to soil resources.

Table 3.02-25 displays changes in “Higher Risk Route” density in high risk watersheds due to adding motorized trails to the NFTS. Alternatives 1 and 3 would result in no change in “Higher Risk Route” density in high risk watersheds. Motorized trail additions to the NFTS in Alternative 2 would increase “Higher Risk Route” density in 22 watersheds by 0.1 to 1.5 miles per square mile. Alternatives 4 and 7 would increase "Higher Risk Route" density by 0.1 mile per square mile in one watershed. Alternative 5 would increase "Higher Risk Route" density by 0.1 to 3.4 miles per square mile in 29 watersheds. Alternative 6 would increase "Higher Risk Route" density by 0.1to 1.2 miles per square mile in 13 watersheds.

Table 3.02-25. Changes in the "Higher Risk Route" density in High Risk Watersheds due to additions to the National Forest Transportation System (mi./sq. mi.)

HUC7 Watershed	HUC7 Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Squaw Creek	5113	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Martis Creek	4632	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upper Pauley Creek	5078	0.0	0.2	0.0	0.0	0.2	0.2	0.0
Fiddle Creek	7814	0.0	0.4	0.0	0.0	2.4	0.1	0.0
Cherokee Creek	4572	0.0	0.1	0.0	0.0	3.4	1.2	0.0
North Yuba River-Indian Creek	6651	0.0	0.6	0.0	0.0	-0.8	0.0	0.0
Canyon Creek-Morristown Ravine	1888	0.0	0.6	0.0	0.0	2.0	0.0	0.0
Little Canyon Creek	7671	0.0	1.5	0.0	0.0	2.7	0.0	0.0
North Yuba River-Lost Creek	3471	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Willow Creek	8192	0.0	0.2	0.0	0.0	0.3	0.0	0.0
East Fork Creek	8450	0.0	0.6	0.0	0.0	0.6	0.6	0.0
Middle Yuba River-National Gulch	6687	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wolf Creek	5551	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oregon Creek-Miller Creek	5657	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oregon Creek-Marion Creek	4244	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Upper Kanaka Creek	5458	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Lower Middle Yuba River	4997	0.0	0.0	0.0	0.0	0.1	0.0	0.0
South Yuba River-Pierce Meadow	4928	0.0	0.1	0.0	0.0	0.1	0.1	0.0
Canyon Creek-Texas Creek	7929	0.0	0.1	0.0	0.0	0.1	0.1	0.0
Lower Canyon Creek-South Yuba River	6156	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Upper Poorman Creek	6917	0.0	0.2	0.0	0.0	0.3	0.2	0.0
Lower Poorman Creek	7932	0.0	0.4	0.0	0.0	0.4	0.0	0.0
South Yuba River-Jefferson Creek	4673	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Headwaters Bear River	2494	0.0	0.2	0.0	0.0	0.2	0.2	0.0
Bear River-Stump Canyon	594	0.0	0.0	0.0	0.0	1.0	0.0	0.0
Middle Fork American River-Dolly Creek	5787	0.0	0.5	0.0	0.0	0.3	0.5	0.0
Middle Fork American River-Chipmunk Creek	2742	0.0	1.1	0.0	0.0	1.1	1.1	0.0
Lower Duncan Canyon	7817	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Screwauger Canyon	8537	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Deep Canyon	5343	0.0	1.3	0.0	0.0	2.0	0.4	0.0
Secret Canyon	6526	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Fork of Middle Fork American River-Bear Wallow	5937	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Grouse Creek	5264	0.0	0.5	0.0	0.0	1.1	0.0	0.0
Volcano Canyon	2371	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Humbug Canyon	6100	0.0	0.1	0.0	0.1	0.1	0.1	0.1
Upper East Fork North Fork of North Fork American River	6651	0.0	0.5	0.0	0.0	0.8	0.5	0.0
North Fork of North Fork American River-Blue Canyon	4359	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Changes to Class of Vehicles and/or Season of Use: Changing the class of vehicle allowed to use a particular National Forest Transportation System (NFTS) road could change the impacts to soil and watershed resources due to the change in road surface. Therefore, these NFTS roads are considered “Higher Risk Routes” 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. 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 road. 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 for resource needs no matter what maintenance level.

Native surface roads and trails (“Higher Risk Routes”) are most susceptible to damage by motor vehicles when wet. The condition of “Higher Risk Routes” can quickly decline during winter or wet weather use due to rutting.

Wet season use of “Higher Risk Routes” often leaves ruts which channel water and increase the erosive power of that water, this can lead to increased erosion both on the and adjacent to the “Higher Risk Route”. Many of the impacts found during field surveys were caused by wet season use of “Higher Risk Routes”.

Implementing seasonal closures would reduce rutting and subsequent channeling of surface water runoff. Seasonal closures would decrease the potential effects of motorized vehicle use on “Higher Risk Routes” by decreasing erosion and sedimentation. The benefits of seasonal closures would be equal to prohibition on cross country travel and would by far exceed adding between 31.2 and 282.8 miles of native surface, motorized trails (“Higher Risk Routes”) with an existing disturbance footprint into the NFTS.

Table 3.02-26 displays changes “Higher Risk Route” density in High Risk Watersheds by alternative. Alternatives 1, 2, 3 and 7 all have the vast majority of “Higher Risk Routes” open year round and therefore, have a higher risk to soil resources. The wet weather seasonal closure imposed in Alternatives 4, 5 and 6 results in all of the “Higher Risk Routes” being closed during the wet time of the year, thus greatly reducing potential negative impacts to soil resources and to water quality.

Alternatives 2, 5, and 6 have changes to the class of vehicles which increases the “Higher Risk Route” density in High Risk Watersheds.

Table 3.02-26. Changes in “Higher Risk Route” density in High Risk Watersheds due to changes in class of vehicles on existing National Forest Transportation System roads (mi./sq. mi.)

HUC7 Watershed	HUC7 Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Squaw Creek	5113	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Martis Creek	4632	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upper Pauley Creek	5078	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fiddle Creek	7814	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cherokee Creek	4572	0.0	0.2	0.0	0.0	-0.2	-0.2	0.0
North Yuba River-Indian Creek	6651	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Canyon Creek-Morristown Ravine	1888	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Little Canyon Creek	7671	0.0	0.0	0.0	0.0	0.0	0.0	0.0

HUC7 Watershed	HUC7 Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
North Yuba River-Lost Creek	3471	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Willow Creek	8192	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Fork Creek	8450	0.0	0.1	0.0	0.0	0.1	0.1	0.0
Middle Yuba River-National Gulch	6687	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wolf Creek	5551	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oregon Creek-Miller Creek	5657	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oregon Creek-Marion Creek	4244	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upper Kanaka Creek	5458	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lower Middle Yuba River	4997	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Yuba River-Pierce Meadow	4928	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Canyon Creek-Texas Creek	7929	0.0	0.1	0.0	0.0	0.1	0.1	0.0
Lower Canyon Creek-South Yuba River	6156	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upper Poorman Creek	6917	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lower Poorman Creek	7932	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Yuba River-Jefferson Creek	4673	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Headwaters Bear River	2494	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bear River-Stump Canyon	594	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Fork American River-Dolly Creek	5787	0.0	0.5	0.0	0.0	0.5	0.5	0.0
Middle Fork American River-Chipmunk Creek	2742	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lower Duncan Canyon	7817	0.0	-0.2	0.0	0.0	0.2	0.2	0.0
Screwauger Canyon	8537	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Deep Canyon	5343	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Secret Canyon	6526	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Fork of Middle Fork American River-Bear Wallow	5937	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grouse Creek	5264	0.0	0.7	0.0	0.0	0.7	0.7	0.0
Volcano Canyon	2371	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Humbug Canyon	6100	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Upper East Fork North Fork of North Fork American River	6651	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Fork of North Fork American River-Blue Canyon	4359	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Cumulative Effects: This project would not change the footprint of current wheel-tracks on the Tahoe National Forest. It would decide which roads, trails and “Open Areas” are authorized for motorized use. All action alternatives would result in a net reduction in “Higher Risk Route” density in all High Risk Watersheds. All action alternatives would result in a slight decrease in the risk of negative cumulative effects to High Risk Watersheds. The cumulative impacts on “Higher Risk Route” density in High Risk Watersheds resulting from this project are displayed in Table 3.02-27. Alternative 1 represents the existing condition. Alternatives 2 through 7 would represent the risk at twenty years (when motorized trails not designated for motorized use would have recovered hydrologically). All other Action Alternatives would decrease the “Higher Risk Route” density in the High Risk Watersheds except for four Westside watersheds in Alternative 5. Alternative 5 would have route densities equal to the existing condition in the Cherokee Creek, East Fork Creek, Deep Canyon and Grouse Creek HUC7 watersheds.

Table 3.02-27. "Higher Risk Route" density in High Risk Watersheds due to the cumulative effects of all proposed actions after 20 years (mi./sq. mi.)

HUC7 Watershed	HUC7 Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Squaw Creek	5113	5.1	5.1	5.1	5.1	5.1	5.1	5.1
East Martis Creek	4632	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Upper Pauley Creek	5078	2.8	2.5	2.2	2.2	2.5	2.4	2.3
Fiddle Creek	7814	4.7	2.7	2.3	2.3	4.7	2.4	2.3
Cherokee Creek	4572	-4.8	0.9	0.7	0.7	4.3	2.1	0.7
North Yuba River-Indian Creek	6651	3.3	2.6	2.0	2.0	2.8	2.1	2.0
Canyon Creek-Morristown Ravine	1888	4.3	2.6	1.9	1.9	4.0	1.9	1.9
Little Canyon Creek	7671	3.8	3.4	1.9	2.0	4.7	2.0	1.9
North Yuba River-Lost Creek	3471	3.2	2.6	2.6	2.6	2.6	2.6	2.6
Willow Creek	8192	3.2	2.4	2.1	2.2	2.4	2.2	2.1
East Fork Creek	8450	3.5	3.8	3.1	3.1	3.8	3.8	3.1
Middle Yuba River-National Gulch	6687	4.5	3.5	3.5	3.5	3.5	3.5	3.5
Wolf Creek	5551	3.2	2.5	2.5	2.5	2.5	2.5	2.5
Oregon Creek-Miller Creek	5657	4.3	3.3	3.3	3.3	3.3	3.3	3.3
Oregon Creek-Marion Creek	4244	3.1	2.1	2.1	2.1	2.3	2.1	2.1
Upper Kanaka Creek	5458	3.0	1.6	1.6	1.6	1.6	1.6	1.6
Lower Middle Yuba River	4997	3.1	1.6	1.6	1.6	1.7	1.6	1.6
South Yuba River-Pierce Meadow	4928	3.0	2.4	2.3	2.3	2.4	2.4	2.3
Canyon Creek-Texas Creek	7929	2.9	2.4	2.2	2.2	2.4	2.4	2.2
Lower Canyon Creek-South Yuba River	6156	3.7	2.9	2.8	2.8	2.9	2.8	2.8
Upper Poorman Creek	6917	4.9	4.1	3.9	3.9	4.2	4.1	3.9
Lower Poorman Creek	7932	3.4	3.1	2.7	2.7	3.1	2.7	2.7
South Yuba River-Jefferson Creek	4673	3.2	2.5	2.5	2.5	2.5	2.5	2.5
Headwaters Bear River	2494	3.4	1.8	1.6	1.7	1.8	1.8	1.7
Bear River-Stump Canyon	594	3.6	1.4	1.4	1.4	2.4	1.4	1.4
Middle Fork American River-Dolly Creek	5787	4.2	3.3	3.3	3.3	4.1	3.3	3.3
Middle Fork American River-Chipmunk Creek	2742	3.2	2.5	1.4	1.4	2.5	2.5	1.4
Lower Duncan Canyon	7817	3.9	3.1	2.9	2.9	3.3	3.1	2.9
Screwauger Canyon	8537	3.7	3.1	2.8	2.8	3.2	2.8	2.8
Deep Canyon	5343	5.0	5.4	4.1	4.1	6.1	4.5	4.1
Secret Canyon	6526	3.1	2.4	2.3	2.3	2.4	2.4	2.3
North Fork of Middle Fork American River-Bear Wallow	5937	2.9	1.8	1.7	1.7	1.8	1.7	1.7
Grouse Creek	5264	4.2	4.3	3.2	3.2	4.9	3.9	3.2
Volcano Canyon	2371	3.1	1.9	1.9	1.9	2.1	1.9	1.9
Humbug Canyon	6100	3.9	3.4	3.2	3.4	3.4	3.4	3.3
Upper East Fork North Fork of North Fork American River	6651	3.1	2.1	1.5	1.5	2.4	2.1	1.5
North Fork of North Fork American River-Blue Canyon	4359	2.8	2.3	2.3	2.3	2.3	2.3	2.3

Hydrology

Introduction

The Sierra Nevada annually yields a large but variable amount of water. Continuous stream-flow records began to be maintained in the mountains less than one hundred years ago and are of short duration with respect to longer-term natural variability. Based on this recent historical record, the Sierra Nevada generates about 25 km3 (20 million acre feet) of runoff each year, on average, out of a total for California of about 88 km3 (71 million acre feet). Stream flow in the Sierra Nevada is generated by seasonal rainfall and snowmelt.

Over 60 percent of California's water supply comes from the Sierra Nevada Mountains and it accounts for 60 percent of the total dollar value of all natural products or services produced by the entire region; more than forest products, agricultural products, recreational services or even residential development (Timmer et al. 2006). The rivers, lakes and streams within these watersheds supply municipal and agricultural users, provide hydro-power, prime recreation including fishing, swimming, boating or sightseeing as well as highly valuable riparian and aquatic habitats. Refer to the aquatic and other biological sections of this EIS for a description of the wide range of species supported within this area as well as a general description of the condition of these species and their habitat.

Precipitation in this portion of the Sierra Nevada Mountain range is a Mediterranean type climate with the majority of the precipitation falling in the winter. Above 6000 feet winter precipitation is dominated by snow fall that equates to roughly 50 to 60 inches of water per year. Intense summer thunderstorms commonly occur in this high elevation zone as well. Precipitation at elevations below about 4000 feet is dominated by rain that provides 40 to 50 inches per year. The zone in between about 4,000 to 6,000 feet is referred to as the rain-on-snow zone which is highly susceptible to rapid runoff and higher erosion rates when a warm rain falls on a snow pack. About half of average annual precipitation occurs during winter, about a third in autumn, about 15% in spring, and generally less than 2% in summer (Smith 1982). About 50% of annual precipitation falls as snow at 1,700 m (5,600 ft) at a latitude of 39° N (Kahrl 1978). Stream flow generated below 1,500 m (4,900 ft) is usually directly associated with storms, while stream flow above 2,500 m (8,200 ft) is primarily a product of spring snowmelt. Between these approximate bounds, stream flow is generated both by warmer storms and by melt of snow cover in spring. Of course, the major rivers collect inputs throughout their elevation range with a mix of precipitation events. Cayan and Riddle (1993) calculated the seasonal distribution of runoff of six Sierra Nevadan rivers which illustrates that snowmelt runoff becomes more important and midwinter rainfall runoff becomes less important with increasing elevation. In the American River Basin, less than half of annual runoff occurs from April through July in the lower two-thirds of the basin. In small catchments of the American adjoining the Sierra Nevada crest, more than two-thirds of annual runoff occurs during this period (Elliott et al. 1978).

People expect water of high quality from rivers on the TNF, and most of the time this expectation is met. High quality water is necessary to provide for beneficial uses such as municipal water supplies, agriculture, recreation, hydroelectric power, and to provide in stream flows for aquatic and riparian ecosystems. Water of sufficient quality to provide suitable conditions for coldwater fish generally meets the conditions required for other uses. The proper functioning of riparian and upland ecosystems is directly linked to satisfactory water quality.

High water quality is a critical habitat element for many species in riparian and aquatic ecosystems. The quality of water depends on many variables. The water quality variables most strongly tied to forested landscapes include water temperature, turbidity, and chemical and nutrient concentrations. These elements interact in complex ways to influence distribution, patterns of abundance, growth, reproduction, and migration of aquatic organisms. For example, sediment alone is not lethal to fish (Cordone and Kelley 1961), but fine sediments deposited on a streambed may disrupt substrate habitats for their food supply, aquatic insects, and result in fish population declines. Fine sediments can disrupt spawning, smother egg masses, or disrupt the development of larvae. Extremes of water temperature affect the type, quantity, and health of plants and animals within aquatic systems. Increases in summertime stream temperature are often cumulative as water moves downstream through watersheds.

Motor Vehicle Use and Water Quality

Motor vehicles presently access at least part of every HUC7 watershed located on the TNF. In a few watersheds (e.g., the Headwaters of the Middle Fork American River) the only motorized routes are surfaced “major” roads. A number of watersheds have low levels of motorized roads and trails since they are primarily within designated wilderness or Research Natural Areas or in inaccessible areas of the Forest (e.g., Headwaters of Canyon Creek (South Yuba River) and Upper Five Lakes and Middle Five Lakes (Middle Fork American River). Watersheds that contain high levels of private ownership such as those around urban areas, rural communities and some private timberlands have route densities that are much higher than average for the TNF (e.g., Squaw Creek and Donner Lake). Historical logging practices on public lands also left a legacy of high levels of routes in some areas. The native surface, motorized route system is the part of the transportation system that has the highest risk of causing soil erosion (on the route tread and/or on areas adjacent to the route) and subsequent sediment delivery to water bodies.

Roads are considered the principal cause of accelerated erosion in forests throughout the western United States (California Division of Soil Conservation 1971, California Division of Forestry 1972, Reid and Dunne 1984, McCashion and Rice 1983, Furniss and others 1991, Harr and Nichols 1993). Roads are also known to modify natural mountainside drainage networks. These drainage changes can alter physical processes in streams, leading to changes in stream flow regime; sediment transport and storage; channel, stream bank, and streambed configurations; substrate composition; and slope stability next to streams (Furniss and others 1991). The locations of roads determine the degree of potential impacts, making some roads more environmentally sensitive than others. The presence of roads can increase the frequency of slope failures compared with the rate of slope failures in undisturbed forest by hundreds of times (Sidle and others 1985). The closer the road or trail is to a water body, the higher the risk of negative effects to that water body. Road stream crossings constructed with culverts have been identified as a significant source of road derived sediment (Hagans and Weaver 1987, Best and others 1995, Weaver and others 1995, Park and others 1998). In addition, vegetation removal activities conducted within 300 feet of streams have been found to significantly negatively influence stream channel conditions (McGurk and Fong 1995). During rainfall events, sediment and other pollutants are transported to water bodies.

Downstream uses would potentially experience negative effects including reservoir infilling, silting of spawning gravel and aquatic habitats, plugging drainage systems, and the increase in risk of petroleum product and other pollutant exposure from vehicle operation.

Not all roads in any given area contribute equal amounts of sediment; the greatest volumes of sediment seem to come from a limited number of sites. In many forested catchments, unpaved roads are the primary sources of sediment but the effect of this sediment on downstream water resources depends on both the magnitude of the road erosion and the connectivity of the roads to the stream network (Coe 2001). Routes on steep slopes as well as near stream routes are commonly "hydrologically connected" to the stream system. Hydrologically connected routes can dramatically increase stream sedimentation, increase stream peak flows and serve as conduits for transport of chemicals from road spills or those applied to roadside areas (Furniss, et al. 1999).

The greatest risk of sediment moving into streams occurs where routes cross streams. Routes near streams are also commonly connected to the stream network. Coe's studies on the Eldorado NF reveled that 25 percent of the routes surveyed were hydrologically connected and that 59 percent of the connectivity was apparent at stream crossings (2006). Routes that cross streams have the potential for direct impacts to streams in 3 different ways.

- **Travel through a stream** can cause disturbance to the stream bed or banks.
- **Contaminants** such as petroleum products, sediment and or anything that is spilled on the roadway can enter the stream at crossings.
- **Stream crossings fail**. Roads often divert streamflow at road-stream crossings, and these diversions can result in erosion of native hillslopes, as well as road surfaces. When a stream crossing fails there is typically a large pulse of sediment released into the stream system. All crossings are designed for failure associated with storms of particular recurrence intervals.

In recent decades, road engineering and construction practices have been improved to alleviate these problems. Most stream crossings are on ephemeral streams, most are improved with culverts; many are bridges; and some crossings go through live streams or ephemeral stream beds. Every engineered stream crossing is designed for failure at a storm of roughly a 50 to 100 year recurrence interval. Culverts are typically corrugated metal pipes that sometimes plug with sediment and or debris; some eventually rust out or are damaged by obstructions or flows around the pipes. The conditions of the roads that drain into these culverts also influence how well the crossing may function. Existing routes constitute current and potential sources of sediment. In general, higher route densities translate to higher potential for adverse effects to aquatic and riparian habitats.

Regulatory 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. 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). All NFS roads and trails open to OHV use are required to comply with the appropriate BMPs.

Of particular relevance for 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.

Affected Environment

Existing Water Supply

The Tahoe National Forest 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 near the California 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 is 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

Table 3.02-28. Sediment yields from reservoir surveys, suspended sediment records, and other estimates (Kattelmann, 1996).

Watershed	Annual Sediment Yield (m³/km²)
American – Ralston	80
American – Auburn Dam Site	130
American – Folsom	250
Bear – Combie	360
Feather – Oroville	90
	100
	120
Truckee – Upper Truckee	21
Squaw Creek	12, 93
Trout Creek	12
Yuba – Nonmining	160
Mining	3,300
North Yuba – Bullards Bar	130

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 3.02-28 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.

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), and Humbug Creek (lead, sediment, etc.). Table 3.02-29 displays the 303(d) listed water bodies and the reason for listing.

Table 3.02-29. 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 Motor Vehicle Use and Water Quality

Route densities near streams such as the densities of roads and trails within Riparian Conservation Areas and stream crossing densities serve as relative measures of route connectivity to stream systems. Most routes are located along ephemeral streams. When routes are adjacent to perennial streams the potential for impacts to aquatic resources can be greater. Highest route densities on the TNF are generally found in the Truckee River watershed. The lowest route densities are found in the North Fork American River watershed.

There are 8,340 miles of roads and trails on the TNF. Average route density is 3.9 miles per square mile. There are 1,719 miles of roads and trails within Riparian Conservation Areas (RCAs) on the TNF. Average route density of the RCAs is 4.3 miles per square mile. There are approximately 21,347 motorized stream crossings on forest (2,175 perennial, 2,064 intermittent, and 17,108 ephemeral). This estimate is based on GIS analysis. Field review of the GIS base data shows that there are often fewer ephemeral crossings in the field than on the GIS layers. Sometimes routes that parallel a stream show up in GIS as multiple crossings.

Figure 3.02-5 shows the existing route density by HUC7 watershed and within RCAs. The majority of the watersheds on the TNF have route densities less than four miles per square mile. RCA route density is generally higher than the route densities in watersheds with route densities greater than six miles per square mile.

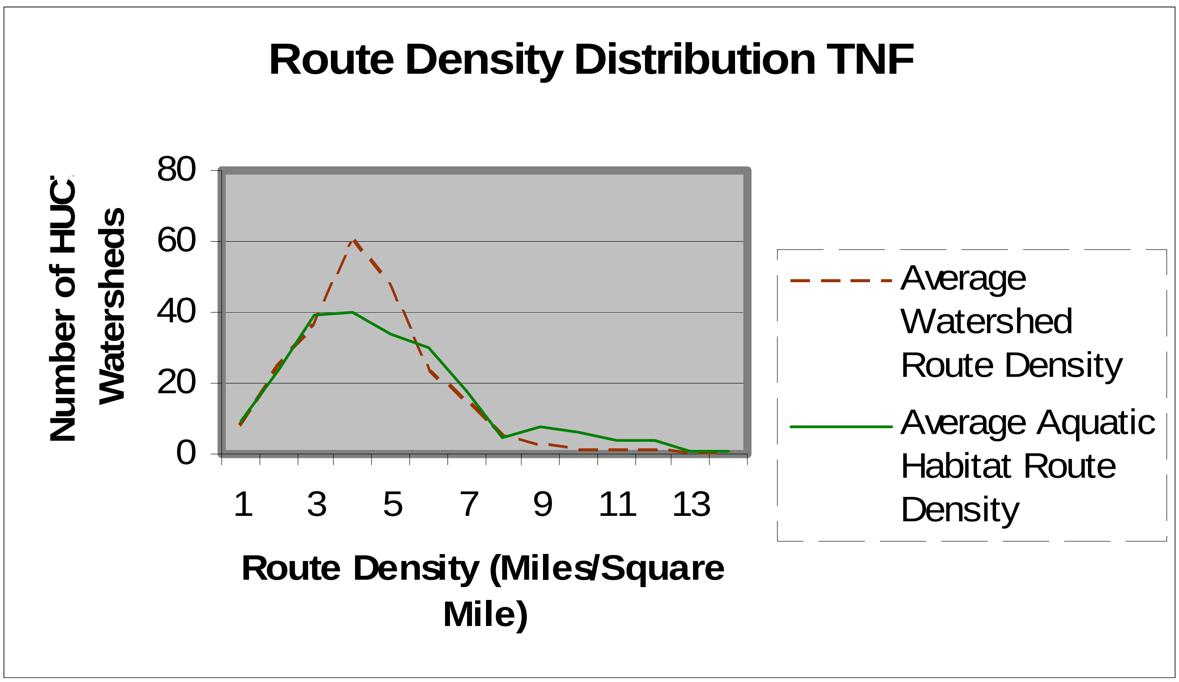

Figure 3.02-5 Distribution of Route Density on the Tahoe National Forest

Existing Watershed Connectivity Risk Assessment

Routes that are hydrologically connected to streams bring sediment or other contaminants from the road or trail surface to the stream system (Furniss et al. 1999). Routes on steep slopes that have inside ditches and cross drains are commonly linked to the stream system and act as extensions to the drainage network. When routes on steep slopes are also located in watersheds with soils that have high erosion and high precipitation, the effects are magnified even more (Refer to soils section for a more thorough discussion). Changing use from motorized to non-motorized use may decrease effects to watershed resources.

Near stream roads and trails as depicted above are commonly connected to the stream system, when these routes cross streams the potential for connectivity is even greater. The number of existing stream crossings across the forest is significant. Every road and motorized trail stream crossing has a design failure point and is expected to fail at some point under extreme weather conditions. Road stream crossings constructed with culverts have been identified as a significant source of road derived sediment (Hagans and Weaver 1987, Best et al 1995, Weaver et al 1995, Park et al 1998) as reported by Moll 1998. Erman at al. (1977) stated that the most significant impacts to invertebrate communities are below road failures and culverts. Decreasing the number of motorized crossings would reduce the risk of impacts caused by motorized vehicle use.

The potential risk of hydrologic connectivity has been modeled using the Ecosystem Management Decision Support Model (EMDS). The risk to water quality and stream channels was based on stream crossing density and route-steam proximity. Route position on slope was incorporated into the risk assessment after the modeled risk was computed. Hydrologic connectivity was assessed at all surveyed stream crossings.

Existing Watershed Connectivity

Watershed connectivity refers to the ease of movement, or rates of exchange, with which water, energy, nutrients, and organisms pass from one area to another, unhindered in the absence of impediments, such as dams, diversions, roads and bridges, large habitat openings, and recreational developments. As ecosystems become fragmented and disconnected, the scale and rate at which essential processes, such as nutrient and energy cycling and gene flow, operate become restricted.

A physical example of connectivity is the exchange of surface flow and groundwater within streambeds and floodplain soils (Boulton and others 1998). Another example is the dynamic interaction of a river with its riparian zone at flood stage when water transports sediments and organic materials from one area and deposits them in another. Chemical connectivity refers to the movement of nutrients from the terrestrial to the aquatic environment, and back. Biological connectivity refers to the continuity of habitats necessary for organisms to successfully complete their life cycles. For example, aquatic insects, fish, and amphibians migrate between different habitats at different stages in their development.

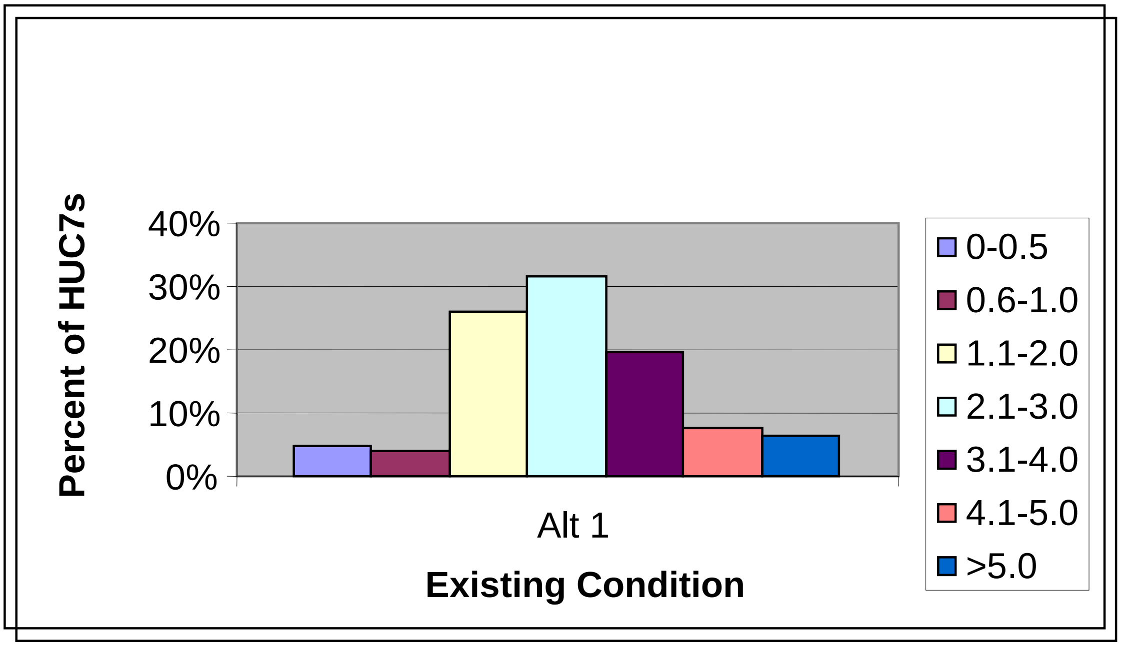

Figure 3.02-6. Native surface, motorized route ("Higher Risk Route") density within RCAs by Percent of HUC7 Watersheds on TNF

Existing Near Stream Route Densities

Earlier in this chapter "Higher Risk Routes" were defined as all native surface roads and motorized trails. Near stream "Higher Risk Route" densities such as the densities within Riparian Conservation Areas (RCAs) serve as a relative measure of hydrologic connectivity of routes and stream systems. Figure 3.02-6 shows "Higher Risk Route" densities within the RCAs that currently exist on the TNF and the percent of the TNF watersheds with the different density classes. The majority of watersheds on the TNF have RCA "Higher Risk Route" densities between one and four miles of route per square mile per square mile of RCA. The is the two to three miles per square mile category is found in slightly more than 30 percent of the TNF HUC7s. Twenty percent of the HUC7s have a RCA "Higher Risk Route" density of three to four miles per square mile. Around 25 percent of the watersheds have RCA "Higher Risk Route" densities of one to two miles per square mile.

To be consistent with the rest of the analysis in this section, RCA "Higher Risk Route" density is divided by quartiles. These quartiles are 0-1.5, 1.6-2.3, 2.4-3.5, and greater than 3.5. The existing RCA "Higher Risk Route" density by quartile and major river basin within the TNF are shown in Figure 3.02-7.

Figure 3.02-7 shows that the highest existing RCA "Higher Risk Route" densities on the TNF are found in the Truckee and Feather River Basins. These rivers are on the eastside of the TNF where the land is flatter and access to rivers, streams, lakes, and reservoirs is generally easier. The Middle Fork of the American River has the lowest RCA motorized, native surface route densities on the TNF.

Table 3.02-30 shows the density and miles of near stream "Higher Risk Route" density by major river basin. The Truckee River Basin has the highest existing near stream "Higher Risk Route" densities. The lowest near stream "Higher Risk Route" densities are found in the Bear River drainage.

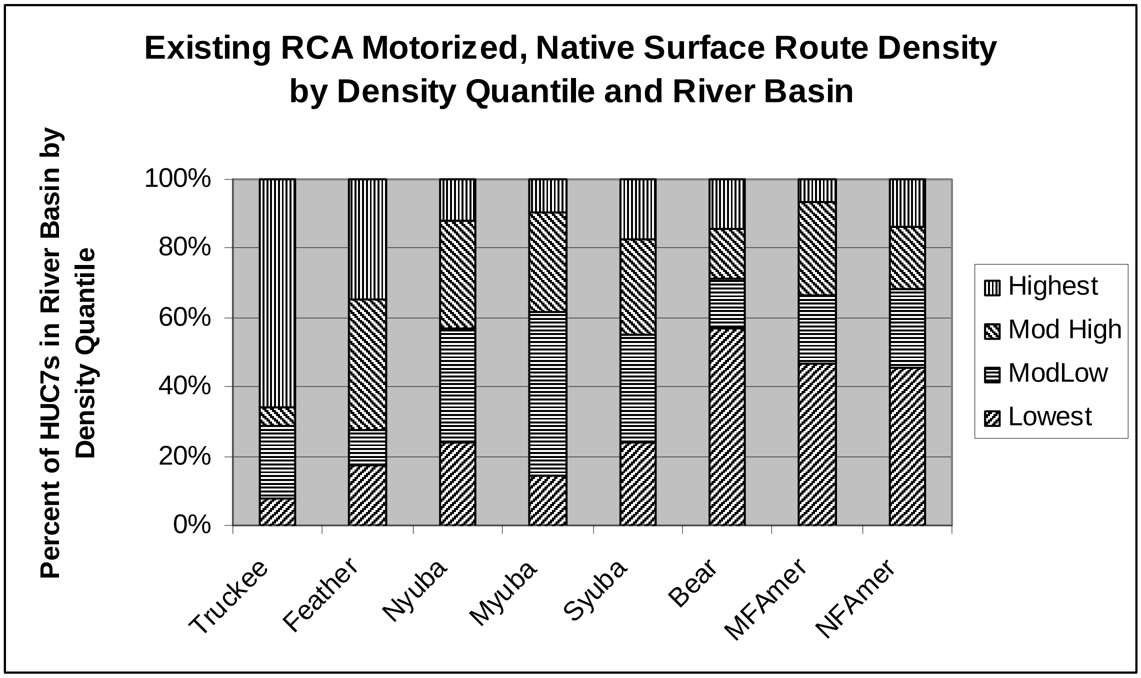

Figure 3.02-7. Existing RCA motorized, native surface ("Higher Risk Route") density by quartile and river basin

Table 3.02-30 "Higher Risk Route" density by major river basin

River Basin	Existing "Higher Risk Route" density (mi./sq. mi.)
Truckee River	4.4 (200.5)
Feather River	3.6 (62.3)
North Yuba River	2.5 (143.4)
Middle Yuba River	2.2 (33.0)
South Yuba River	2.6 (95.1)
Subtotal Yuba River	2.5 (271.5)
Bear River	1.6 (10.0)
Middle Fork American River	2.1(63.4)
North Fork American River	2.1 (66.5)
Subtotal American River	2.1 (130.0)
Total TNF	**2.8 (674.2)**

Existing Stream Crossing Density

Another common measure of hydrologically connected routes is "Higher Risk Route" stream crossing densities. Many "Higher Risk Route"-stream crossings have the potential to divert streamflow if drainage structures plug or fail. The number of crossings with diversion potential on the Tahoe National Forest is not known, so for the purpose of this analysis, all crossings are assumed to have diversion potential. The likelihood of diversions is therefore related to the numbers and densities of "Higher Risk Route" stream crossings.

The GIS layer used for the assessment of the ephemeral stream system has not been fully field verified. Field surveys associated with this project have not found as many crossings as predicted. So while the ephemeral stream crossing layer is used to guide the risk assessment for potential areas of concern, the assessment of projected stream crossing density is separated by type of crossing (perennial, intermittent, and ephemeral). Ephemeral streams are included in the RCA "Higher Risk Route" density analysis which should cover concerns for motorized "Higher Risk Route" use in these areas. Inventoried ephemeral crossings are also considered in this throughout this analysis.

Table 3.02-31 shows the density "Higher Risk Route" stream crossings by major river basin as measure in number of crossings per square mile of RCAs. The Feather River has the highest density of "Higher Risk Route" stream crossings. The North Fork American River has the lowest "Higher Risk Route" stream crossing density.

Table 3.02-31. "Higher Risk Route" stream crossings density by major river basin (number of crossings per square mile of RCAs)

River Basin	Existing "Higher Risk Route" stream crossing density
Truckee River	8.4
Feather River	13.7
North Yuba River	6.7
Middle Yuba River	8.4
South Yuba River	6.4
Subtotal Yuba River	7.0
Bear River	6.8
Middle Fork American River	6.8
North Fork American River	4.3
Subtotal American River	5.6
Total TNF	**7.5**

Table 3.02-32 shows the HUC7 watersheds with the greatest "Higher Risk Route" perennial and intermittent stream crossing densities. Twelve of the these watersheds are in the Truckee River Basin, four are in the Feather River, two in the North Yuba, one in the South Yuba and one in the Middle Fork American River.

Table 3.02-32. HUC7 Watersheds with the greatest existing "Higher Risk Route" perennial and intermittent stream crossing densities (number of crossings per square mile of RCAs)

HUC7 Watershed	Watershed Name	Existing Stream Crossing Density
16050102010201	Donner Lake	11.8
16050102010305	Prosser Creek Reservoir	14.2
16050102010403	Middle Martis Creek	17.4
16050102010405	Lower Martis Creek	14.5
16050102020203	Kyburz Flat	15.5
16050102020302	Lower Sagehen Creek	17.8
16050102020402	Upper Sardine Valley	17.3
16050102020404	Hoke Valley	9.9
16050102020405	Stampede Reservoir	18.6
16050102020501	Little Truckee River-Canyon	10.1
16050102020502	Russell Valley	20.6
16050102020503	Boca Reservoir	12.6
18020123020101	Smithneck Creek-Trosi Canyon	16.7
18020123020104	Upper Bear Valley Creek	15.7
18020123020301	Upper Cold Stream	13.7
18020123020304	Lower Cold Stream	20.7
18020125010506	Cherokee Creek	15.0
18020125010507	North Yuba River-Indian Creek	9.2
18020125040106	South Yuba River-Pierce Meadow	12.8
18020128060101	Upper North Shirttail Canyon	15.3

Existing Seasonal Closures

The condition of "Higher Risk Routes" 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 during the wet season can cause the break down of drainage control structures and increases the risk of runoff concentration and erosion; both from the tread surface and off the trail. 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 to wet season use. "Higher Risk Routes" are most susceptible to damage by motor vehicles when wet. Currently there are 3,388.7 miles of "Higher Risk Routes" that are open year round. Two hundred and thirty one miles of roads and trails are closed seasonally.

Existing Cross Country Travel

There are currently 717,900 acres containing 1,400 miles of motorized trails un-authorized for motorized use which are open to cross country travel on the Tahoe National Forest. Some of these motorized trails un-authorized for motorized use are stable and others are causing erosion and sediment delivery to water channels (See Appendix A, Road Cards). Existing cross-country prohibitions would continue on 86,500 acres.

Existing Equivalent Road Acres

The cumulative effects of this project on watershed resources are analyzed for the whole geographic area of the Tahoe National Forest are analyzed at several scales (Forest, HUC7 Watershed, and RCA (See Riparian Conservation Objective Analysis, Appendix R)). They represent the additive, incremental effects of past, present, and reasonably foreseeable future activities, actions, and decisions on the soil resource.

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 3.02-33 displays the number of watersheds and acres that are currently over the Threshold of Concern.

Table 3.02-33. Watersheds and acres that are currently over the Threshold of Concern

Threshold of Concern	Number of Watersheds	Acres
Over 100% Threshold of Concern	2	3,500
Under 100% Threshold of Concern	224	816,900

Currently there are two HUC7 watersheds that have been identified as being over TOC. These watersheds are Trout Creek and Alder Creek. The majority of the ERA disturbance in the Trout Creek and Alder Creek watersheds is due to the Tahoe Donner Subdivision on private land. This project does not propose to change the existing disturbance footprint, so the above referenced CWE results would still apply. Projects listed in Appendix Q (Wildlife Cumulative Effects) have been incorporated into this analysis.

Hydrology Environmental Consequences

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

Cross-country motorized vehicle travel increases the amount of native surface routes on the Tahoe National Forest. 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 "Higher Risk Routes" 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 "Higher Risk Routes" and private roads (with native surface) 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.

Methods Used to Assess Environmental Consequences

Metrics, such as, equivalent road acres, near stream route density, density of crossings, and/or presence of highly erodible sites/topography are being used to track changes in potential environmental effects to watershed resources. Tables of soil and watershed data used in this analysis can be found in Appendix D, Watershed Risk Assessment.

The approach used for analyzing watershed effects in this document relies on a road/trail-related erosion sensitivity analysis (EMDS Erosion Risk model), a watershed health assessment (a comparison of the route related stressors identified above), site-specific inventory data, and profession knowledge of the TNF summarized at the HUC7 watershed (2,500-10,000 acres), the River Basin, and the Forest scales.

This effects analysis considers all roads and motorized trails including private on the TNF, but focuses on "Higher Risk Routes" previously defined as native surface (dirt) roads and motorized trails.

Not incorporated in the focused analysis were surfaced roads, non-motorized trails, over-snow routes, private roads, and county and state roads.

Direct and Indirect Effects to Watershed Resources

Direct impacts to soils, 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 has 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 Tahoe National Forest 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 deliver 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 from the trail or road surface is a concern regarding loss or degradation of the facility, but not a particular concern for the watershed 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.

The most serious impacts of roads and motorized trails occur where they are in close proximity to streams or wetlands (See Road Cards, Appendix A and RCO Analysis, Appendix R. 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 alternatives would have indirect effects on 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* on routes; (2) areas add motorized trails to the NFTS with highly erosive soils; (3) affect types of *maintenance*; and (4) affect the potential for *recovery* and restoration.

Recovery: See Soils section above

Projected Effects on Watershed Resources on the TNF

Projected Water Supply (direct, indirect, cumulative)

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, none of the action alternatives would impact water supply.

Projected Water Quality

There are six water bodies on the Tahoe National Forest 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 (sediment and siltation) and Humbug Creek (lead, sediment, etc.). Table 3.02-34 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 abandon mines. There is no change under any of the alternatives to the number of abandon 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 motorized trail un-authorized for motorized use in this watershed. All of the action alternatives except Alternative 5 prohibit use of this trail by motorized vehicles. In Alternative 5 this motorized trail is added to the National Forest Transportation System (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 abandon mines in the area and the type of rock formations. None of the alternatives change the number of abandon 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 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 3.02-34. 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
		Abandon 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)	685	494	434	0	3	3	451
		National Forest System Native Surface Roads and Trails Open Seasonally (Miles)	0	0	0	449	598	488	0
		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 Priority Organics 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 motorized trail un-authorized for motorized use in this watershed. All of the action alternatives except Alternative 5 prohibit use of this trail 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.

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 Alternatives 4, 5 and 6 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 designated 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 designated as “Open Areas” for shoreline access by motorized vehicles in Alternative 2. The use of these dry lake beds by motorized vehicles is prohibited in Alternatives 3, 4, 5, 6 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 “Higher Risk Routes” within close proximity to streams are the areas of highest potential sediment delivery to the stream channel. Figure 3.02-8 shows “Higher Risk Route” perennial and intermittent stream crossing density by alternative. Figure 3.02-9 shows the “Higher Risk Route” density in RCAs by alternative. All action alternatives would decrease the density of "Higher Risk Routes" within RCAs and "Higher Risk Route" stream crossings.

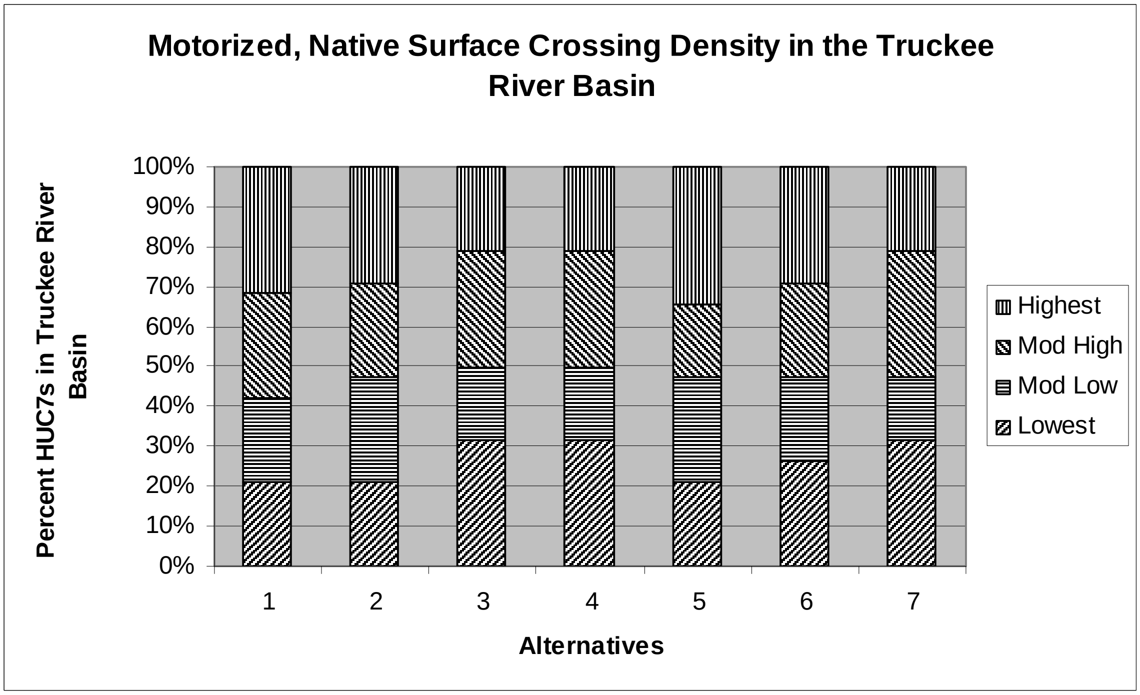

Figure 3.02-8. "Higher Risk Route" crossing density in the Truckee River Basin (within the TNF boundary) by Alternative

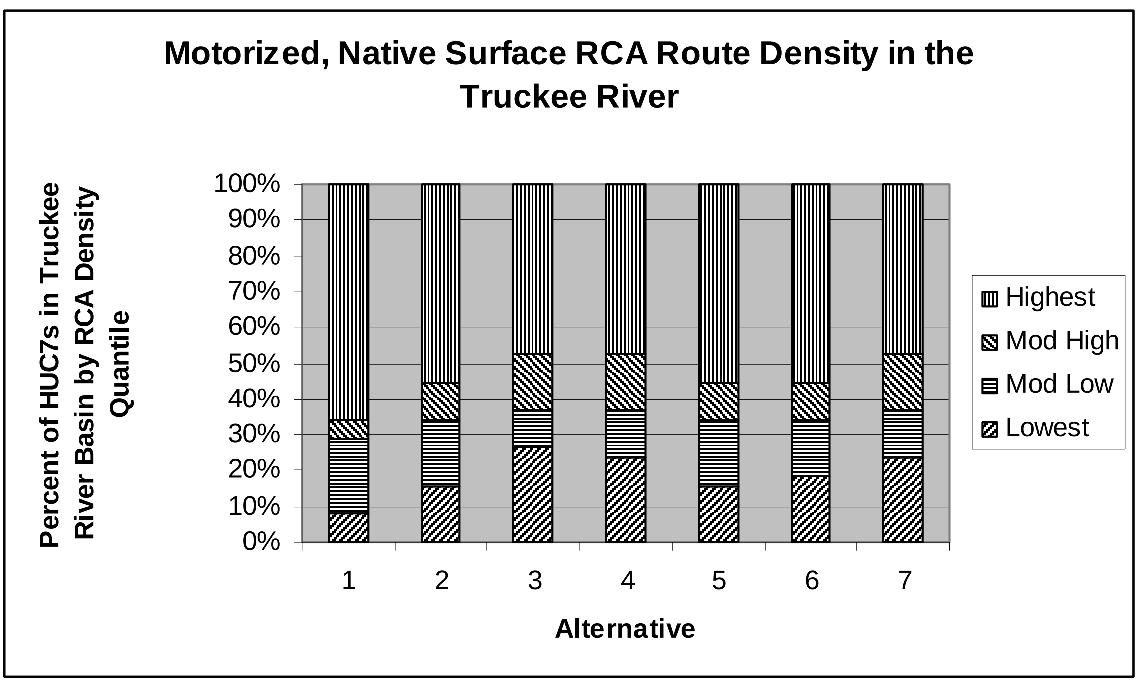

Figure 3.02-9. "Higher Risk Route" density in RCAs in the Truckee River Basin (within the TNF boundary) by Alternative

Projected Watershed Connectivity

Connectivity refers to the ease of movement, or rates of exchange, with which water, energy, nutrients, and organisms pass from one area to another, unhindered in the absence of impediments, such as dams, diversions, roads and bridges, large habitat openings, and recreational developments. As ecosystems become fragmented and disconnected, the scale and rate at which essential processes, such as nutrient and energy cycling and gene flow, operate become restricted. Effects on watershed connectivity are estimated using the following metrics:

- Near Stream Route Density and
- Stream Crossing Density

Projected Near Stream "Higher Risk Route" density

Densities of native surface roads and motorized trails ("Higher Risk Routes") within Riparian Conservation Areas (RCAs) serve as a relative measure of watershed connectivity. The greater the density of "Higher Risk Routes" open to motorized vehicles within RCAs, the greater the potential risk to watershed connectivity.

Table 3.02-35 shows the density of "Higher Risk Routes" within RCAs by major river basin and alternative. The No Action alternative (Alternative 1) has the greatest density of "Higher Risk Routes" within RCAs. All action alternatives would result in a lower density of "Higher Risk Routes" in RCAs than in the existing condition (Alt. 1). Alternatives 3, 4 and 7 would have the lowest density of "Higher Risk Routes" in RCAs. Alternative 6 densities would be slightly higher than alternatives 3, 4 and 7. Alternatives 2 and 5 would result in the largest density of "Higher Risk Routes" in RCAs of all the action alternatives.

Table 3.02-35. "Higher Risk Route" density in RCAs by river basin and alternative (mi./sq. mi.)

River Basin	HUC 7 Watershed Acres	RCA Acres	Alt. 1 Density	Alt. 2 Density	Alt. 3 Density	Alt. Density	Alt. 5 Density	Alt. 6 Density	Alt. 7 Density
Truckee River	135,794	28,912	3.2	2.5	2.3	2.3	2.5	2.4	2.3
Feather River	57,896	11,091	1.8	1.7	1.2	1.3	1.7	1.5	1.3
North Yuba River	152,490	36,322	1.7	1.2	1.0	1.0	1.5	1.1	1.0
Middle Yuba River	47,291	9549	0.9	0.6	0.5	0.6	0.6	0.6	0.5
South Yuba River	104,205	23,813	1.6	1.5	1.3	1.3	1.5	1.5	1.3
Subtotal Yuba River	**303,986**	**69,684**	**1.5**	**1.2**	**1.0**	**1.0**	**1.3**	**1.1**	**1.0**
Bear River	12,452	3909	1.1	1.0	0.7	0.8	1.1	1.0	0.8
Middle Fork American River	87,674	19,070	1.2	1.2	1.0	1.0	1.3	1.1	1.0
North Fork American River	92,713	20,159	1.5	1.2	1.1	1.1	1.2	1.1	1.1
Subtotal American River	**180,387**	**39,229**	**1.3**	**1.2**	**1.0**	**1.0**	**1.2**	**1.1**	**1.0**
Total TNF	**1,174,888**	**261,738**	**1.7**	**1.4**	**1.2**	**1.2**	**1.5**	**1.4**	**1.2**

For the purposes of this analysis, a density of more than 3.5 miles per square mile of "Higher Risk Routes" within Riparian Conservation Areas was considered to be a high density (highest existing density quartile). Table 3.02-36 and Figure 3.02-10 shows the percent of watersheds on the TNF with the highest and lowest "Higher Risk Route" densities in RCAs. The percent of watersheds with RCA "Higher Risk Route" densities less than 1.6 miles per square mile of RCA (lowest density) would increase from the existing 26 percent to 40 to 50 percent in the action alternatives. The river basins with higher RCA route densities would have higher risk of negative watershed effects than areas of lower RCA route densities.

- Alternative 1 (No Action) would maintain the existing 26 percent of HUC7 watersheds with RCA "Higher Risk Route" densities that less than 1.6 miles per square mile and 24 percent with RCA "Higher Risk Route" densities that exceed 3.5 miles per square mile.
- Alternative 2 would result in 41 percent of HUC7 watersheds with RCA "Higher Risk Route" densities that are less than 1.6 miles per square mile and 19 percent with RCA "Higher Risk Route" densities that exceed 3.5 miles per square mile.
- Alternative 3 would result in 51 percent of HUC7 watersheds with RCA "Higher Risk Route" densities that are less than 1.6 miles per square mile and 14 percent with RCA "Higher Risk Route" densities that exceed 3.5 miles per square mile.
- Alternatives 4 and 7 would result in 50 percent of HUC7 watersheds with RCA "Higher Risk Route" densities that are less than 1.6 miles per square mile and 14 percent with RCA "Higher Risk Route" densities that exceed 3.5 miles per square mile.
- Alternative 5 would result in 40 percent of HUC7 watersheds with RCA "Higher Risk Route" densities that are less than 1.6 miles per square mile and 20 percent with RCA "Higher Risk Route" densities that exceed 3.5 miles per square mile.
- Alternative 6 would result in 44 percent of HUC7 watersheds with RCA "Higher Risk Route" densities that are less than 1.6 miles per square mile and 16 percent with RCA "Higher Risk Route" densities that exceed 3.5 miles per square mile.

All action alternatives would lower the potential impacts to soil and watershed resources by decreasing the amount of all season motorized use on unmaintained routes in RCAs.

Table 3.02-36. Percent of watersheds with "Higher Risk Route" density greater than 3.5 and less than 1.6 miles per square mile in Riparian Conservation Areas

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Percent of Watersheds with a high density (>3.5 Miles/Square Mile) of "Higher Risk Routes" In Riparian Conservation Areas	24%	19%	14%	14%	20%	16%	14%
Percent of Watersheds with a low density (<1.6 Miles/Square Mile) of "Higher Risk Routes" In Riparian Conservation Areas	26%	41%	51%	50%	40%	44%	50%

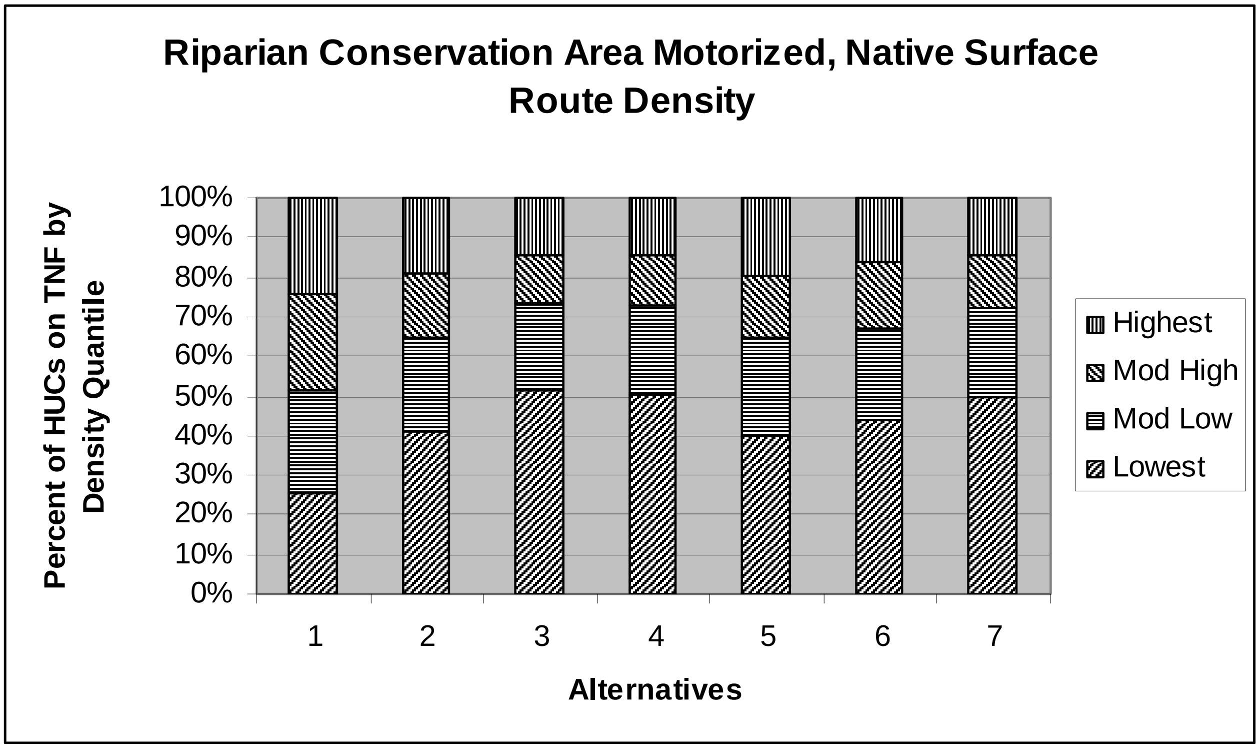

Figure 3.02-10. Density of "Higher Risk Routes" (Miles per Square Mile) in Riparian Conservation Areas

Riparian Conservation Area Route Density

Prohibition on Cross Country Travel: All of the action alternatives prohibit cross country travel. This prohibition will reduce the "Higher Risk Route" density in Riparian Conservation Areas (RCAs) in all watersheds across the forest. It would also prevent the proliferation of any new motorized trails un-authorized for motorized use which could increase "Higher Risk Route" density in RCAs. The impacts on "Higher Risk Route" density in RCAs resulting from the prohibition on cross country travel is displayed in Table 3.02-37. All action alternatives would decrease the density of "Higher Risk Routes" in RCAs by less than 1 mile per square mile. The largest decreases in all action alternatives are found in the Truckee River Basin (0.9 mi/sq mi). Decreases in "Higher Risk Route" density in RCAs would average 0.3 miles/square mile in the American and Bear River Basins and 0.5 miles/square mile in the Yuba River Basin. The prohibition of cross country travel would also decrease the average "Higher Risk Route" density in RCAs across the Tahoe National Forest by 0.5 mi/ square mile.

Table 3.02-37. Changes in "Higher Risk Route" density in Riparian Conservation Areas (RCAs) by river basin due to the prohibition of cross country travel (mi./sq. mi.)

River Basin	RCA Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	28,912	0.0	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9
Feather River	11,091	0.0	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
North Yuba River	36,322	0.0	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
Middle Yuba River	9549	0.0	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
South Yuba River	23,813	0.0	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Subtotal Yuba River	**69,684**	**0.0**	**-0.5**	**-0.5**	**-0.5**	**-0.5**	**-0.5**	**-0.5**
Bear River	3909	0.0	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Middle Fork American River	19,070	0.0	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
North Fork American River	20,159	0.0	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
Subtotal American River	**39,229**	**0.0**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**	**-0.3**
Total TNF	**261,738**	**0.0**	**-0.5**	**-0.5**	**-0.5**	**-0.5**	**-0.5**	**-0.5**

Motorized Trail Additions to the National Forest Transportation System (NFTS). There are no motorized trail additions to the NFTS under Alternative 1. The action alternatives would add between 31.2 and 282.8 miles of native surface, motorized trails to the NFTS. Motorized trail additions to the NFTS would have minimal effects to soil resources, because these trails are already part of the disturbance footprint and would be managed according to TNF trail and resource standards. Appendix A, Road Cards, has the mitigation requirements that are needed to add the motorized trails to the NFTS with minimal impacts to soil resources.

Table 3.02-38 displays changes in "Higher Risk Route" density in RCAs due to motorized trail additions to the NFTS. There would be no change to the current "Higher Risk Route" density in due to additions to the NFTS under Alternatives 1 and 3. Alternatives 4 and 7 would result in increases of 0.1 mile per square mile in the Truckee and Yuba River basins. Alternative 6 would increase "Higher Risk Route" density in RCAs by 0.1-0.5 miles per square mile in all watersheds. Alternatives 2 and 5 would increase "Higher Risk Route" density in RCAs by 0.2-0.9 miles per square mile in all watersheds.

Table 3.02-38. Changes in "Higher Risk Route" density in Riparian Conservation Areas (RCAs) due to motorized trail additions to the National Forest Transportation System (mi./sq. mi.)

River Basin	RCA Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	28,912	0.0	0.3	0.0	0.1	0.4	0.2	0.1
Feather River	11,091	0.0	0.9	0.0	0.0	0.9	0.4	0.0
North Yuba River	36,322	0.0	0.4	0.0	0.0	0.7	0.2	0.0
Middle Yuba River	9549	0.0	0.0	0.0	0.0	0.1	0.0	0.0
South Yuba River	23,813	0.0	0.3	0.0	0.0	0.3	0.2	0.0
Subtotal Yuba River	**69,684**	**0.0**	**0.5**	**0.0**	**0.1**	**0.5**	**0.5**	**0.1**
Bear River	3909	0.0	0.3	0.0	0.0	0.5	0.2	0.0
Middle Fork American River	19,070	0.0	0.2	0.0	0.0	0.2	0.1	0.0
North Fork American River	20,159	0.0	0.2	0.0	0.0	0.2	0.0	0.0
Subtotal American River	**39,229**	**0.0**	**0.2**	**0.0**	**0.0**	**0.2**	**0.1**	**0.0**
Total TNF	**261,738**	**0.0**	**0.2**	**0.0**	**0.0**	**0.2**	**0.2**	**0.0**

Changes to Class of Vehicles and/or Season of Use: Changing the class of vehicle allowed to use a particular NFTS road from "Highway Legal Vehicles Only" to "All Vehicles" could change the impacts to soil and watershed resources due to the change in road surface. Therefore, these roads are considered high risk 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. 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 road. 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 for resource needs no matter what maintenance level. Table 3.02-39 displays changes in "Higher Risk Route" density in RCAs due to changes in class of vehicles on existing NFTS roads by alternative. No changes to class of vehicles in Alternatives 1, 3, 4 and 7. Alternatives 2, 5, and 6 would result in an increase of 0.1 miles per square mile in the Feather River basin and 0.2 miles per square mile over the entire Tahoe National Forest.

Native surface roads and trails ("Higher Risk Routes") are most susceptible to damage by motor vehicles when wet. The condition of "Higher Risk Routes" can quickly decline during winter or wet weather use due to rutting. Wet season use of "Higher Risk Routes" 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 "Higher Risk Routes".

Implementing seasonal closures would reduce rutting and subsequent channeling of surface water runoff. Seasonal closures would decrease the potential effects of motorized vehicle use on "Higher Risk Routes" by decreasing erosion and sedimentation.

Alternatives 1, 2, 3 and 7 all have the vast majority of "Higher Risk Routes" open year round and, therefore, have a higher risk to watershed resources. The wet weather seasonal closures imposed in

Alternatives 4, 5 and 6 results in all of the “Higher Risk Routes” being closed during the wet time of the year, thus greatly reducing potential negative impacts to soil resources and to water quality. The benefits of seasonal closures would be equal to prohibition on cross country travel and would by far exceed adding between 31.2 and 282.8 miles of native surface, motorized trails (with an existing disturbance footprint) into the NFTS.

Table 3.02-39. Changes “Higher Risk Route” density within Riparian Conservation Areas due to changes in the class of vehicle on existing NFTS roads (mi./sq. mi.)

River Basin	RCA Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	28,912	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Feather River	11,091	0.0	0.1	0.0	0.0	0.1	0.1	0.0
North Yuba River	36,322	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Yuba River	9549	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Yuba River	23,813	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal Yuba River	**69,684**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Bear River	3909	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Fork American River	19,070	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Fork American River	20,159	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal American River	**39,229**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
Total TNF	**261,738**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Cumulative Effects: This project would not change the footprint of current wheel-tracks on the Tahoe National Forest. All action alternatives would result in a net reduction in “Higher Risk Route” density in Riparian Conservation Areas (RCAs) across all river basins. All action alternatives would result in a very slight decrease in the risk of negative cumulative effects to watersheds. The cumulative impacts on “Higher Risk Route” density in RCAs resulting from this project are displayed in Table 3.02-40. Alternative 1 represents the existing condition. Alternatives 2 through 7 would represent the risk at twenty years (when motorized trails prohibited to motorized use would have recovered hydrologically). The action alternatives would decrease “Higher Risk Route” density in RCAs by 0.7 to 0.9 miles per square mile in the Truckee River basin, 0.1 to 0.6 miles per square mile in the Feather River basin, 0.2 to 0.5 miles per square mile in the Yuba River basin, 0.1 to 0.4 miles per square mile in the Bear River basin, 0.1 to 0.3 miles per square mile in the American River basin and 0.2 to 0.5 miles per square mile across the Tahoe National Forest. Alternative 1would have the highest risk of negative cumulative effects followed by Alternative 2, Alternative 5, Alternative 6, Alternative 4, Alternative 7, then Alternative 3 in order of highest to lowest potential impact. The differences in the risk of negative impacts between some of the alternatives would be hard to measure.

Table 3.02-40. Cumulative "Higher Risk Route" density in Riparian Conservation Areas after 20 years (mi./sq./mi.)

River Basin	RCA Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	28,912	3.2	2.5	2.3	2.3	2.5	2.4	2.3
Feather River	11,091	1.8	1.7	1.2	1.3	1.7	1.5	1.3
North Yuba River	36,322	1.7	1.2	1.0	1.0	1.5	1.1	1.0
Middle Yuba River	9549	0.9	0.6	0.5	0.6	0.6	0.6	0.5
South Yuba River	23,813	1.6	1.5	1.3	1.3	1.5	1.5	1.3
Subtotal Yuba River	**69,684**	**1.5**	**1.2**	**1.0**	**1.0**	**1.3**	**1.1**	**1.0**
Bear River	3909	1.1	1.0	0.7	0.8	1.1	1.0	0.8
Middle Fork American River	19,070	1.2	1.2	1.0	1.0	1.3	1.1	1.0
North Fork American River	20,159	1.5	1.2	1.1	1.1	1.2	1.1	1.1
Subtotal American River	**39,229**	**1.3**	**1.2**	**1.0**	**1.0**	**1.2**	**1.1**	**1.0**
Total TNF	**261,738**	**1.7**	**1.4**	**1.2**	**1.2**	**1.5**	**1.4**	**1.2**

Projected Stream Crossing Density

Another common measure of hydrologically connected routes is stream crossing densities within Riparian Conservation Areas. A higher density of stream crossings in Riparian Conservation Areas (RCAs) has the potential to adversely impact water quality. There are approximately 21,347 motorized stream crossings currently on the forest (2,175 perennial, 2,064 intermittent, and 17,108 ephemeral). As discussed in the Existing Environment section, the GIS layer used for the assessment of the ephemeral stream system has not been field verified. Field surveys associated with this project have not found as many crossings as predicted. So while the ephemeral stream crossing layer is used to guide the risk assessment for potential areas of concern, it is not being used in the assessment of projected stream crossing density. Ephemeral streams are included in the RCA route density analysis which should cover concerns for motorized, native surface road and trail use in these areas. Inventoried ephemeral crossings are also considered in this throughout this analysis.

This analysis focuses on native surface roads and trails open for motorized use previously defined as ""Higher Risk Routes"." 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 be more stable.

Table 3.02-41 shows the density of "Higher Risk Route" stream crossings in RCAs by major river basin. The No Action alternative (Alternative 1) has the greatest density of "Higher Risk Route" stream crossings in RCAs. All action alternatives would result in a lower density of "Higher Risk Route" stream crossings in RCAs than in the existing condition (Alt. 1). Alternatives 3, 4 and 7 would have the lowest density of "Higher Risk Route" stream crossings in RCAs. Alternative 6 densities would be slightly higher than Alternatives 3, 4 and 7. Alternatives 2 and 5 would result in the highest stream crossing densities of the action alternatives.

Table 3.02-41. "Higher Risk Route" stream crossing density in Riparian Conservation Areas (number of crossings per square mile of RCAs)

River Basin	River Basin Acres	RCA Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	200,500	40,495	8.4	7.5	6.8	6.9	7.6	7.3	6.9
Feather River	112,534	21,927	13.7	12.6	10.2	10.4	12.6	11.8	10.4
North Yuba River	229,995	55,169	6.7	5.7	3.8	3.8	6.5	4.3	3.8
Middle Yuba River	126,370	24,674	8.4	7.1	6.3	6.3	7.1	7.1	6.3
South Yuba River	170,886	36,943	6.4	5.9	5.0	5.0	5.9	5.6	5.0
Subtotal Yuba River	**527,252**	**116,786**	**7.0**	**6.0**	**4.7**	**4.7**	**6.5**	**5.3**	**4.7**
Bear River	20,112	6,067	6.8	5.3	4.3	4.5	5.3	5.3	4.5
Middle Fork American River	146,533	32,590	6.8	6.5	5.5	5.5	7.0	6.3	5.5
North Fork American River	133,107	29,303	4.3	3.5	3.1	3.1	3.5	3.5	3.1
Subtotal American River	**279,639**	**61,893**	**5.6**	**5.1**	**4.4**	**4.4**	**5.3**	**4.9**	**4.4**
Total TNF	**1,946,928**	**247,169**	**7.5**	**6.6**	**5.4**	**5.5**	**6.9**	**6.1**	**5.5**

To be consistent with the rest of the analysis in this section, watersheds were separated into quartiles based on the density of miles open for motorized use of "Higher Risk Routes" as described earlier. These categories are:

Level of Risk	**"Higher Risk Route" density by Watershed** (mi./sq. mi.)
Highest	10.3 Plus
High Risk	6.7 to 10.3
Low Risk	3.9 to 6.6
Lowest Risk	0 to 3.8

Table 3.02-42 shows the watersheds with the highest existing "Higher Risk Route" perennial and intermittent stream crossings densities and the changes in crossing density with each of the action alternative. Thirteen watersheds would have a decrease in crossing densities in all action alternatives. In the South Yuba River-Pierce Meadow watershed crossing densities would stay the same through all action alternatives. One watershed (North Yuba River- Indian Creek) would have an increase in crossing density in Alternatives 2 and 5. The increase in crossing density is due to changes in class of vehicles on existing NFTS roads from "Open to Highway Legal Vehicles Only" to "Open to All Vehicles" and the associated change in road surface.. Five watersheds (Lower Sagehen Creek, Hoke Valley, Little Truckee River-Canyon, Upper Cold Stream, and Lower Cold Stream) would have higher crossing densities in Alternatives 2, 5, and 6 also due to changes in class of vehicles on existing NFTS roads from "Open to Highway Legal Vehicles Only" to "Open to All Vehicles" and the associated change in road surface.

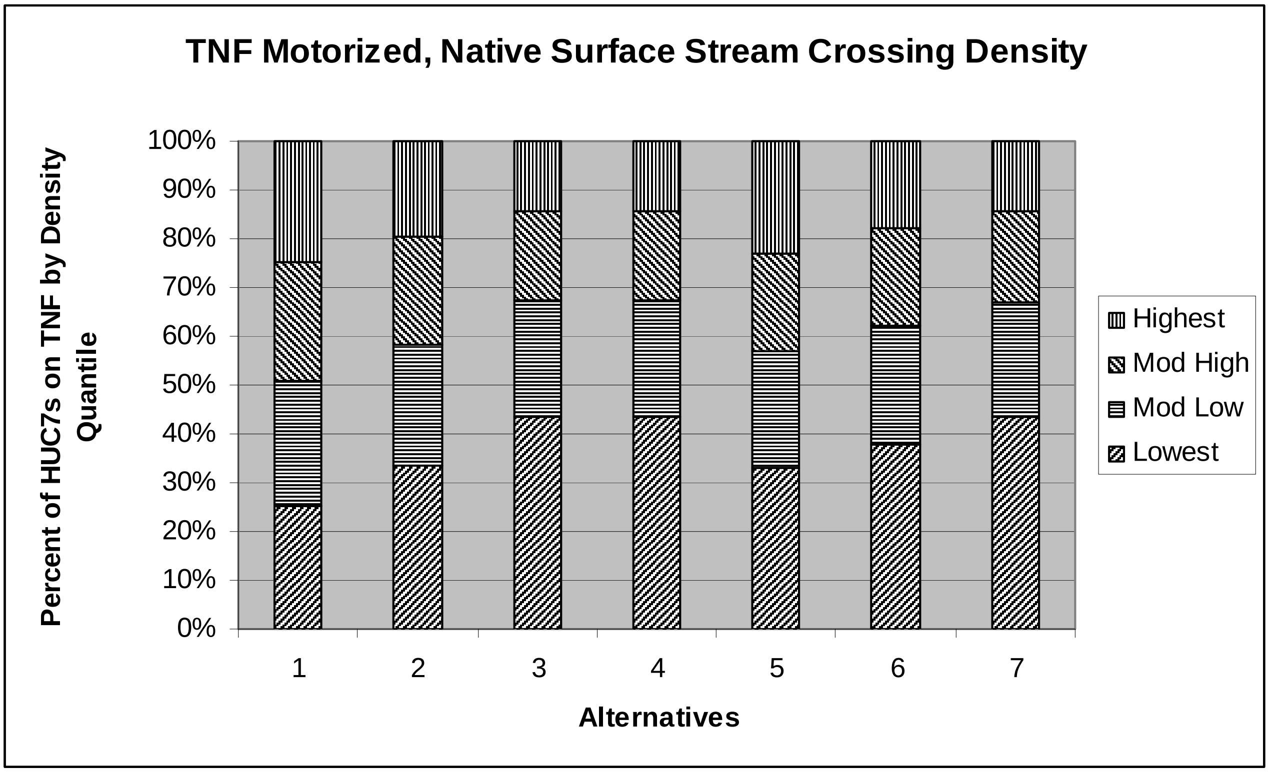

Figure 3.02-11. "Higher Risk Route" perennial and intermittent stream crossing density (crossings per square mile of Riparian Conservation Area)

Figure 3.02-11. shows that all action alternatives would decrease the density of perennial and intermittent "Higher Risk Route" crossings. Alternative 3 would result in the largest decrease in "Higher Risk Route" crossing density and Alternative 5 the smallest decrease.

Table 3.02-42. "Higher Risk Route" crossing density in Riparian Conservation Areas (RCAs) by alternative (crossings/sq. mi. of RCAs)

HUC7 Number	Watershed Name	Alt 1 Density	Alt 2 Density	Alt 3 Density	Alt 4 Density	Alt 5 Density	Alt 6 Density	Alt 7 Density
16050102010201	Donner Lake	11.8	11.1	11.1	11.1	11.1	11.1	11.1
16050102010305	Prosser Creek Reservoir	14.2	10.1	10.1	10.1	10.5	10.1	10.1
16050102010403	Middle Martis Creek	17.4	17.4	17.4	17.4	17.4	17.4	17.4
16050102010405	Lower Martis Creek	14.5	14.5	14.5	14.5	14.5	14.5	14.5
16050102020203	Kyburz Flat	15.5	12.8	12.8	12.8	12.8	12.8	12.8
16050102020302	Lower Sagehen Creek	17.8	20.4	16.5	16.5	20.4	20.4	16.5
16050102020402	Upper Sardine Valley	17.3	12.4	12.4	12.4	12.4	12.4	12.4
16050102020404	Hoke Valley	9.9	12.4	6.2	6.2	12.4	12.4	8.7
16050102020405	Stampede Reservoir	18.6	10.1	8.9	10.1	10.4	10.1	10.1
16050102020501	Little Truckee River-Canyon	10.1	11.3	7.4	7.8	11.6	11.3	7.8

HUC7 Number	Watershed Name	Alt 1 Density	Alt 2 Density	Alt 3 Density	Alt 4 Density	Alt 5 Density	Alt 6 Density	Alt 7 Density
16050102020502	Russell Valley	20.6	17.7	17.3	17.3	18.1	17.7	17.3
16050102020503	Boca Reservoir	12.6	11.2	10.2	10.2	11.2	11.2	10.2
18020123020101	Smithneck Creek-Trosi Canyon	16.7	14.4	13.8	14.4	14.4	14.4	14.4
18020123020104	Upper Bear Valley Creek	15.7	15.7	10.0	10.0	15.7	10.0	10.0
18020123020301	Upper Cold Stream	13.7	14.6	10.0	10.0	14.6	14.6	10.0
18020123020304	Lower Cold Stream	20.7	30.6	16.2	18.0	30.6	26.1	18.0
18020125010506	Cherokee Creek	15.0	5.4	3.6	3.6	13.8	7.8	3.6
18020125010507	North Yuba River-Indian Creek	9.2	13.1	6.8	6.8	13.1	6.8	6.8
18020125040106	South Yuba River-Pierce Meadow	12.8	12.8	12.8	12.8	12.8	12.8	12.8
18020128060101	Upper North Shirttail Canyon	15.3	10.7	10.7	10.7	10.7	10.7	10.7

All Action Alternatives would reduce the density of “Higher Risk Route” stream crossings and thus improve water quality conditions. All Action alternatives would decrease the percent of HUC7 watershed on the Tahoe National Forest with the highest density category of stream crossings in Riparian Conservation Areas. Conversely all of the action alternatives increase the percent of watershed in the lowest category of stream crossing density in Riparian Conservation Areas. Alternatives 3 and 4 would have the largest potential improvement in water quality conditions. Alternative 5 would have the smallest improvement.

“Higher Risk Route” Perennial and Intermittent Stream Crossing Density in Riparian Conservation Areas (RCAs)

Prohibition on Cross Country Travel: All of the action alternatives prohibit cross country travel. This prohibition will reduce the density “Higher Risk Route” perennial and intermittent stream crossings in RCAs in all watersheds across the forest. It would also prevent the proliferation of any new motorized trails un-authorized for motorized use which could increase stream crossing density. The impacts on “Higher Risk Route” stream crossing density in riparian conservation areas resulting from the prohibition on cross country travel is displayed in Table 3.02-43. The action alternatives would decrease the crossing density in the Truckee River basin by 1.7 crossings per square mile of riparian conservation area, the Feather River basin by 3.5 crossings per square mile, the Bear River basin by 2.4 crossings per square mile, the Yuba River basin by 2.3 crossings per square mile, the American river basin by 1.3 crossings per square mile, and 2.0 crossings per square mile on the Tahoe National Forest.

Table 3.02-43. Changes in "Higher Risk Route" stream crossing density in RCAs by river basin due to the prohibition of cross country travel (crossing/sq. mi.)

River Basin	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	0.0	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7
Feather River	0.0	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
North Yuba River	0.0	-2.9	-2.9	-2.9	-2.9	-2.9	-2.9
Middle Yuba River	0.0	-2.1	-2.1	-2.1	-2.1	-2.1	-2.1
South Yuba River	0.0	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
Subtotal Yuba River	**0.0**	**-2.3**	**-2.3**	**-2.3**	**-2.3**	**-2.3**	**-2.3**
Bear River	0.0	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4
Middle Fork American River	0.0	-1.3	-1.3	-1.3	-1.3	-1.3	-1.3
North Fork American River	0.0	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2
Subtotal American River	**0.0**	**-1.3**	**-1.3**	**-1.3**	**-1.3**	**-1.3**	**-1.3**
Total TNF	**0.0**	**-2.0**	**-2.0**	**-2.0**	**-2.0**	**-2.0**	**-2.0**

Motorized Trail Additions to the National Forest Transportation System (NFTS): There are no motorized trail additions to the NFTS under Alternative 1. The action alternatives would add between 31.2 and 282.8 miles of "Higher Risk Routes" to the National Forest Transportation System as motorized trails. Additions to the system would have minimal effects to soil resources, because these "Higher Risk Routes" are already part of the disturbance footprint and would be managed according to TNF trail and resource standards. Appendix A, Road Cards, has mitigations that are needed to add the motorized trails to the NFTS with minimal impacts to soil resources.

Table 3.02-44 displays changes in "Higher Risk Route" stream crossing density in RCAs due to motorized trail additions to the NFTS by alternative. There would be no change the current stream crossing density due to motorized trail additions to the NFTS under Alternatives 1 and 3. Alternatives 4 and 7 would result in increases of 0.1 "Higher Risk Route" crossings per square mile of RCAs in the Truckee and Feather River basins and 0.2 "Higher Risk Route" crossings per square mile of RCAs in the Yuba River basins. Alternative 6 would increase "Higher Risk Route" RCA crossing density by 0.4-0.8 crossings per square mile in all watersheds. Alternatives 2 and 5 would increase "Higher Risk Route" stream crossing density in RCAs by 0.4-1.6 crossings per square mile in all watersheds. In the North Yuba River, Alternative 5 would increase "Higher Risk Route" stream crossing density by 2.6 crossings per square mile of RCAs.

Table 3.02-44. Changes in "Higher Risk Route" stream crossing density in Riparian Conservation Areas (RCAs) due to motorized trail additions to the National Forest Transportation System (crossing/sq. mi.)

River Basin	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	0.0	0.6	0.0	0.1	0.6	0.3	0.1
Feather River	0.0	1.6	0.0	0.1	1.6	0.8	0.1
North Yuba River	0.0	1.7	0.0	0.0	2.6	0.4	0.0
Middle Yuba River	0.0	0.4	0.0	0.0	0.5	0.4	0.0
South Yuba River	0.0	0.8	0.0	0.0	0.9	0.5	0.0
Subtotal Yuba River	**0.0**	**1.2**	**0.0**	**0.0**	**1.6**	**0.4**	**0.0**
Bear River	0.0	0.4	0.0	0.2	0.4	0.4	0.2
Middle Fork American River	0.0	0.7	0.0	0.0	1.2	0.5	0.0
North Fork American River	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal American River	**0.0**	**0.5**	**0.0**	**0.0**	**0.8**	**0.4**	**0.0**
Total TNF	**0.0**	**0.9**	**0.0**	**0.0**	**1.2**	**0.4**	**0.1**

Changes to Class of Vehicles and/or Season of Use: Changing the class of vehicle allowed to use a particular National Forest Transportation System (NFTS) road could change the impacts to watershed resources due to the change in road surface. Therefore, these NFTS roads are considered become high risk even though they already have "hardened" surfaces that lack vegetation. It is likely that direct impacts to watershed resources occurred when the road was constructed. Impact 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 road 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 for resource needs no matter what maintenance level. Table 3.02-45 displays the changes in High Risk stream crossing density in RCAs due to changes in class of vehicle by alternative. No changes to class of vehicles would occur in Alternatives 1 and 3. Alternatives 2, 5, and 6 would result in increases of 0.2 to 0.8 stream crossings per square mile of RCAs in the all river basins and 0.3 crossings per square mile over the entire Tahoe National Forest.

Native surface roads and trails ("Higher Risk Routes") are most susceptible to damage by motor vehicles when wet. The condition of "Higher Risk Routes" can quickly decline during winter or wet weather use due to rutting. Wet season use of "Higher Risk Routes" often leaves ruts which channel water and increase the erosive power of that water, this can lead to increased erosion both on and adjacent to the "Higher Risk Route". Many of the impacts found during field surveys were caused by wet season use of "Higher Risk Routes". Implementing seasonal closures would reduce rutting and subsequent channeling of surface water runoff. Seasonal closures would decrease the potential effects of motorized vehicle use on "Higher Risk Routes" by decreasing erosion and sedimentation. The benefits of seasonal closures would be equal to prohibition on cross country travel and would by far exceed adding between 31.2 and 282.8 miles of "Higher Risk Routes" (with an existing disturbance footprint) into the NFTS. Alternatives 1, 2, 3 and 7 all have the vast majority of "Higher Risk Routes" open year round and, therefore, have a higher risk to watershed resources. The wet weather seasonal closures imposed in Alternatives 4, 5 and 6 results in all of the "Higher Risk Routes" being closed during the wet time of the year, thus greatly reducing potential negative impacts to soil resources and to water quality.

Table 3.02-45. Changes in "Higher Risk Route" stream crossing density in RCAs due to changes in class of vehicle on existing National Forest Transportation roads. (crossings/sq. mi.)

River Basin	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	0.0	0.3	0.0	0.0	0.3	0.3	0.0
Feather River	0.0	0.8	0.0	0.0	0.8	0.8	0.0
North Yuba River	0.0	0.2	0.0	0.0	0.2	0.2	0.0
Middle Yuba River	0.0	0.4	0.0	0.0	0.4	0.4	0.0
South Yuba River	0.0	0.1	0.0	0.0	0.1	0.1	0.0
Subtotal Yuba River	**0.0**	**0.2**	**0.0**	**0.0**	**0.2**	**0.2**	**0.0**
Bear River	0.0	0.5	0.0	0.0	0.5	0.5	0.0
Middle Fork American River	0.0	0.4	0.0	0.0	0.4	0.4	0.0
North Fork American River	0.0	0.3	0.0	0.0	0.3	0.3	0.0
Subtotal American River	**0.0**	**0.2**	**0.0**	**0.0**	**0.2**	**0.2**	**0.0**
Total TNF	**0.0**	**0.3**	**0.0**	**0.0**	**0.3**	**0.3**	**0.0**

Cumulative Effects: This project would not change the footprint of current wheel-tracks on the Tahoe National Forest. All action alternatives would result in a net reduction in "Higher Risk Route" perennial and intermittent stream crossing density in all river basins. All action alternatives would result in a very slight decrease in the risk of negative cumulative effects to watersheds. The cumulative impacts on "Higher Risk Route" stream crossing density in RCAs resulting from this project are displayed in Table 3.02-46. Alternative 1 represents the existing condition. Alternatives 2 through 7 would represent the "Higher Risk Route" Stream crossing density in RCAs after twenty years (when "Higher Risk Routes" not added to the National Forest Transportation System would have recovered hydrologically). The action alternatives would decrease "Higher Risk Route" stream crossing density by 0.8 to 1.2 crossings miles per square mile in the Truckee River basin, 1.1 to 3.5 crossings per square mile in the Feather River basin, 1.0 to 2.3 crossings per square mile in the Yuba River basin, 1.5 to 2.5 crossings per square mile in the Bear River basin, 0.3 to 1.2 crossings per square mile in the American River basin and 0.6 to 2.1 crossings per square mile on the Tahoe National Forest.

Table 3.02-46. "Higher Risk Route" stream crossing density in Riparian Conservation Areas after 20 years due to cumulative effects of all proposed actions (crossings/sq. mi.)

River Basin	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	8.4	7.6	6.8	6.9	7.6	7.3	6.9
Feather River	13.7	12.6	10.2	10.4	12.6	11.8	10.4
North Yuba River	6.7	5.7	3.8	3.8	6.5	4.3	3.8
Middle Yuba River	8.4	7.1	6.3	6.3	7.1	7.1	6.3
South Yuba River	6.4	5.9	5.0	5.0	5.9	5.6	5.0
Subtotal Yuba River	**7.0**	**6.0**	**4.7**	**4.7**	**6.5**	**5.3**	**4.7**
Bear River	6.8	5.3	4.3	4.5	5.3	5.3	4.5
Middle Fork American River	6.8	6.5	5.5	5.5	7.0	6.3	5.5
North Fork American River	4.3	3.5	3.1	3.1	3.5	3.5	3.1
Subtotal American River	**5.6**	**5.1**	**4.4**	**4.4**	**5.3**	**4.9**	**4.4**
Total TNF	**7.5**	**6.6**	**5.4**	**5.5**	**6.9**	**6.1**	**5.5**

Cumulative Effects on Hydrology Resources

The cumulative effects on watersheds are for the whole geographic area of the Tahoe National Forest analyzed at several scales (Forest, River Basin, and HUC7). Short-term effects generally occur within 5 years. Long-term effects occur within 20-30 years. They represent the additive, incremental effects of past, present, and reasonably foreseeable future activities, actions, and decisions on the hydrology resource. The current condition of the roads and trails, the number of private roads, and the watershed damage at primitive campsites are all a reflection of past and current management activities.

Management actions affect traffic, motorized trails un-authorized for motorized use, maintenance, the effectiveness of closures, and recovery of closed routes. Cumulatively, these actions influence tread wear and soil erosion. Wet season use of native surface routes often leaves ruts which channel water and increase the erosive power of that water. This would lead to increased erosion both on the trail and adjacent to the trail. This could also lead to increased sediment delivery to streams.

Fuels treatments open up stands, create fire lines and temporary roads, and generally create opportunities for unauthorized OHV use. This has been and would continue to be a problem in urban-interface areas and in other areas with easy access to the Forest. The foothills Forest-urban interface is one of the most rapidly growing areas in the State, and OHV registrations in this area are increasing at an even faster rate (Widell, 2002). Because the baby boomer generation is aging and becoming less mobile, but still desires to recreate in the Forest, there is increasing demand for motorized recreation, especially on ATVs. All of this increasing demand will increase use levels on National Forest Transportation System roads and motorized trails and also increase the pressure for cross country travel.

Equivalent Road Acres: Equivalent Road Acres (acres of disturbance divided by acres of HUC7 watershed) are a measure of watershed disturbance typically used in watershed cumulative effects analysis. Cumulative Watershed Effects (CWE) are the combined effects of past, present, and future land management activities within a watershed that may affect the watershed's structure or process. While this project does not include any new construction it does decide 1) If cross country travel should be prohibited, 2) which if any existing motorized trails un-authorized for motorized use should be added to the National Forest Transportation System (NFTS), and 3) any changes to be made in the class of vehicle or season of use allowed on the existing (NFTS).

The Forest-wide CWE analysis run for a recent Forest-wide fire planning analysis and project specific NEPA documents were used to identify HUC 7 watershed that are at or over Threshold of Concern (TOC). Currently there are three HUC7 watersheds that have been identified as being over TOC. These watersheds are Trout Creek, Alder Creek, and Campbell Hot Springs. The majority of the ERA disturbance in the Trout Creek and Alder Creek watersheds is due to the Tahoe Donner Subdivision on private land. The Campbell Hot Springs watershed modeled as being over Threshold of Concern due to overlapping vegetation management treatments. This project does not propose or change the disturbance footprint, so the modeled CWE results found in project specific NEPA documents would still apply.

Projects listed in Appendix Q (Wildlife Cumulative Effects) have been incorporated into this analysis. Most fuels and vegetation management projects include road maintenance projects as a part of the proposal. Some projects include decommissioning of unnecessary routes. Projects listed in Chapter 3.00 as reasonable foreseeable actions have also been considered in this analysis.

Since the scope of this project is limited to deciding 1) If cross country travel should be prohibited, 2) which if any existing motorized trails un-authorized for motorized use should be added to the National Forest Transportation System (NFTS), and 3) any changes to be made in the class of vehicle or season of use allowed on the existing (NFTS); a typical Cumulative Watershed Effects analysis using Equivalent Road Acres shows no measurable changes between the alternatives in the short term (1 year from the date of action) and would have beneficial effects over the long term (20 or 30 years) owing to passive restoration of unused routes. For example, the Donner Lake HUC7 currently has 85 miles of roads and trails (1.3% ERA). All action alternatives would result prohibiting motorized use on 3.7 miles of these roads and trails. If these 3.7 miles are converted to ERAs (square feet of routes converted to acres divided by acres in HUC7) they would equal 0.1% ERA. Assuming a twenty year recovery rate, the Donner Lake HUC7 route-related ERAs would decrease by 0.003% ERA each year for twenty years. Therefore, metrics, such as, near stream route miles/density, number/density of crossings, and/or presence of highly erodible sites/topography are also being used to track changes in potential environmental effects to watershed resources. Tables of soil and watershed data used in this analysis can be found in Appendix D, Watershed Risk Assessment.

Cumulative Watershed Effects of Proposed Actions Using Equivalent Road Acres (ERA) Methodology

Table 3.02-47 shows the Equivalent Road Acres ERA associated with roads, motorized trails and “Open Areas” by river basin and Alternative. Alternative 1 represents existing ERAs. The action alternatives show reductions at 20 years, after hydrologic recovery of trails prohibited to motorized use. The highest existing road and motorized trail related ERAs are in the Bear (1.2 percent) and Truckee River basins (1.1 percent). The Feather and Yuba River basins have road and motorized trail related ERAs of 0.8 percent. The American River has the lowest existing basin ERA at 0.7%. The average ERAs percentage on the Tahoe National Forest is 0.8%. All of the action alternatives would result in lower of road and motorized trail related ERAs over the long term (20 years). The Truckee and Feather River basins ERAs would be reduced by 0.2 percent in all action alternatives. The Yuba River basin ERA would be reduced by 0.2

percent in Alternatives 2, 3, 4, 6 and 7 and 0.1 percent in Alternative 5. The Bear River basin ERAs would be reduced by 0.2 percent in Alternatives 2, 4, 5, 6 and 7 and 0.3 percent in Alternative 3. The American River basin ERAs would be reduced by 0.1 percent in all action alternatives. The action alternatives would result in a 0.1 percent reduction in ERAs over the Tahoe National Forest (at 20 years, after hydrologic recovery). Alternative 1 has the highest percent ERA, followed by Alternative 5. Alternatives 2, 4, 6 and 7 show differences in effects at this scale. Alternative 3 would result in slightly lower ERAs (0.1%) in the Bear River.

Table 3.02-47. Road and motorized trail related Equivalent Road Acres (ERAs) by river basin Alternative (ERA percents of watershed)

River Basin	Basin Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt7
Truckee River	227,393	1.1%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
Feather River	107,594	0.8%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
North Yuba River	229,995	0.8%	0.5%	0.5%	0.5%	0.6%	0.5%	0.5%
Middle Yuba River	126,370	0.9%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
South Yuba River	170,886	0.8%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
Subtotal Yuba River	**527,252**	**0.8%**	**0.6%**	**0.6%**	**0.6%**	**0.7%**	**0.6%**	**0.6%**
Bear River	20,108	1.2%	1.0%	0.9%	1.0%	1.0%	1.0%	1.0%
Middle Fork American River	146,533	0.8%	0.6%	0.6%	0.6%	0.7%	0.6%	0.6%
North Fork American River	133,107	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Subtotal American River	**279,639**	**0.7%**	**0.6%**	**0.6%**	**0.6%**	**0.6%**	**0.6%**	**0.6%**
Total TNF	**1,161,987**	**0.8%**	**0.7%**	**0.7%**	**0.7%**	**0.7%**	**0.7%**	**0.7%**

Equivalent Road Acres (measured as percent of watershed acres in ERA density classes)

Prohibition on Cross Country Travel: All of the action alternatives prohibit cross country travel. This prohibition will reduce equivalent road acres across the forest in the long term. It would also prevent the proliferation of any new motorized trails un-authorized for motorized use which could increase ERAs. The impacts to ERAs resulting from the prohibition on cross country travel are displayed in Table 3.02-48. Alternative 1 represents existing ERAs. The action alternatives show reductions at 20 years, after hydrologic recovery of routes not designated for motorized use. Reductions would be 0.9 ERAs in the Truckee River basin, 0.6 ERAs in the Feather River basin, 0.5 ERAs in the Yuba River basin, 0.3 ERAs in the Bear and American River basin, and 0.5 ERAs across the Tahoe National Forest.

Table 3.02-48. Changes in Equivalent Road Acres by river basin due to the prohibition of cross country travel (ERA percents of watershed)

River Basin	Basin Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Truckee River	227,393.26	0.0%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
Feather River	107,594.21	0.0%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
North Yuba River	229,995.4	0.0%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
Middle Yuba River	126,370.19	0.0%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
South Yuba River	170,885.91	0.0%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
Subtotal Yuba River	**527,251.50**	**0.0%**	**-0.2%**	**-0.2%**	**-0.2%**	**-0.2%**	**-0.2%**	**-0.2%**
Bear River	20,108.42	0.0%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%	-0.3%
Middle Fork American River	146,532.57	0.0%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
North Fork American River	133,106.89	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Subtotal American River	**279,639.46**	**0.0%**	**-0.1%**	**-0.1%**	**-0.1%**	**-0.1%**	**-0.1%**	**-0.1%**
Total TNF	**1,161,986.90**	**0.0%**	**-0.2%**	**-0.2%**	**-0.2%**	**-0.2%**	**-0.2%**	**-0.2%**

Motorized Trail Additions to the National Forest Transportation System (NFTS): There are no additions to the NFTS under Alternative 1. The action alternatives would add between 31.2 and 282.8 miles of motorized trails to the National Forest Transportation System (NFTS). Additions to the NFTS would have minimal effects to watershed resources, because these trails are already part of the disturbance footprint and would be managed according to TNF trail and resource standards. Appendix A, Road Cards, has mitigations that are needed to add these motorized trails to the NFTS with minimal impacts to soil resources.

Table 3.02-48 displays changes in ERAs due to motorized trail additions to the NFTS by alternative. There would be no change in ERAs due to motorized trail additions to the NFTS under Alternatives 1 and 3. The usual Cumulative Watershed Effects analysis using the ERA methodology does not get more detailed than tenth's of a percent (e.g., 2.5%). Table 3.02-49 shows the changes in ERAs due to the additions to the NFTS. Looking at the changes at the typical ERA detail (tenth's of a percent, 2.5%), there are no measurable changes due to the addition of the proposed routes in any alternative. This is because the change in ERA is so small it does not show up. For example, the change in ERAs due to the additions to the NFTS was the largest in Alternative 5 (0.002%) in the Bear River.

Table 3.02-49. Changes in Equivalent Road Acres Due to Additions to the National Forest Transportation System (ERA percents of watershed)

River Basin	Basin Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt7
Truckee River	227,393.26	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Feather River	107,594.21	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
North Yuba River	229,995.40	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Middle Yuba River	126,370.19	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
South Yuba River	170,885.91	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Subtotal Yuba River	**527,251.5**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Bear River	20,108.42	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Middle Fork American River	146,532.57	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
North Fork American River	133,106.89	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Subtotal American River	**279,639.46**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Total TNF	**1,161,986.90**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Changes to Class of Vehicles and/or Season of Use: Changing the class of vehicle allowed to use a particular National Forest Transportation System (NFTS) road could change the impacts to soil and watershed resources due to the change in road surface. Therefore, these roads are considered to become "Higher Risk Routes" (previously defined as native surface roads and motorized trails) even though they already have "hardened" surfaces that lack vegetation. It is likely that direct impacts to watershed resources occurred when the road was constructed. Impacts may still be occurring if the route 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 road. When the maintenance level of a particular road 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 for resource needs no matter what maintenance level. Tables 3.02-50 displays the changes in ERAs by river basin and alternative due to changes in the class of vehicle on NFTS roads from "Open to Highway Legal Vehicles Only" to "Open to All Vehicles." No changes to class of vehicles would occur in Alternatives 1 and 3, 4. Alternatives 2, 5 and 6 would result in the ERAs in the Bear River increasing by 1.0% ERAs at the river basin scale.

Native surface roads and trails (defined as "Higher Risk Routes") are most susceptible to damage by motor vehicles when wet. The condition of "Higher Risk Routes" can quickly decline during winter or wet weather use due to rutting. Wet season use of "Higher Risk Routes" 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 "Higher Risk Routes". Implementing seasonal closures would reduce rutting and subsequent channeling of surface water runoff. Seasonal closures would decrease the potential effects of motorized vehicle use on "Higher Risk Routes" by decreasing erosion and sedimentation. The benefits of seasonal closures would be equal to prohibition on cross country travel and would by far exceed adding between 31.2 and 282.8 miles of "Higher Risk Routes" (with an existing disturbance footprint) into the NFTS. Alternatives 1, 2, 3 and 7 all have the vast majority of "Higher Risk Routes" open year round and, therefore, have a higher risk to watershed resources. The wet weather seasonal closures imposed in Alternatives 4, 5 and 6 results in all of the “Higher Risk Routes” being closed during the wet time of the year, thus greatly reducing potential negative impacts to soil resources and to water quality.

Table 3.02-50. Changes in Equivalent Road Acres (ERAs) due to changes in Class of Vehicles on existing NFTS roads (ERA percents of watershed)

River Basin	Basin Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt7
Truckee River	227,393.26	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Feather River	107,594.21	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
North Yuba River	229,995.40	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Middle Yuba River	126,370.19	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
South Yuba River	170,885.91	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Subtotal Yuba River	**527,251.50**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Bear River	20,108.42	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%	0.0%
Middle Fork American River	146,532.57	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
North Fork American River	133,106.89	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Subtotal American River	**279,639.46**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Total TNF	**1,161,986.90**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Cumulative Effects: This project would not change the footprint of current wheel-tracks on the Tahoe National Forest. All action alternatives would result in a net reduction in ERAs in all river basins. All action alternatives would result in a very slight decrease in the risk of negative cumulative effects to watersheds. The cumulative impacts on ERAs resulting from this project are displayed in Table 3.02-51. Alternative 1 represents the existing condition. Alternatives 2 through 7 would represent the ERAs in twenty years (after hydrologic recovery). The highest existing road and trail related ERAs are in the Bear (1.2 percent) and Truckee River basins (1.1 percent). The Feather and Bear River basins have road and trail related ERAs of 0.8 percent. The American has the lowest existing basin ERA at 0.7%. The average ERAs percentage on the Tahoe National Forest is 0.8%. All of the action alternatives would result in lower of road and trail related ERAs over the long term (20 years). The Truckee and Feather River basins ERAs would be reduced by 0.2 percent in all action alternatives. The Yuba River basin ERA would be reduced by 0.2 percent in Alternatives 2, 3, 4, 6 and 7 and 0.1 percent in Alternative 5. The Bear River basin ERAs would be reduced by 0.2 percent in Alternatives 2, 4, 5, 6 and 7 and 0.3 percent in Alternative 3. The American River basin ERAs would be reduced by 0.1 percent in all action alternatives. The action alternatives would result in a 0.1 percent reduction in ERAs over the Tahoe National Forest (at 20 years, after hydrologic recovery). Alternative 1 has the highest percent ERAs, followed by Alternative 5. Alternatives 2, 4, 6 and 7 show only minor differences in effects at this scale. Alternative 3 would result in slightly lower ERAs (0.1%) in the Bear River.

Table 3.02-51. Equivalent Road Acres associated with roads 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
Truckee River	227,393	1.1%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
Feather River	107,594	0.8%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
North Yuba River	229,995	0.8%	0.5%	0.5%	0.5%	0.6%	0.5%	0.5%
Middle Yuba River	126,370	0.9%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
South Yuba River	170,886	0.8%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
Subtotal Yuba River	**527,252**	**0.8%**	**0.6%**	**0.6%**	**0.6%**	**0.7%**	**0.6%**	**0.6%**
Bear River	20,108	1.2%	1.0%	0.9%	1.0%	1.0%	1.0%	1.0%
Middle Fork American River	146,533	0.8%	0.6%	0.6%	0.6%	0.7%	0.6%	0.6%
North Fork American River	133,107	0.7%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
Subtotal American River	**279,639**	**0.7%**	**0.6%**	**0.6%**	**0.6%**	**0.6%**	**0.6%**	**0.6%**
Total TNF	**1,161,987**	**0.8%**	**0.7%**	**0.7%**	**0.7%**	**0.7%**	**0.7%**	**0.7%**

Summary of Effects to Geologic, Soil and Watershed 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 Tahoe National Forest 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.

Conclusion

Prohibition on 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 watershed resources, is the wet season closure. The positive effects of these two actions would far outweigh the proposed additions of motorized trails to the National Forest Transportation

System 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.

3.03. Terrestrial & 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 must be planned and implemented so that they do not jeopardize the continued existence of threatened or endangered species or lead to a trend toward listing or loss of viability of Forest Service Sensitive species. In addition, management activities should be designed to maintain or improve habitat for Management Indicator Species to the degree consistent with multiple-use objectives established in each Forest 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 National Forest System (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.

Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

- **Bald Eagle**: The bald eagle was listed by the USDI Fish and Wildlife Service as a federally endangered species in 1978. On July 12, 1995, this species was reclassified to Threatened status in the lower 48 states. On August 9, 2007, the bald eagle was removed from the federal list of threatened and endangered species. Even though they are de-listed, 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 continue to prevent bald eagle “take” resulting from human activities.

Following de-listing, the species 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.

- **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 Tahoe NF Motorized Travel Management Project 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 alterative routes are available.

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

Background

In recent years, the increasing demand for motorized recreational opportunities on National Forest system 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):

1. Increased terrestrial and aquatic species mortality from collision with vehicles
2. Modification of animal behavior
3. Alteration of the terrestrial and aquatic habitat
4. Increased alteration and use of habitats by humans

Mortality from collision 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 avoid 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 as the closer 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 the 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 Frisell (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.

Some Potential Effects of Habitat Alteration to Aquatic Species Habitats

Trombulak and Frisell (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).

Some 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.

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).

The species assessment presented here is organized by **Species Groups** divided along major habitat associations 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, and are incorporated by reference.

This assessment consists of 4 steps: (1) identify wildlife species and groups; (2) identify road and trail associated factors for each group; (3) develop and apply assessment processes and GIS 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	Pure oak and mixed oak/conifer forest	Forest-wide
Black Bear				X	Early and late seral stages within all forest types	Forest-wide
Blue Grouse			X		Late seral open canopy coniferous forests	Forest-wide
California Floater		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.

Species	Federally Listed	Forest Service Sensitive	Management Indicator Species	Other Species of Concern	Indicator Habitat or Ecosystem Component	Distribution on Tahoe NF
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.
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		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		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

Species	Federally Listed	Forest Service Sensitive	Management Indicator Species	Other Species of Concern	Indicator Habitat or Ecosystem Component	Distribution on Tahoe NF
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
Northern Leopard Frog		X			Springs, slow flowing streams, marshes, bogs, ponds, canals, and reservoirs, usually in permanent and semi-permanent water in many habitat types and aquatic vegetation	On the Tahoe National Forest the only drainage to potentially support endemic populations of this species is the Truckee River drainage
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		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 Carmen 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	Pure oak and mixed oak/conifer forest	Strongly tied to westside oak habitats
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
Willow Flycatcher		X			Riparian shrub (willow) and wet meadow	Occurs at discreet willow/meadow habitat on SVRD, TKRD, and YRRD.
Wild Turkey				X	Pure oak and mixed oak/conifer forest types	Primarily westside of Tahoe NF in suitable habitat
Yellow Warbler			X		Riparian	Forest-wide

[1] Valley elderberry longhorn beetle and peregrine falcon are not included since their habitats are either not on the Tahoe NF or are not affected by this project.

A total of 36 species or species groups are included in the species group assessment, including the special status species listed in Table 3.03-2. These include aquatic macro invertebrates, 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 wildlife 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 and the peregrine falcon since their habitats are either not on the Tahoe NF or are not affected by this project. Assessments for the Valley elderberry longhorn beetle and the peregrine falcon are carried out in the Biological Evaluation are incorporated by reference.

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

Wildlife group	Species
Wide-ranging carnivores	Black bear, wolverine, Sierra Nevada red fox
Ungulates	Mule deer
Oak and Oak-conifer associated species	Mule deer, pallid bat
Early and mid seral coniferous forest associated species	Mountain quail
Late-seral moderate to closed canopied coniferous forest associated species	California spotted owl, northern goshawk, great gray owl, American marten, Pacific fisher, northern flying squirrel, forest coniferous birds (brown creeper)
Late-seral open canopied coniferous forest	Blue grouse
Riparian and wetland 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.
Snag associated species	Pallid bat, hairy woodpecker
Shrubland (west-slope chaparral) associated species	Fox sparrow

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 disturbance, habitat modification, and harvest/mortality. (1) 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. (2) Habitat modification occurs when habitat is modified through creation of a path, presence of food, or removal of vegetation. (3) Harvest/mortality is human-induced where there is a direct and negative impact on the animal such as hunting; fishing, collision with vehicles, and other incidental contact which results in impacts similar to those from hunting.

Based on a review of literature and local knowledge of selected species on the Tahoe NF, these three broad disturbance classifications were used for this assessment. Table 3.03-3 lists the road and trail-associated factors along with their disturbance type, activity type effects, and affected wildlife groups.

Table 3.03-3. Road and trail-associated factors with disturbance and activity type, and affected wildlife group

Road and trail – associated factors[1]	Activity Type[2]	Definition of Associated factors	Wildlife group affected
Hunting and trapping	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	Harvest	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	Harvest	Mortality or injury resulting from a motorized vehicle running over or colliding with an animal	• Wide-ranging carnivores • Ungulates • Late seral species • Aquatic-Riparian species
Habitat loss and fragmentation	Habitat modification	Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities	• Wide-ranging carnivores • Ungulates • Late seral species • Early and mid seral species • Aquatic-Riparian species
Edge effects	Habitat modification	Changes to habitat microclimate associated with the edge induced by roads or trails	• Late successional
Snag or downed log reduction	Habitat modification	Reduction in density of snags and down logs due to their removal near roads as facilitated by road access	• Wide-ranging carnivores • Late successional species • Snag dependent species
Collection	Harvest	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	• Late successional species • Aquatic-Riparian species
Route for competitors and predators	Habitat modification	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 • Late successional species • Early and mid seral species • Aquatic-Riparian associated • Oak-Associated hardwood & hardwood/conifer species • Snag-dependent species • Shrubland associated species
Disturbance at a specific site	Disturbance	Displacement of individual animals from a specific location that is being used for reproduction and rearing of young	• Wide-ranging carnivores • Ungulates • Late successional species • Early and mid seral species • Aquatic-Riparian associated • Oak-associated hardwood & hardwood/conifer species • Snag-dependent species • Shrubland associated species
Physiological response	Disturbance	Increase in heart rate or stress hormones when near a road or trail or network of roads or trails	• Wide-ranging carnivores • Ungulates • Late successional 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. Harvest 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 a three primary steps: (1) Road density was derived within specific wildlife habitats, (2) the cumulative effects of travel routes to species groups were assessed based on a similar process completed by Gaines et al. 2003, and (3) the relative environmental risk of roads and trails to habitats was determined.

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 the wildlife groups. The analysis of the project alternatives focuses on the effects of three actions: (1) the prohibition of cross-country motorized vehicle travel, (2) adding facilities (roads unauthorized for motorized public use, trails, and/or areas) to the National Forest Transportation System (NFTS), and (3) changing the vehicle class and season of use on the NFTS.

Wildlife Analysis Assumptions

- All vehicle types result in approximately the same amount of disturbance effect to wildlife.
- Location of route is equal to disturbance effects from that route (e.g., assume all trails provide the same level of disturbance).
- Habitat is already impacted in the short-term. In the long-term, habitat will remain the same on motorized trails added to the National Forest Transportation System (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).
- 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.
- Noise generated from non-motorized associated disturbance impacts are limited to within 60 meters of motorized roads and trails.
- The cumulative effects of past projects are incorporated within the existing vegetation and travel system maps.
- The estimation of route densities for Alternative 1 (no action) includes all existing motorized trails un-authorized for motorized use; this is based on the assumption that these un-authorized motorized trails would continue to be used under continued cross-country travel. Under the action alternatives, only motorized trails proposed for addition to the National Forest Transportation System (NFTS) are included in estimating route densities, since under the ban for cross-country travel, motorized use would only occur on the NFTS.
- 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 overtime (see Chapter 3.0 Recreation).

Wildlife Sources of Information

- 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, & 6
- Northern Goshawk – nest sites, Protected Activity Centers, CWHR habitat types 4M, 4D, 5M, 5D, & 6
- Mule Deer – key deer habitat areas including winter, critical winter, fawning, and critical summer ranges.
- Forest Carnivores (marten, fisher, Sierra Nevada red fox, and wolverine) – Tahoe Forest Carnivore Network, CWHR habitat types 4M, 4D, 5M, 5D, & 6)
- Oak dependent species – Pure oak and oak/conifer habitat layer

Analysis Indicators

The primary analysis indicators used for the analysis are density of motorized roads/trails, miles of motorized roads/trails, and Zone of Influence of motorized roads/trails. Each indicator is designed to be calculated using the sources of information above, using GIS queries. The analysis indicators are focused on assessing the effects of adding facilities to the National Forest Transportation System (NFTS), as described below.

The effects of prohibition of cross country travel, wet weather seasonal restrictions, and change in class of vehicle for NFTS roads are also assessed.

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, late seral coniferous forest associated species, aquatic and riparian associated species, oak woodland and oak-conifer associated species, and snag 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 National Forest System (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 (Space and Time)

For most species groups, the geographic boundary for analyzing cumulative effects are lands that fall within the boundary of the Tahoe NF, including all National Forest System lands and non-National Forest System lands (private). This cumulative effects geographic boundary pertains to all species groups with the exception of greater sandhill cranes and the oak and oak and oak-conifer group. The cumulative effects boundary for sandhill cranes is the areas where known sandhill crane breeding habitat occurs at Sardine Valley, Carman Valley, and at Kyburz Flat on the Sierraville and Truckee ranger districts. The cumulative effects boundary for the oak species group is the west side of the Tahoe NF encompassing the Yuba River Ranger District and the American River Ranger District, since the oak woodland and oak-conifer habitat type only occurs on the west side of the Forest. National Forest System lands encompasses 821,035 acres and non-NFS lands encompasses 373,259 acres within the boundary of the Tahoe NF. The total NFS and non-NFS lands within the boundary of the Tahoe NF comprises 1,204,298 acres. All lands within the boundary of the Tahoe NF is an appropriate scale to analyze cumulative effects of terrestrial and aquatic species for activities associated with motorized roads and trails, since this area is 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.

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 trails 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 roads that are closed or decommissioned.

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

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or 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 to provide pertinent information of relatively recent activities that may still be impacting species and their habitats.

Analysis Measures or Indicators

Indicators or measures are presented in the environmental consequences section to compare and contrast the effects of the project alternatives. Measures or Indicators were selected for project effects based on a thorough review of literature on the interaction between wildlife and motorized routes. Three primary analysis measures were used to compare project effects of each alternative: density of motorized routes, miles of routes, and Zone of Influence of motorized routes.

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 project 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 routes unauthorized for motorized public use because use of these routes can be assumed to continue as part of continued cross-country travel. Finally, route density necessarily 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, the direct and indirect effects of proposed route additions is shown by the differences between the alternatives.

Table 3.03-4. Proportion of Tahoe NF acreage with motorized route densities between 0 miles per square mile and >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
Wildlife								
Motorized Route Density (Percent of Forest Total)	**0 Miles/Square Mile**	<1%	<1%	<1%	<1%	<1%	<1%	<1%
	0-2 Miles/Square Mile	17%	25%	27%	26%	24%	25%	25%
	2-4 Miles/Square Mile	44%	56%	56%	56%	53%	56%	56%
	4-6 Miles/Square Mile	32%	15%	13%	14%	18%	15%	15%
	>6 Miles/Square Mile	7%	4%	4%	4%	5%	4%	4%

* Under Alternative 1 motorized route densities include all NFTS routes and existing routes unauthorized to motorized public use.

Miles of motorized routes to measure potential disturbance

Use of motorized routes has the potential to affect wildlife in a number of ways. Effects to wildlife may range from behavioral changes, increased stress or changes in reproductive success, as described previously. The number of miles of motorized routes is used to measure relative disturbance potential to aquatic and terrestrial wildlife species on the Tahoe NF.

Forest-wide miles of motorized routes

Overall miles of motorized routes on the Tahoe NF are used to compare differences in disturbance potential of motorized use between alternatives.

Miles of motorized routes (species-specific disturbance potential at a specific site)

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 were 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 for goshawk Protected Activity Centers (PACs) were also compared by alternatives.

Zone of influence [proportion of a species (or species group's) key habitat that is influenced by motorized routes]

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. Because there are limited data and studies for many species, assumptions and generalizations were made for some species where no data were available. The Zone of Influence is a relative index of habitat effectiveness to compare alternatives.

Wide-Ranging Carnivores

Large and mid-sized carnivores are unique in their response to human-induced habitat changes due to their large spatial habitat needs and their sensitivity to landscape patterns, including road edge effects and road density (Buskirk and Zielinski 2003 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)
- Increase in heart rate or stress hormones when near a road or trail or network of roads or trails

Effects Common to All Wide-ranging Species

Change 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 wildlife. Therefore, changes in the class of vehicles would not vary in their effects to wide-ranging species for all the alternatives.

Wet Weather Seasonal Restrictions. 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.

Prohibition of Cross Country Travel. Wide ranging species would benefit the most under Alternatives 3, 4, 5, 6, and 7 from the prohibition of cross country travel, and the least under Alternative 1, where disturbance, avoidance, and abandonment could occur. Under all the action alternatives, cross country travel would be prohibited on National Forest System lands including areas that were previously prohibited to cross country motorized use. Whereas, under Alternative 1, cross country travel would continue, except for areas previously prohibited to motorized use. Under Alternative 1, cross country travel would continue on 717,900 acres. Under Alternative 2, cross country travel would be prohibited on 715,200 acres, and designated open on 2,700 acres. For the remaining action alternatives, cross country travel would be prohibited on 717,900 acres.

Addition of Motorized Open Areas

Alternative 2 proposes open motorized areas at Eureka Diggins (27 acres), Greenhorn Area (60 acres), and access to the Boca, Stampede, and Prosser reservoirs on dry soils.

Eureka Diggings: Only Alternative 2 proposes open motorized use of the Eureka Diggings area which does not provide habitat for wide-ranging species. It is a barren area, void of vegetation that was hydraulically mined during the gold rush era. Direct, indirect, and cumulative impacts to wide-ranging species would be minor and limited to incidental disturbance to individual animals that may be traveling through in adjacent areas. The remaining action alternatives would have no effect to wide-ranging species.

Greenhorn Area: Located just outside of Nevada City, the Greenhorn is 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 is only proposed under Alternative 2. The Greenhorn area does not provide suitable habitat for wide-ranging 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 wide-ranging species, including the wolverine, bear, and red fox. 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.

Access to Boca, Stampede, and Prosser reservoirs: As the water levels are drawn down in these reservoirs, motor vehicles are used to access the shoreline for boating, camping, fishing and picnicking. They are typically not used as open play areas as are Eureka Diggings and Greenhorn Creek. The access to these reservoirs is only proposed under Alternative 2. The three reservoir areas 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. Minor and incidental direct impacts to bear, wolverine, or red fox are traveling in vicinity of the reservoirs. 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, indirect, or cumulative impact to wide-ranging species.

Cumulative Effects Boundary in Space and Time for Wide-ranging Species

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 National Forest System lands and non-National Forest System 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 relies on 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.

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 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 affect in bear movement within their home ranges (Brody and Pelton 1989 *In* Joslin and Youmans, coordinators 1999).

Black Bear: Environmental Consequences

Analysis Measures

The analysis measures used to analyze direct, indirect effects, and cumulative effects of the proposed alternatives for black bear are:

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed to determine how black bear habitat is affected.

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.

Zone of Influence: Kasworm and Manley's (1990) studies in Montana found that black bears avoided habitat within 274 meters of roads. Therefore, a Zone of Influence of 274 meters from motorized routes will be used to compare alternatives for relative habitat effectiveness.

Direct and Indirect Effects

Prohibition of Cross Country Travel. Alternative 1 poses the greatest risk to black bear from the continuance of cross country travel, including on existing motorized trails un-authorized for motorized use, where 19% of bear habitat would be influenced within 275 meters of these routes. The action alternatives benefit black bear habitat where cross country travel is prohibited, including within 16% to 19% (Alt 2 & 3 – lowest, Alt 5 – highest) habitat within 275 meters of motorized trails un-authorized for motorized use.

Route Density: To assess the extent the project 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 3.03-5).

High bear habitat capability: High habitat capability for bear where motorized road/trail densities are <0.5 miles/square mile are similar for all the alternatives ranging from 4 to 5 percent of the landscape on the Tahoe NF.

Moderate bear habitat capability: Motorized road/trail across the Tahoe NF (NFS and non-NFS) indicate that Alternative 1 (77%) provides the least amount of moderate habitat capability for bear (where motorized road/trail densities fall between 0.5 and 5 miles/square mile), followed by Alternative 5 (84%). The remaining alternatives provide similar amounts of moderate habitat capability for bear, ranging from 86 to 87 percent.

Low bear habitat capability: 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 8 to 9 percent.

Table 3.03-5. Percentage of Tahoe NF within high, moderate, and low habitat capability for bear

		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Route Density (Percent of Forest Total)	**High Capability** (Lowest Route Density - 0-0.5 Miles/Square Mile)	4%	5%	5%	5%	5%	5%	5%
	Moderate Capability (Moderate Route Density - 0.5-5 Miles/Square Mile)	77%	86%	87%	87%	84%	86%	86%
	Low Capability (Highest Route Density - >5 Miles/Square Mile)	19%	9%	8%	8%	11%	9%	9%

Zone of Influence

Table 3.03-6 displays the direct, indirect, and cumulative effects to bear habitat within a 275-meter Zone of Influence of motorized roads/trails. Alternative 1 reduces bear habitat effectiveness to the greatest extent because motorized use can be expected to continue on motorized trails un-authorized for motorized use during continued cross-country travel. Alternative 1 directly and indirectly influences approximately 19% of bear habitat within a 275-meter Zone of Influence of these motorized trails un-authorized for motorized use where bear habitat effectiveness could be reduced or where negative bear-human interactions have the potential to occur. Alternative 5 directly and indirectly reduces habitat effectiveness by approximately 4% within a 275-meter influence of motorized trails added to the National Forest Transportation System (NFTS). Motorized trails added to the NFTS under the remaining action alternatives directly and influences from 0% (Alternative 3) to 2% (Alternative 2) of bear habitat.

The cumulative effects of existing authorized motorized routes on both NFS and non-NFS lands are displayed in Table 3.03-6. Cumulative effects of existing authorized motorized routes on NFS and non-NFS lands would influence 32% and 14% respectively. Under the action alternatives, bear would benefit from the ban on cross country travel and associated concentrated use on motorized trails un-authorized for motorized use, resulting increasing bear habitat effectiveness by approximately 16% (Alternative 5) to 19% (Alternative 2).

Table 3.03-6. Proportion of Bear Habitat within a 275-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)	0%	2%	0%	1%	4%	1%	1%
Existing routes unauthorized for motorized public use (negative impact)	19%	0%	0%	0%	0%	0%	0%
Routes unauthorized to motorized public use (positive impact)	0%	18%	19%	19%	16%	18%	19%
Cumulative Effects of Past, Present, and Proposed Actions							
Existing motorized routes - NFS lands (negative impact)	32%	32%	32%	32%	32%	32%	32%
Existing motorized routes - non-NFS lands (negative impact)	14%	14%	14%	14%	14%	14%	14%
Positive Cumulative Effects							
Decommissioned routes (positive impact)	1%	1%	1%	1%	1%	1%	1%
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)	**65%**	**46%**	**46%**	**47%**	**50%**	**47%**	**47%**

Summary of Direct and Indirect Effects

Table 3.03-7 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 3.03-7. Black Bear - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Route Density	Has the highest proportion of bear habitat within the highest route density category (>5 mi/mi2) resulting in low habitat capability.	Reduces the proportion of bear habitat in the highest route density category (>5 mi/mi2) and increases the proportion in the moderate (0.5-5 mi mi/mi2) and low density categories by approx. 10% compared to Alt 1.	Reduces the proportion of bear habitat in the highest route density category (>5 mi/mi2) and increases the proportion in the moderate (0.5-5 mi mi/mi2) and low density categories by approx. 11% compared to Alt 1.	Reduces the proportion of bear habitat in the highest route density category (>5 mi/mi2) and increases the proportion in the moderate (0.5-5 mi mi/mi2) and low density categories by approx. 11% compared to Alt 1.	Reduces the proportion of bear habitat in the highest route density category (>5 mi/mi2) and increases the proportion in the moderate (0.5-5 mi mi/mi2) and low density categories by approx. 9% compared to Alt 1.	Reduces the proportion of bear habitat in the highest route density category (>5 mi/mi2) and increases the proportion in the moderate (0.5-5 mi mi/mi2) and low density categories by approx. 10% compared to Alt 1.	Reduces the proportion of bear habitat in the highest route density category (>5 mi/mi2) and increases the proportion in the moderate (0.5-5 mi mi/mi2) and low density categories by approx. 10% compared to Alt 1.
Proposed Motorized Route Additions	Negatively affects the greatest proportion of black bear habitat (19%) on the TNF from continued use within a 275 meter zone of influence of existing routes unauthorized to motorized public use	Negatively affects 2% black bear habitat within 275 meters of proposed route additions	Does not affect black bear habitat, no route additions proposed	Negatively affects 1% black bear habitat within 275 meters of proposed route additions, similar to Alts 6 & 7.	Negatively affects 4% of black bear habitat within 275 meters proposed route additions, next greatest following Alt 1.	Negatively affects approx.1% of black bear habitat from proposed route additions, similar to Alts 4 & 7.	Negatively affects 1% of black bear habitat from proposed route additions, similar to Alts 4 & 6.
Cross Country Travel	Negatively affects black habitat where cross country travel continued on 717,900 acres, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited on 715,200 acres, including within 18% habitat within 275 meters of existing routes unauthorized to motorized public use.	Benefits black bear habitat where cross country travel is prohibited on 717,900 acres, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use.	Benefits black bear habitat where cross country travel is prohibited on 717,900 acres, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use.	Benefits black bear habitat where cross country travel is prohibited on 717,900 acres, including within 16% habitat within 275 meters of existing routes unauthorized to motorized public use.	Benefits black bear habitat where cross country travel is prohibited on 717,900 acres, including within 18% habitat within 275 meters of existing routes unauthorized to motorized public use.	Benefits black bear habitat where cross country travel is prohibited on 717,900 acres, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use.
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	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 black habitat where cross country travel continued, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 18% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 16% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 18% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use

*Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

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Cumulative Effects to Bear

The geographic boundary for analyzing cumulative effects to bear are lands that fall within the boundary of the Tahoe NF including all National Forest System lands and non-National Forest System 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: 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. Table 3.03-8 displays cumulative effects to bear.

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 27% of bear habitat would have reduced effectiveness within 275 meters of routes unauthorized for motorized public use. Unmanaged cross-country travel would continue and increase over the next 20 years based on the increasing trend in sales of ATVs, motorcycles and 4X4 vehicles in recent years, likely resulting in an increase in routes unauthorized for motorized public use. The overall cumulative effects of Alternative 5 would only be slightly greater than alternatives 2, 3, 4, 6, & 7. Alternatives 2, 3, 4, 6 & 7 would have similar cumulative effects and would not result in an appreciable change in overall bear habitat capability since the addition of routes unauthorized for motorized public use to the existing NFTM system would only cumulatively add between 0-2 percent.

Table 3.03-8. Cumulative Effects of Route Density to Bear

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)	19%	9%	8%	8%	11%	9%	9%
Future Effects – Likelihood of increased route density contributing to low bear habitat capability	**High** – Unmanaged cross country route proliferation will continue to increase over time, low bear habitat capability will increase with time	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same
Cumulative Effects of Route Density Affecting Habitat Capability	Greatest Potential for Cumulative Effects of Route Density from past, present, and future, resulting in a greater percentage of the landscape in low bear habitat capability	Similar to Alt 3, 4, 6, & 7. Bear Habitat Capability would stay approx. the same as existing situation	Similar to Alt 2, 4, 6, & 7. Bear Habitat Capability would stay approx. the same as existing situation	Similar to Alt 2, 3, 6, & 7. Bear Habitat Capability would stay approx. the same as existing situation	Slightly greater cumulative effects than Alt 2, 3, 4, 6, & 7. Route density would contribute slightly to reduced bear habitat capability over the existing situation.	Similar to Alt 2, 3, 6, & 7. Bear Habitat Capability would stay approx. the same as existing situation	Similar to Alt 2, 3, 6, & 7. Bear Habitat Capability would stay approx. the same as existing situation

Overall Cumulative Effects to Bear from Past, Present and Reasonably Foreseeable Future Actions: Appendix Q (Wildlife 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 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. 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% which would not necessarily 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 2007, approximately 64,000 acres 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 Q, Wildlife Cumulative Effects). It expected that suitable habitat will be maintained, and it is anticipated that these treatments will 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. Table 3.00-1 lists the reasonably foreseeable recreation projects that are expected to occur. Two non-motorized trails are being proposed for development in the near future. The development and use of these trails 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 routes unauthorized for motorized public use until these areas are revegetated and recovered through active or passive restoration means. It is expected that, generally, non-motorized recreation on routes unauthorized for motorized pubic use 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, wolverine are known 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, 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 male individual. 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).

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

Analysis Measures

Cross Country Travel, Wet Weather Seasonal Closures, and Change in Class of Vehicles: The prohibition of cross country travel, wet weather seasonal closures, and the change in class of vehicles are discussed under "Effects Common to All Wide-ranging Species."

Motorized Route Density: Motorized route density provides a relative measure of habitat effectiveness. 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 >6 miles/square mile are presented.

Zone of Influence - Habitat Fragmentation (Snags and Down Logs): 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 for public safety concerns. The Zone of Influence within 60 meters of routes 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, & 6 CWHR types within the Tahoe NF. Furthermore, 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: 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 the four verified wolverine photographic detection sites on the Truckee and Sierraville Ranger Districts of the Tahoe NF were evaluated for each of the project 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.

Direct and Indirect Effects

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. The motorized route density within 7th field watersheds was determined for all motorized routes including those on National Forest System lands and non-National Forest System lands. Although, motorized route density represents the direct, indirect, and cumulative route density for all routes, the differences between the alternatives shows the differences of direct and indirect effects of the alternatives. It is not practical to calculate route density just for those routes that are being considered for addition to the NFTS. 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 mature and late seral coniferous forest habitat types (CWHR types 4M, 4D, 5M, 5D, &6), Old Forest Emphasis Areas, and within the Tahoe NF Forest Carnivore Network (See Late seral coniferous Forest Associated Species Section).

Table 3.03-9 provides data on the proportion of lands within the Tahoe NF with motorized route densities between 0 and > 6 miles/square mile. Alternative 1 has the lowest proportion of land with motorized routes density <2 miles/square mile (17% - high to moderate security). The remaining alternatives are similar in their proportion of land base with motorized route density <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% > 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 3.03-9. Percent of Tahoe NF with motorized route densities between zero and >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.

Zone of Influence - Habitat Fragmentation (Snags and Down Logs): 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 estimating the Zone of Influence within 60 meters of 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 trails to be added to the National Forest Transportation System (NFTS) is evaluated by each alternative as it relates to habitat fragmentation for the wolverine and the Sierra Nevada red fox. From a landscape perspective, Alternative 1 would contribute to the highest amount of potential habitat fragmentation through loss of snags and down logs on approximately 6% of mature and late seral coniferous forest habitat by allowing continued cross-country motorized use, including use of identified motorized trails un-authorized for motorized use, to continue on the Tahoe NF (Table 3.03-10). Alternative 5 would potentially contribute to approximately 2% habitat fragmentation where snags and down logs may be removed for public safety. Alternatives 2, 4, 6, & 7 all affect landscape fragmentation through loss of down logs and snags minimally, at less than 1%. Alternative 3 would not contribute to habitat fragmentation since no routes unauthorized for motorized public use would be added to the NFTS under this alternative.

Table 3.03-10. Percent of NFS lands within a 60 meter "Zone of Influence" of motorized routes within Mature Forest Habitat (CWHR 4M, 4D, 5M, 5D, & 6)

Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed motorized Routes to be added to the National Forest Travel System	0%	<1%	0%	<1%	2%	<1%	<1%
Continued use of motorized routes unauthorized to motorized public use with the continuance of cross country travel	6%	0%	0%	0%	0%	0%	0%
Routes unauthorized to motorized public use with the prohibition of cross country travel	0%	6%	6%	6%	4%	6%	6%

Disturbance to a Specific Site - Wolverine: 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. Four individual, verified wolverine detections were documented between the towns of Truckee and Sierraville during February and March of 2008. For this analysis, the miles motorized trails that are proposed to be added to the National Forest Transportation System (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 four verified wolverine detections. In general, wolverine tend to move up into the higher elevation subalpine and treeline environments during the breeding period. 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 9,000 feet. Mt. Lola is the nearest location with subalpine and treeline conditions to the four verified wolverine detections (~3 miles). 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 using the area for foraging or traveling when motorized use tends to occur, Alternative 1 results in the greatest miles of routes 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 motorized trails un-authorized for motorized use 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 trails un-authorized for motorized use to the NFTS, and therefore, would not have any direct effects to wolverine within 5 miles of known detection locations.

Table 3.03-11. Miles of Proposed Motorized Trail Addition to the NFTS and Existing Motorized trails un-authorized for motorized use within 5 miles of Known Verified Wolverine Detections

Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of Proposed Motorized Trail Additions to NFTS within 5 miles of Verified Wolverine Detections	0	4	0	2	9	3	2
Miles of Unauthorized Motorized Trails within 5 miles of Verified Wolverine Detections Continued with cross country travel	104	0	0	0	0	0	0
Miles of Unauthorized Motorized Trails within 5 miles of Verified Wolverine Detections prohibited from the prohibition of cross country travel	0	100	104	102	93	101	102
Acres of Cross country travel is prohibited within 5 miles of verified wolverine detections	0	81,884	81,884	81,884	81,884	81,884	81,884
Acres of Cross country travel within 5 miles of verified wolverine detections is continued	81,884	0	0	0	0	0	0

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, wet weather restrictions, and seasonal closures.

Table 3.03-12. Wolverine and Red Fox - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Route Density	Has the highest proportion of habitat within the highest route density categories (>4 mi/mi^2) resulting in low habitat security, and the lowest proportion in the lowest density categories (<4 mi/mi^2)	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 20% compared to Alternative 1	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 22% compared to Alternative 1	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 17% compared to Alternative 1	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1
Proposed motorized trail additions to the NFTS within 60 meters affecting snag and down log habitat	Negatively affects snag and down log habitat by 6% from existing routes unauthorized to motorized public use	Negatively affects snag and down log habitat by <1% from proposed additions	Does not affect snag and down log habitat from proposed additions	Negatively affects snag habitat by <1% from proposed additions	Negatively affects snag and down log habitat by 2% from proposed additions	Negatively affects snag and down log habitat by <1% from proposed additions	Negatively affects snag and down log habitat by <1% from proposed additions
Cross Country Travel	Negatively affects red fox and wolverine habitat where cross country travel continued on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use	Benefits red fox and wolverine habitat where cross country travel is prohibited on 715,200 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 4% habitat influenced within 60 meters of existing routes unauthorized to motorized public use	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	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 red fox and wolverine habitat where cross country travel continued on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Has the highest proportion of habitat within the highest route density categories (>4 mi/mi^2) resulting in low habitat security, and the lowest proportion in the lowest density categories (<4 mi/mi^2)	Benefits red fox and wolverine habitat where cross country travel is prohibited on 715,200 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 20% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 22% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 4% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 17% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1.

*Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects: Sierra Nevada Red Fox and Wolverine

Cumulative Effects of 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 National Forest System lands and non-National Forest System 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 - a variety of 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.

The cumulative effects to wolverine and Sierra Nevada red fox 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 3.03-13). 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 >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 3.03-13. Cumulative effects to Wolverine and Sierra Nevada Red Fox 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				
Motorized Route Density - Total Combined Percent of Tahoe NF 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%
Habitat Fragmentation - Total Percent of Forest within 60 meters of existing and proposed motorized routes (approximate percentage, some overlap on motorized routes may occur)	26%	<20%	<20%	<20%	22%	<20%	<20%
Disturbance to a specific site – cumulative miles of all motorized routes within 5 miles of verified wolverine detections	638	538	534	536	543	537	536
Addition of Motorized Open Areas	0	Eureka Diggins (27 acres) Greenhorn (60 acres) Boca, Stampede, and Prosser (2,589 acres)	0	0	0	0	0
Acres of Cross Country Travel Prohibited	0	715,224	717,900	717,900	717,900	717,900	717,900
Acres of Cross Country Travel continued	717,900	0	0	0	0	0	0
Change in Class of Vehicles	None	No effect	None	No effect	No effect	No effect	No effect
Wet Weather Seasonal Restrictions	None	Reduced disturbance	None	Reduced disturbance	None	Reduced disturbance	None

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 route proliferation will be prohibited	Low potential for increased route density and habitat fragmentation– Cross country route proliferation will be prohibited	Low potential for increased route density and habitat fragmentation– Cross country route proliferation will be prohibited	Low potential for increased route density and habitat fragmentation– Cross country route proliferation will be prohibited	Low potential for increased route density and habitat fragmentation– Cross country route proliferation will be prohibited	Low potential for increased route density and habitat fragmentation– Cross country route proliferation will 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 all existing routes unauthorized to motorized public use under continued cross country travel.

Overall Cumulative Effects to California Wolverine and Sierra Nevada Red Fox 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 sight 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 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. 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% which would not necessarily 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 will be protected by reducing wildfire risk. Between 1994 and 2007, approximately 64,000 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 includes 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 >6 mi/sq. mi.) habitat condition, followed by Alternative 5 (23%). The remaining action alternatives are similar 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 will result in a beneficial impact to wolverine prey (mule deer) from the ban of cross country travel on over 800,00 acres, including the use on between 257 and 390 miles of existing motorized trails un-authorized for motorized use, 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 motorized trails un-authorized for motorized use. 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 trails 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, & 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 motorized trails un-authorized for motorized use, 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 (Alt 5 – 9 mi., Alt 2 – 4 mi., Alt 6 – 3 mi., Alt 4 & 7 – 2 mi., Alt 3 – none).

Sensitive Species Determinations

The Biological Evaluation for the Travel Management EIS project (Appendix L-1, 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, and which would have a considerably fewer number of miles of motorized routes within 5 miles of verified wolverine detections as compared to Alternative 1, no action (Alternative 1 - 104 miles, Alternative 6 - 3 miles). Across the Tahoe NF, fragmentation and route density would be considerably reduced compared to Alternative 1, no action. 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 form January 1 to June 30 to avoid adverse impacts to potential breeding. Evaluate activities for a 2-7ear period for detections not associated with a den site (Standard and Guideline 32).

Sierra Nevada red fox: There have not been any verified Sierra Nevada red fox detections on the Tahoe NF, therefore, this standard and guideline does not apply.

California wolverine: The Travel Management Project analyzed how proposed motorized trail additions would affect the area within a 5 mile radius of known verified wolverine detections. The analysis indicated that if wolverine are 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 continued use on 104 miles of motorized trails un-authorized for motorized use 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 trail additions within 5 miles of known wolverine detection, followed by alternatives 2, 6, 7, and 4 in descending order. Alternative 3 does not add motorized trail to the National Forest Transportation System (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 700,000 acres across the Forest significantly improves habitat effectiveness for all the action alternatives.

Ungulates - Mule Deer: Affected Environment

The mule deer is the only species in the ungulate 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. Deer herd habitat types are displayed in Table 3.03-14.

Table 3.03-14. Acreage of Deer habitat by type and property owner on the Tahoe National Forest

Deer Habitat Type	Forest Service	Non-Forest Service	Total in Forest Boundary
Critical Summer	109,610	40,007	149,617
Critical Winter	28,285	11,566	39,851
Fawning	6,985	6,302	13,287
Holding	1,418	1,883	3,301
Summer	574,816	245, 550	820,366
Winter	110,158	47,321	157,479
Total	**831,272**	**352,629**	**1,183,901**

Table 3.03-15 shows deer habitat acreage on NFS lands within deer habitat types for each of the primary deer herds (Blue Canyon, Downieville, Nevada City, and Loyalton-Truckee) occurring within the boundary of the Tahoe NF.

Table 3.03-15. Acreage on Deer Habitat by type for each major deer herd on NFS lands

Deer Herd	Habitat Type	Acres
Blue Canyon	Critical Summer	64,829
	Critical Winter	12,115
	Fawning	730
	Holding	846
	Summer	170,000
	Winter	60,533
Downieville	Critical Summer	60
	Critical Winter	4,868
	Summer	250,000
	Winter	56,678
Nevada City	Critical Summer	60,162
	Critical Winter	14,101
	Fawning	8,118
	Holding	2,455
	Summer	110,000
	Winter	37,071
Loyalton-Truckee	Critical Summer	25,748
	Critical Winter	8,524
	Fawning	4,440
	Summer	300,000
	Winter	4,508

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).

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 than 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 >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).

Deer and vehicle collisions probably differ by the type of road or trail, so care must be given when considering deer-vehicle collisions. The majority of deer-vehicle collisions occur in the early morning or late afternoon and evening hours, around dawn and sunset, when the deer are most active and when visibility is poor. More deer-vehicle collisions occur during the spring and fall when deer are migrating. In the fall, hunting may cause deer to be more wary and increase movement of deer. In the spring, vegetation tends to green-up along roadsides and attract deer to roads. There are little to no data on deer road kills along Forest roads, however roads maintained at a higher standard for passenger vehicle (maintenance levels 3, 4, & 5), where vehicle speeds are greatest, have the most potential to contribute to deer-vehicle collisions. Deer-vehicle collisions on 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.

Several studies indicated that mortality from deer-vehicle collisions differed by sex and age. In Pennsylvania, vehicle-caused mortality was significantly higher for fawns and yearlings than adults; and more adult females were killed than adult males (Jalkotzy et al. 1997). Jalkotzy et al. (1997) also cited that female deer in South Dakota were killed more often, except during the fall when male deer mortality was higher.

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.

Ungulates - Mule Deer: Environmental Consequences

Effects common to all alternatives

Changes in Class of Vehicles: Although mule deer responses to motorized vehicle use varies depending upon the type of vehicle, in addition to the intensity, timing, speeds, and amount of motorized vehicle use, mule deer responses are not well understood. For this analysis, it is assumed that all vehicle types result in the same disturbance to mule deer. Therefore, changes in the class of vehicles would not vary in their effects to mule deer for all of the proposed alternatives.

Analysis Measures

Wet Weather Seasonal Restrictions for Motorized Vehicles: 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 seasonal restrictions specified in the Forest Plan that would apply to all the alternatives including the no action alternative. 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 Closures by Management Area (MA)

MA #	MA Name	Reason For Restriction	Open Period
12	Antelope	Key Deer Winter Range and Migration Corridor	May 1 to November 1
23	Pendola	Key Deer Winter Range	May 1 November 1 south of the Long Point Road
24	Oregon	Key Deer Winter Range	May 1 to November 1 in Plum Valley, Lohman Ridge, and Studhorse Canyon
42	South Yuba	Key Deer Winter Range	May 1 to November 1 southwest of Bloody Run Creek and the Graniteville Road.
59	Casa Loma	Key Deer Winter Range	May 1 to November 1 on key winter deer range
65	Chalk	Key Deer Winter Range	May 1 to November 1 in Burlington Ridge area and Greenhorn Road.
84	Humbug-Sailor	Key Deer Winter Range	May 1 to November 1 on key winter deer range
102	End of the World	Deer Holding Area	December 31 to September 15in deer holding area.
106	Big Oak	Key Deer Winter Range	May 1 to November 1
108	Little Oak	Key Deer Winter Range	November 1 to May 1 to November 1 on key winter deer range

For Alternatives 2, 5 and 6, the 1990 Tahoe LRMP would be amended to remove the November 1 to May 1 seasonal closure in Management Area 84 (Humbug Sailor) on key winter deer range. In addition to the above deer seasonal restrictions specified in the Tahoe LRMP, wet weather seasonal restrictions would apply to Alternatives 4, 5 and 6 and native surface roads and motorized trails. The benefits to deer of these additional wet weather closures are analyzed for the alternatives.

Prohibition of Cross Country Travel

The prohibition of cross country travel is analyzed for their effects on the Blue Canyon, Downieville, Nevada City, and Loyalton-Truckee deer herds within each deer habitat type. The prohibition of cross country travel will benefit mule deer by lessening the potential for disturbance, avoidance, and/or abandonment by motorized vehicle use.

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 for each 7th field watershed.

Miles of Routes: To assess the potential direct and indirect impacts to deer from motorized route associated disturbance including noise, hunting, poaching, etc., the miles of motorized trails to be added to National Forest Transportation System (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.

Zone of Influence: 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 project 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.

Direct and Indirect Effects

Wet Weather Seasonal Restrictions

Wet weather seasonal restrictions of native surface motorized roads and trails are analyzed for the project alternatives (Table 3.03-15). Alternatives 4, 5, and 6 provide additional wet weather seasonal restrictions, which may benefit deer that may be using areas that are not currently under existing Forest Plan deer seasonal restrictions. In areas outside current Forest Plan closure areas, the wet weather seasonal closures would provide an additional 4 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.

Alternatives 2, 5 and 6, and 7 amends the Forest Plan to remove seasonal deer closures for Management Area 84 – Humbug Sailor. As a result, deer would either adapt to motorized use or would be displaced from this area. Currently motorized use in this area is high. Wet weather seasonal restrictions during the months of January 1 to April 30 would apply to this area in Alternatives 4, 5 and 6 and therefore afford 3 months benefit to deer that may potentially be using this area when wet weather restrictions are in place.

Table 3.03-15. Motorized Seasonal Restrictions Benefiting Deer Ranges on the Tahoe NF

Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Forest Plan Deer Restrictions	Forest Plan Deer Restrictions, except Forest Plan amended to remove the Nov 1 to May 1 seasonal restriction in Management Area 84 (Humbug Salilor) on key winter range.	Forest Plan Deer Restrictions.	Forest Plan Deer Restrictions, and Additional wet weather restrictions on all native surfaced roads and trails apply (Closed Jan 1 to April 30, except Burlington Ridge and Greenhorn Area; Burlington Ridge and Greenhorn Area closed Jan 1 to March 31)	Forest Plan Deer Restrictions, except Forest Plan amended to remove the Nov 1 to May 1 seasonal restriction in Management Area 84 (Humbug Salilor) on key winter range; and Additional wet weather restrictions on all native surfaced roads and trails (Closed Jan 1 to April 30, except Burlington Ridge and Greenhorn Area; Burlington Ridge and Greenhorn Area closed Jan 1 to March 31)	Forest Plan Deer Restrictions except Forest Plan amended to remove the Nov 1 to May 1 seasonal restriction in Management Area 84 (Humbug Salilor) on key winter range; and Additional wet weather restrictions on all native surfaced roads and trails (Closed Jan 1 to April 30, except Burlington Ridge and Greenhorn Area; Burlington Ridge and Greenhorn Area closed Jan 1 to March 31)	Forest Plan Deer Restrictions and Additional wet weather restrictions on all native surfaced roads and trails (Closed Jan 1 to April 30, except Burlington Ridge and Greenhorn Area; Burlington Ridge and Greenhorn Area closed Jan 1 to March 31)

Prohibition of Cross Country Travel

The prohibition of cross country travel is analyzed for the alternatives for the Blue Canyon, Downieville, Nevada City, Loyalton-Truckee deer herds within each deer habitat type and is summarized in Table 3.03-16). The acres of existing cross country motorized travel by each deer herd and habitat type, as previously designated by the Tahoe NF LRMP, would continue for all the alternatives.

Blue Canyon Deer Herd

Under Alternative 1, cross country travel would continue on 187,074 acres, where disturbance, disruption, avoidance, and abandonment could result. Under all the action alternatives, cross country travel would be prohibited on an additional 79% of deer habitat (187,074 acres out of 236,616 Blue Canyon herd habitat acres), which would substantially benefit the Blue Canyon deer herd and reduce negative effects associated with motorized use.

Downieville Deer Herd

Under Alternative 1, cross country travel would continue on 225,687 acres, where disturbance, disruption, avoidance, and abandonment could result. Under all the action alternatives, cross country travel would be prohibited on approximately 100% of deer habitat (225,687 acres out of 225,758 Downieville herd habitat acres) which would substantially benefit the Downieville deer herd and reduce effects associated with motorized use.

Nevada City Deer Herd

Under Alternative 1, cross country travel would continue on 114,739 acres, where disturbance, disruption, avoidance, and abandonment could result. Under all the action alternatives, cross country travel would be prohibited on an additional 87% of deer habitat (114,739 acres out of 131,558 Nevada City herd habitat acres), which would considerably benefit the Nevada City deer herd and reduce effects associated with motorized use.

Loyalton-Truckee Deer Herd

Under Alternative 1, cross country travel would continue on 224,481 acres within the Truckee-Loyalton deer herd habitat, where disturbance, disruption, avoidance, and abandonment could result. Under all the action alternatives, cross country travel would be prohibited on an additional 98% (224,481 acres out of 228,534 Loyalton-Truckee herd habitat acres), which would substantially benefit the Loyalton-Truckee deer herd and reduce effects associated with motorized use.

Table 3.03-16. Acres of Proposed Cross Country Motorized Travel Prohibitions

	Habitat Acres	Acres Existing Motorized Cross Country Prohibition	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Blue Canyon Deer Herd			**Acres of Proposed Motorized Cross Country Prohibition**						
Summer	122,893	20,923	0	101,970	101,970	101,970	101,970	101,970	101,970
Critical Summer	51,463	21,792	0	29,671	29,671	29,671	29,671	29,671	29,671
Fawning	700	577	0	123	123	123	123	123	123
Holding	846	0	0	846	846	846	846	846	846
Winter	49,732	2,792	0	46,940	46,940	46,940	46,940	46,940	46,940
Critical Winter	10,982	3,458	0	7,524	7,524	7,524	7,524	7,524	7,524
Total Acres	**236,616**	**49,542**	**0**	**187,074**	**187,074**	**187,074**	**187,074**	**187,074**	**187,074**

	Habitat Acres	Acres Existing Motorized Cross Country Prohibition	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Downieville Deer Herd			**Acres of Proposed Motorized Cross Country Prohibitions**						
Summer	185,222	71	0	185,151	185,151	185,151	185,151	185,151	185,151
Critical Summer	22	0	0	22	22	22	22	22	22
Fawning	0	0	0	0	0	0	0	0	0
Holding	0	0	0	0	0	0	0	0	0
Winter	38,541	0	0	38,541	38,541	38,541	38,541	38,541	38,541
Critical Winter	1,973	0	0	1,973	1,973	1,973	1,973	1,973	1,973
Total Acres	**225,758**	**71**	**0**	**225,687**	**225,687**	**225,687**	**225,687**	**225,687**	**225,687**
Nevada City Deer Herd			**Acres of Proposed Motorized Cross Country Prohibitions**						
Summer	60,651	277	0	60,374	60,374	60,374	60,374	60,374	60,374
Critical Summer	37,853	16,542	0	21,311	21,311	21,311	21,311	21,311	21,311
Fawning	4,107	0	0	4,107	4,107	4,107	4,107	4,107	4,107
Holding	572	0	0	572	572	572	572	572	572
Winter	19,309	0	0	19,309	19,309	19,309	19,309	19,309	19,309
Critical Winter	9.066	0	0	9.066	9.066	9.066	9.066	9.066	9.066
Total Acres	**131,558**	**16,819**	**0**	**114,739**	**114,739**	**114,739**	**114,739**	**114,739**	**114,739**
Loyalton-Truckee Deer Herd			**Acres of Proposed Motorized Cross Country Prohibitions**						
Summer	197,891	3,915	0	193,976	193,976	193,976	193,976	193,976	193,976
Critical Summer	20,474	0	0	20,474	20,474	20,474	20,474	20,474	20,474
Fawning	2,120	97	0	2,023	2,023	2,023	2,023	2,023	2,023
Holding	0	0	0	0	0	0	0	0	0
Winter	2,173	0	0	2,173	2,173	2,173	2,173	2,173	2,173
Critical Winter	5,876	41	0	5,835	5,835	5,835	5,835	5,835	5,835
Total Acres	**228,534**	**4,053**	**0**	**224,481**	**224,481**	**224,481**	**224,481**	**224,481**	**224,481**

Addition of Motorized Open Areas

Alternative 2 proposes motorized open areas at Eureka Diggings (27 acres), Greenhorn Area (60 acres), and access to the Boca, Stampede, and Prosser reservoirs on dry soils.

Eureka Diggings: Only Alternative 2 proposes open motorized use of the Eureka Diggings area which does not provide habitat for mule deer. It is a barren area, void of vegetation that was hydraulically mined during the gold rush era. Direct, indirect, and cumulative impacts to mule deer would be minor and limited to incidental disturbance to individual animals that may be traveling through in adjacent areas. The remaining action alternatives would have no effect to wide-ranging species.

Greenhorn Area: Located just outside of Nevada City, the Greenhorn is 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 is only proposed under Alternative 2. The Greenhorn area does not provide suitable habitat for wide-ranging 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 wide-ranging species, including the wolverine, bear, and red fox. 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.

Access to Boca, Stampede, and Prosser reservoirs: As the water levels are drawn down in these reservoirs, motor vehicles are used to access the shoreline for boating, camping, fishing and picnicking. They are typically not used as open play areas as are Eureka Diggings and Greenhorn Creek. The access to these reservoirs is only proposed under Alternative 2. The three reservoir areas 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. Minor and incidental direct impacts to bear, wolverine, or red fox are traveling in vicinity of the reservoirs. 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, indirect, or cumulative impact to wide-ranging species.

Motorized Route Density: On the Tahoe NF, motorized road density was determined by 7th field watersheds by deer herd. Table 3.03-17 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).

Blue Canyon Deer Herd

Implementing Alternative 1 would have route densities that exceeded route densities within Alternatives 2, 3, 4, 6, by about 1 mile per square mile within both winter and critical winter range for the Blue Canyon Deer Herd. Alternative 5 would have route densities about 0.7 miles per square mile less than Alternative 1 within critical winter range. Within critical summer ranges, Alternatives 1 and 5 are similar (~2 miles/mile^2). Within critical summer ranges, Alternatives 2, 3, 4, 6, and 7 are similar and slightly lower in their route densities than alternatives 1 and 5. Fawning habitat occurs within the Tahoe NF boundary for the Blue Canyon Deer Herd. For all alternatives, route densities within fawning habitat are less than 1 mile/mile^2; Alternatives 1 and 5 were highest with ~ 0.6 mile/mile^2.

Downieville Deer Herd

For the Downieville Deer Herd, only about 60 acres of critical summer or fawning habitat 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 1.8 miles/miles^2 or 0.3 miles/miles^2 higher than all other alternatives. Within critical winter range, Alternative 1 approaches 4 miles per square mile and route densities in this alternative exceed route densities in the other alternatives by approximately 0.7 mile/square mile (Table 3.03-17). Within winter range, Alternative 1 has route densities of 3.8 miles/square mile, which exceed route densities in all the action alternatives by at least 0.8 mile/square mile.

Nevada City Deer Herd

When comparing critical summer and fawning habitat for the Nevada City Deer Herd, Alternative 1 exceeds the action alternatives by about 0.3 miles/square mile (Table 3.03-17). For critical winter habitat, route densities for Alternative 1 exceed all the action alternatives by about 1.1 miles/square mile. 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.

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 0.3 to 0.5 miles/square mile within each of critical summer, fawning, critical winter, and winter ranges (Table 3.03-16). All the action alternatives have similar route densities. Although Alternative 5 has slightly higher route densities within critical summer and fawning habitat than the other action alternatives, the additional 0.1 mile/square mile should not pose an appreciable impact to the Loyalton-Truckee Deer Herd. There are no differences in route densities for the action alternatives within winter or critical winter range.

Table 3.03-17. 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	2.2	1.9	1.9	1.9	2.1	1.9	1.9
	Fawning	0.6	0.5	0.5	0.5	0.6	0.5	0.5
	Critical Winter	3.3	2.4	2.4	2.4	2.6	2.4	2.4
	Winter	4.6	3.6	3.6	3.6	3.8	3.6	3.6
Downieville Deer Herd	Critical Summer	1.8	1.5	1.5	1.5	1.5	1.5	1.5
	Fawning	0	0	0	0	0	0	0
	Critical Winter	3.9	3.2	3.2	3.2	3.2	3.2	3.2
	Winter	3.8	2.9	2.9	2.9	3.0	2.9	2.9
Nevada City Deer Herd	Critical Summer	2.4	2.1	2.1	2.1	2.1	2.1	2.1
	Fawning	2.9	2.7	2.6	2.7	2.7	2.7	2.7
	Critical Winter	5.2	3.9	3.9	3.9	4.1	3.9	3.9
	Winter	4.8	3.8	3.8	3.8	3.9	3.8	3.8
Loyalton-Truckee Deer Herd	Critical Summer	2.9	2.5	2.5	2.5	2.5	2.5	2.5
	Fawning	5.4	4.8	4.8	4.8	4.8	4.8	4.8
	Critical Winter	1.6	1.3	1.3	1.3	1.3	1.3	1.3
	Winter	2.4	1.9	1.9	1.9	1.9	1.9	1.9

* Alternative 1 includes motorized under continued cross country travel.

Route Density Summary

For all major deer herds occurring within the boundaries of the Tahoe NF, Alternative 1 would have the greatest 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.

Miles of proposed motorized trail additions to the National Forest Transportation System (NFTS)

Table 3.03-18 displays the miles of proposed motorized trail additions to the NFTS for the action alternatives, and the miles of existing motorized trails un-authorized for motorized use for Alternative 1, No Action,) for each deer herd. Motorized trail 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.

Blue Canyon Deer Herd

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. Motorized route miles 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. Motorized route miles for the remaining action alternatives is about 45 route miles in critical winter range. A similar pattern emerges for winter range.

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.

Downieville Deer Herd

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).

In summary, 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.

Nevada City Deer Herd

When comparing critical summer and fawning habitat for the Nevada City Deer Herd, Alternative 1 exceeds the action alternatives by at least 30 miles (Table 3.03-18). 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.

In summary, 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.

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 18 miles (Alternative 5) within critical summer ranges (Table 3.03-18). 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

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.

Table 3.03-18. Miles of Motorized Trail Additions on NFS and private lands 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
Miles of Motorized Routes Within Blue Canyon Deer Herd	Critical Summer Habitat	38	2	0	0	20	1	0
	Fawning Habitat	<1	0	0	0	0	0	0
	Critical Winter Habitat	20	0	0	0	5	0	0
	Winter Habitat	95	4	0	0	20	4	4
Miles of Motorized Routes Within Downieville Deer Herd	Critical Summer Habitat	<1	0	0	0	0	0	0
	Fawning Habitat	0	0	0	0	0	0	0
	Critical Winter Habitat	3	0	0	0	0	0	0
	Winter Habitat	68	1	0	0	1	1	0
Miles of Motorized Routes Within Nevada City Deer Herd	Critical Summer Habitat	34	2	0	1	4	2	1
	Fawning Habitat	5	0	0	0	0	0	0
	Critical Winter Habitat	26	0	0	0	5	0	0
	Winter Habitat	53	1	0	0	14	0	0
Miles of Motorized Routes Within Loyalton-Truckee Deer Herd	Critical Summer Habitat	22	0	0	0	0	0	0
	Fawning Habitat	4	0	0	0	0	0	0
	Critical Winter Habitat	5	1	0	1	1	1	1
	Winter Habitat	2	0	0	0	0	0	0
Total motorized miles for all herds (existing system, unauthorized for motorized public use and private)		**380**	**11**	**0**	**6**	**70**	**9**	**6**

* Alternative 1 includes miles of motorized trails un-authorized for motorized use under continued cross country travel.

Zone of Influence at 200 Meters

As stated above, deer were found to respond to disturbance associated with secondary motorized roads and trails within a 200 meter distance. Although, because deer may respond differently, depending on the type of motorized route and the type of surrounding vegetation, analyzing for these variables can be complex. The amount of disturbance to deer depends upon the type of motorized route, the intensity of use, and the degree to which motorized activities overlap with deer use. The project alternatives only consider the addition of motorized trails to the National Forest Travel System (NFTS) that are native surfaced, which have less volume of traffic and receive lower rates of speed. Therefore, a Zone of Influence within 200 meters of motorized routes was used by to compare differences in the direct and indirect impacts between alternatives for each deer herd, within key deer ranges. Although major roads (i.e., paved and surfaced roads used by passenger vehicles which may receive higher use levels and rates of speed, including county roads, state highways, etc.) may have a greater Zone of Influence for deer than secondary motorized routes, a 200-meter Zone of Influence was used to analyze all existing motorized routes consistently because using greater Zone of Influence may result in excessive overlap in habitat when considering all motorized routes, and therefore, overstate the effects of motorized routes. In addition, regardless of the amount of impact from a particular type of route (major or secondary), the impacts from existing routes remain constant across all the alternatives, and therefore, the direct and indirect effects of adding new routes to the NFTS is demonstrated by the relative difference between each of the project alternatives.

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 unauthorized for motorized public use. The sections below describe how the alternatives rank in their influence on key deer habitats from routes unauthorized for motorized public use for each deer herd.

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 ,motorized trails un-authorized for motorized use. Under Alternative 1, approximately 20% of key winter deer ranges are “moderately” influenced by motorized trails un-authorized for motorized use and approximately 9% of key summer ranges are affected. All the action alternatives result in a low influence on key deer ranges from proposed additions of motorized trails un-authorized for motorized use. Alternative 5 has a somewhat higher Zone of Influence than the remainder of the action alternatives where approximately 5% of key winter ranges are directly and indirectly affected.

Downieville Deer Herd

The Downieville Deer Herd is moderately affected overall by Alternative 1 where 42% of critical summer ranges, 9% critical winter, and 15% winter ranges are within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use which may be used under continued cross-country travel. 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 motorized trails added to the NFTS 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 (39%) is influenced by continued use of motorized trails un-authorized for motorized use 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. Combined critical summer and fawning habitat is influenced on average 8% of key summer habitats within 200 meters of existing motorized trails un-authorized for motorized use which could continue to be used under continued cross-country travel. The action alternatives all result in a “low” amount of key deer habitat being influenced by motorized trails added to the NFTS. However, Alternative 5 results in an average of 2% of all key winter ranges and 1% of key summer habitats 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 factors associated with continued use of existing motorized trails un-authorized for motorized use associated with cross-country travel. Alternative 1 directly and indirectly affects an average 14% key summer habitats and 9% key winter ranges. The remaining alternatives affect 1% of key deer summer and winter habitats.

Table 3.03-19. Proportion of Key Deer Ranges within a 200-meter "Zone of Influence" of Motorized Routes 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	9%	1%	0%	0%	5%	0%	0%
	Fawning	729	0%	0%	0%	0%	0%	0%	0%
	Subtotal/Weighted Average	**65,558**	**9%**	**<1%**	**0%**	**0%**	**5%**	**<1%**	**0%**
	Overall Ranking Key Summer		Low	Low	Low	Low	Low	Low	Low
	Acres of Key Summer Range where motorized cross country travel is prohibited		0	29,794	29,794	29,794	29,794	29,794	29,794
	Acres of Key Summer Range where motorized cross country travel is continued		29,794	0	0	0	0	0	0
	Critical Winter	12,115	18%	0%	0%	0%	4%	0%	0%
	Winter	60,533	20%	1%	0%	1%	5%	1%	1%
	Total Weighted Average	**72,648**	**20%**	**<1%**	**0%**	**1%**	**5%**	**<1%**	**<1%**
	Overall Rank Key Winter Range		Mod	Low	Low	Low	Low	Low	Low
	Acres of Key Winter Range where motorized cross country travel is prohibited		0	54,464	54,464	54,464	54,464	54,464	54,464
	Acres of Key Winter Range where motorized cross country travel is prohibited		54,464	0	0	0	0	0	0
Downieville Deer Herd	Critical Summer	**60**	42%	0%	0%	0%	0%	0%	0%
	Overall Ranking Key Summer		Mod	Low	Low	Low	Low	Low	Low
	Acres of Key Summer Range where motorized cross country travel is prohibited		0	185,173	185,173	185,173	185,173	185,173	185,173
	Acres of Key Summer Range where motorized cross country travel is continued		185,173	0	0	0	0	0	0
	Critical Winter	4,868	9%	0%	0%	0%	1%	0%	0%
	Winter	56,679	15%	0%	0%	0%	1%	0%	0%
	Subtotal/Weighted Average	**61,607**	**15%**	**0%**	**0%**	**0%**	**1%**	**0%**	**0%**
	Acres of Key Winter Range where motorized cross country travel is prohibited		0	40,514	40,514	40,514	40,514	40,514	40,514
	Acres of Key Winter Range where motorized cross country travel is continued		40,514	0	0	0	0	0	0
	Overall Rank Key Winter		Low	Low	Low	Low	Low	Low	Low

	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	8%	1%	0%	1%	1%	1%	0%
	Fawning	8,118	9%	1%	0%	0%	1%	1%	1%
	Subtotal/Weighted Average	**68,280**	**8%**	**1%**	**0%**	**<1%**	**1%**	**1%**	**<1%**
	Overall Ranking Key Summer		Low	Low	Low	Low	Low	Low	Low
	Acres of Key Summer Range where motorized cross country travel is prohibited		0	25,418	25,418	25,418	25,418	25,418	25,418
	Acres of Key Summer Range where motorized cross country travel is continued		25,418	0	0	0	0	0	0
	Critical Winter	14,101	23%	0%	0%	0%	1%	0%	0%
	Winter	37,071	16%	0%	0%	0%	2%	0%	0%
	Subtotal/Weighted Average	**51,172**	**18%**	**0%**	**0%**	**0%**	**2%**	**0%**	**0%**
	Overall Rank Key Winter		Mod	Low	Low	Low	Low	Low	Low
	Acres of Key Winter Range where motorized cross country travel is prohibited		0	28,375	28,375	28,375	28,375	28,375	28,375
	Acres of Key Winter Range where motorized cross country travel is continued		28,375	0	0	0	0	0	0
Loyalton-Truckee Deer Herd	Critical Summer	25,748	14%	0%	0%	0%	0%	0%	0%
	Fawning	4,440	13%	0%	0%	0%	0%	0%	0%
	Subtotal/Weighted Average	**30,188**	**14%**	**<1%**	**0%**	**0%**	**0%**	**0%**	**0%**
	Overall Ranking Key Summer		Low	Low	Low	Low	Low	Low	Low
	Acres of Key Summer Range where motorized cross country travel is prohibited		0	22,497	22,497	22,497	22,497	22,497	22,497
	Acres of Key Summer Range where motorized cross country travel is continued		22,497	0	0	0	0	0	0
	Critical Winter	8,524	10%	1%	0%	1%	1%	1%	1%
	Winter	4,508	8%	0%	0%	0%	0%	0%	0%
	Subtotal/Weighted Average	**13,032**	**9%**	**<1%**	**0%**	**<1%**	**<1%**	**<1%**	**<1%**
	Overall Ranking Key Winter		Low	Low	Low	Low	Low	Low	Low
	Acres of Key Winter Range where motorized cross country travel is prohibited		0	8,008	8,008	8,008	8,008	8,008	8,008
	Acres of Key Winter Range where motorized cross country travel is continued		8,008	0	0	0	0	0	0

*Alternative 1 includes motorized trails un-authorized for motorized use associated with continued cross country travel.

Summary of Direct and Indirect Effects

Table 3.03-20 summarizes the overall net effect to the mule deer from the proposed actions from motorized trail additions, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-20. Mule Deer - Summary of Overall Net Direct and Indirect Effects*

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Route Additions	Negatively affects the greatest proportion of deer habitats by continued cross country travel 380 miles of motorized trails un-authorized for motorized use to continue on 380 miles	Following Alternative 5, affects the next greatest proportion of deer habitats by adding 11 miles of motorized trails	Does not affect deer habitats – no proposed routes or open areas	Similar to Alt 7 - Following Alternative 2, affects the next greatest proportion of deer habitats by adding 6 miles of motorized trails	Following Alternative 1, affects the next greatest proportion of deer habitats by adding 70 miles of motorized trails	Following Alternative 2, affects the next greatest proportion of deer habitats by adding 9 miles of motorized trails	Similar to Alt 4 - Following Alternative 2, affects the next greatest proportion of deer habitats by adding 6 miles of motorized trails
Cross Country Travel	Allows cross country travel to continue where 380 miles of existing routes unauthorized to motorized public use would continue to adversely affed deer habitats	Benefits deer habitats by prohibiting cross country travel on 369 miles within deer habitats	Benefits deer habitats by prohibiting cross country travel on 380 miles within deer habitats	Benefits deer habitats by prohibiting cross country travel on 374 miles within deer habitats	Benefits deer habitats by prohibiting cross country travel on 310 miles within deer habitats	Benefits deer habitats by prohibiting cross country travel on 371 miles within deer habitats	Benefits deer habitats by prohibiting cross country travel on 374 miles within deer habitats
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
Overall Net Effect of Proposed Actions	Allows cross country travel to continue where 380 miles of existing routes unauthorized to motorized public use would continue to adversely affed deer habitats	Benefits deer habitats by prohibiting cross country travel on 369 miles within deer habitats	Benefits deer habitats by prohibiting cross country travel on 380 miles within deer habitats	Benefits deer habitats by prohibiting cross country travel on 374 miles within deer habitats, and receives additional protection from wet weather seasonal restrictions on native surfaced roads	Benefits deer habitats by prohibiting cross country travel on 310 miles within deer habitats, and receives additional protection from wet weather seasonal restrictions on native surfaced roads	Benefits deer habitats by prohibiting cross country travel on 371 miles within deer habitats, and receives additional protection from wet weather seasonal restrictions on native surfaced roads	Benefits deer habitats by prohibiting cross country travel on 374 miles within deer habitats

*Also see summary of direct and indirect effects to oak associated species.

Cumulative Effects

Cumulative Effects of 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 and array of habitat types used by the 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 of 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 Motorized Route Miles

The cumulative motorized route miles including existing routes on the Tahoe NFTS, existing private routes, and proposed motorized trail additions to the National Forest Transportation System (NFTS) is shown in Table 3.03-21 and described below.

Blue Canyon Deer Herd

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. Motorized route miles 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. Motorized route miles for the remaining action alternatives is about 45 route miles in critical winter range. A similar pattern emerges for winter range.

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.

Downieville Deer Herd

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).

In summary, 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.

Nevada City Deer Herd

When comparing critical summer and fawning habitat for the Nevada City Deer Herd, Alternative 1 exceeds the action alternatives by at least 30 miles (Table 3.03-19). 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.

In summary, 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.

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 18 miles (Alternative 5) within critical summer ranges (Table 3.03-17). 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.

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.

Table 3.03-21. Cumulative Motorized Route Miles

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of Motorized Routes Within Blue Canyon Deer Herd	Critical Summer Habitat	215	179	177	177	197	178	177
	Fawning Habitat	<1	0	0	0	0	0	0
	Critical Winter Habitat	65	45	45	45	50	45	45
	Winter Habitat	429	338	334	338	354	338	338
Miles of Motorized Routes Within Downieville River Deer Herd	Critical Summer Habitat	<1	0	0	0	0	0	0
	Fawning Habitat	0	0	0	0	0	0	0
	Critical Winter Habitat	17	14	14	14	14	14	14
	Winter Habitat	310	243	242	242	243	243	242
Miles of Motorized Routes Within Nevada City Deer Herd	Critical Summer Habitat	230	198	196	197	200	198	197
	Fawning Habitat	48	43	43	43	43	43	43
	Critical Winter Habitat	98	67	67	67	72	67	67
	Winter Habitat	249	197	196	196	210	196	196
Miles of Motorized Routes Within Loyalton-Truckee Deer Herd	Critical Summer Habitat	118	96	96	96	96	96	96
	Fawning Habitat	31	27	27	27	27	27	27
	Critical Winter Habitat	24	20	19	20	20	20	20
	Winter Habitat	19	17	17	17	17	17	17
Total motorized miles for all herds (existing system, unauthorized for motorized public use and private)		**1853**	**1484**	**1473**	**1479**	**1543**	**1482**	**1479**

* Alternative 1 includes miles of motorized trails un-authorized for motorized use associated with continued cross country travel.

Zone of Influence

Tables 3.03-22 through 3.03-25 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 motorized and non-motorized routes is 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 3.03-18). Overall cumulative effects (Table 3.03-22) within the Blue Canyon Deer Herd (including motorized trails un-authorized for motorized use, existing system routes, and non-motorized routes on both NFS and non-NFS lands), indicates all the alternatives “highly” reduce habitat effectiveness within key deer winter ranges (critical winter and winter) with the largest contribution from existing motorized system routes (44%). Alternative 1 poses the greatest risk to reduced habitat effectiveness within key winter ranges where approximately 64% of key winter range is influenced by all motorized and non-motorized routes, of which approximately 20% of key winter range is influenced by cross country travel, including use on existing motorized trail un-authorized for motorized use. 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 additions of motorized trails to the NFTS (range 0% to 5%-Alt 5). Under the action alternatives, between 17% and 20% (17% - Alt 5, 20% remaining action alternatives) of key deer winter range would benefit from the prohibition of cross country travel, including motorized use on existing motorized trails un-authorized for motorized use. However, since these motorized trails 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 (45%), followed by Alternative 5 (41%), and the remaining alternatives (36%), where key summer ranges (critical summer and fawning) are influenced cumulatively by all motorized and non-motorized routes. On average, Alternative 1 directly and indirectly affects 9% of key summer ranges (9%-critical summer, 0%-fawning) from cross country motorized travel on existing motorized trails un-authorized for motorized use. The remaining action alternatives do not contribute existing cumulative impacts. Motorized trails added to the NFTS under Alternative 5 contributes an additional 5% each to key winter and key summer ranges to existing cumulative impacts. Between 5% and 9% of key summer range influenced by the motorized trails un-authorized for motorized use would benefit deer, since cross-country motorized travel, including use on these motorized trails, would be prohibited. In addition, for all the action alternatives, cross-country motorized travel would be prohibited.

Table 3.03-22. Proportion of Blue Canyon 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 trails to be added to NFTS (negative impact)	Critical Summer	9%	1%	0%	0%	5%	0%	0%
	Fawning	0%	0%	0%	0%	0%	0%	0%
	Weighted Average Key Summer	**9%**	**<1%**	**0%**	**0%**	**5%**	**0%**	**0%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	18%	0%	0%	0%	4%	0%	0%
	Winter	20%	1%	0%	1%	5%	1%	1%
	Weighted Average Key Winter	**20%**	**<1%**	**0%**	**<1%**	**5%**	**<1%**	**<1%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Cumulative effects of past, present, and proposed actions								
Existing motorized and non-motorized routes (NFS and non NFS lands) (negative impact)	Critical Summer	36%	36%	36%	36%	36%	36%	36%
	Fawning	0%	0%	0%	0%	0%	0%	0%
	Weighted Average Key Summer	**36%**	**36%**	**36%**	**36%**	**36%**	**36%**	**36%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Critical Winter	36%	36%	36%	36%	36%	36%	36%
	Winter	46%	46%	46%	46%	46%	46%	46%
	Weighted Average Key Winter	**44%**	**44%**	**44%**	**44%**	**44%**	**44%**	**44%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
Routes decommissioned or unauthorized to motorized public use (positive impact)	Critical Summer	0%	8%	9%	9%	5%	9%	9%
	Fawning	0%	0%	0%	0%	0%	0%	0%
	Weighted Average Key Summer	**0%**	**8%**	**9%**	**9%**	**5%**	**9%**	**9%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	0%	18%	18%	18%	15%	18%	18%
	Winter	1%	20%	20%	20%	17%	20%	20%
	Weighted Average Key Winter	**<1%**	**20%**	**20%**	**20%**	**17%**	**20%**	**20%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Total Cumulative Effects								
Overall Relative Cumulative Impact Score = Sum Total of Routes (**Note**: Some overlap may occur where route categories intersect)	**Cumulative Total Key Summer (%)**	**45%**	**36%**	**36%**	**36%**	**41%**	**36%**	**36%**
	Cumulative Total Key Summer Ranking	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Cumulative Total Key Winter (%)	**64%**	**44%**	**44%**	**44%**	**49%**	**44%**	**44%**
	Cumulative Total Key Winter Ranking	**High**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**

*Alternative 1 includes miles of motorized trails un-authorized for motorized use 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 3.03-18), therefore, the majority of this discussion will focus on cumulative effects to key winter ranges. Only 60 acres of key summer ranges falls within the boundary of the Downieville Deer Herd. However, Alternative 1 does result in a "moderate" cumulative impact where 42% of critical summer range is specifically influenced by cross-country motorized travel, including use of motorized trails un-authorized for motorized use. The action alternatives do not add to existing cumulative impacts to critical summer range.

Overall cumulative effects (Table 3.03-23) from motorized route associated factors within the Downieville Deer Herd (including proposed motorized trail additions to the NFTS, 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), ranging between 43% and 100%, with the largest contribution from existing NFTS motorized routes and motorized routes off of NFS lands (43%). Alternative 1 poses the greatest risk to reduced habitat effectiveness within key winter ranges where approximately 15% of key winter range (critical winter – 9% , winter – 15%) is influenced by continued cross-country motorized travel, including use motorized trails un-authorized for motorized use. The total cumulative impact from Alternative 1 results in reduced habitat effectiveness within about 58% of key winter ranges. This high influence of motorized and non-motorized routes may have considerable adverse impacts to the Downieville Herd when deer are 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 43% of key winter ranges are cumulatively impacted by motorized and non-motorized routes, resulting in a high amount of reduced habitat effectiveness for the Downieville Deer Herd. Alternative 5 directly and indirectly results in about 5% of additional reduced habitat effectiveness in key deer winter range. All the remaining action alternatives result in adding a nominal amount of direct and indirect impacts to existing cumulative impacts on key deer winter range, where less than 1% winter range results in lower habitat effectiveness. Under the action alternatives, the majority of existing motorized trails un-authorized for motorized use within key winter habitat would be prohibited from the ban of cross country travel, ranging from 17% (Alt 5) to 20% (remaining alternatives). However, since these motorized trails would continue to remain in place until they are re-vegetated. Non-motorized use on these motorized trails may occur which could still reduce habitat quality, but the effects would likely be less depending on the type and intensity of non motorized use.

Table 3.03-23. Downieville Deer Herd - Proportion of 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 (negative impact)	Critical Summer	42%	0%	0%	0%	0%	0%	0%
	Overall Rank	**Mod**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	9%	0%	0%	0%	0%	0%	0%
	Winter	15%	0%	0%	0%	1%	0%	0%
	Weighted Average Key Winter	**15%**	**0%**	**0%**	**0%**	**<1%**	**0%**	**0%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Adverse Cumulative effects of past, present, and proposed actions								
Existing motorized and non-motorized (NFS and non NFS) routes (negative impact)	Critical Summer	0%	0%	0%	0%	0%	0%	0%
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	47%	47%	47%	47%	47%	47%	47%
	Winter	43%	43%	43%	43%	43%	43%	43%
	Weighted Average Key Winter	**43%**	**43%**	**43%**	**43%**	**43%**	**43%**	**43%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
Positive Cumulative Effects								
Decommissioned routes or routes unauthorized to motorized public access (positive impact)	Critical Summer	0%	42%	42%	42%	42%	42%	42%
	Overall Rank	**Low**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Critical Winter	0%	9%	9%	9%	9%	9%	9%
	Winter	2%	17%	17%	17%	17%	17%	17%
	Weighted Average Key Winter	**<1%**	**16%**	**16%**	**16%**	**16%**	**16%**	**16%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Total Cumulative Effects								
Overall Relative Cumulative Impact Score = Sum Total of Routes (**Note**: Some overlap may occur where route categories intersect)	**Cumulative Key Summer (%)**	**42%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
	Cumulative Key Summer Ranking	**Mod**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Cumulative Key Winter (%)	**58%**	**43%**	**43%**	**43%**	**43%**	**43%**	**43%**
	Cumulative Key Winter Ranking	**High**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**

*Alternative 1 includes existing motorized trails un-authorized 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 3.03-18). Overall cumulative effects (Table 3.03-24) within the Nevada City Deer Herd (including motorized trails un-authorized for motorized use, 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 67% are cumulatively affected, followed by Alternative 5 (51%), and then by the remaining action alternatives (49%). Existing NFTS system and non-NFS routes influences approximately 49% key winter habitats. Alternative 1 poses the greatest risk to reduced habitat effectiveness within key winter ranges where approximately 18% of key winter range is attributed to continued cross-country motorized use, including use of motorized trails un-authorized for motorized use, where current existing NFS and non-NFS motorized routes are already highly influencing key deer winter ranges. 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 condition of the checkerboard ownership pattern in this region, including the urban development issues. Increased stress from this 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 proposed additions of motorized trails un-authorized for motorized use to the NFTS would add to existing cumulative impacts within key deer winter range. The remaining action alternatives would not add to existing cumulative impacts as no proposed motorized trails un-authorized for motorized use are identified to be added to the NFTS which would directly or indirectly affect winter range for the Nevada City Deer Herd. The majority (22%) of motorized trails un-authorized for motorized use within key winter habitat would be prohibited from motorized use under the action alternatives where deer would benefit. However, since these existing motorized trails un-authorized for motorized use would continue to remain on the ground, and may receive non-motorized use, habitat effectiveness could be reduced, but the effects would likely be less than motorized use, depending on the type of activity.

Overall cumulative effects to key summer ranges results in an overall "moderate" influence from all motorized and non-motorized routes under all the alternatives. Alternative 1 has the highest overall cumulative impacts (48%). The action alternatives would cumulatively affect between 40% and 41% of key summer ranges (critical summer and fawning) by all motorized and non-motorized routes. On average, Alternative 1 directly and indirectly affects 8% of key summer ranges (8%-critical summer, 9%-fawning) from motorized trails un-authorized for motorized use and 25,418 acres where cross country travel would continue. The remaining action alternatives contributes a relatively small proportion to existing cumulative impacts, where between 0% and 1% of key summer range is affected by the addition of proposed motorized trails to be added to the NFTS. Under the action alternatives, approximately 9-11% of key summer range currently influenced by the prohibition of cross-country travel, including use on motorized trails un-authorized for motorized use that would be a benefit to the Nevada City Deer Herd. 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 3.03-24. Nevada City Deer Herd - Proportion of Key Deer Ranges 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								
Motorized Routes (negative impact)	Critical Summer	8%	1%	0%	1%	1%	1%	0%
	Fawning	9%	1%	0%	0%	1%	1%	1%
	Weighted Average Key Summer	**8%**	**1%**	**0%**	**<1%**	**1%**	**1%**	**<1%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	23%	0%	0%	0%	1%	0%	0%
	Winter	16%	0%	0%	0%	2%	0%	0%
	Weighted Key Winter	**18%**	**0%**	**0%**	**0%**	**2%**	**0%**	**0%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
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	52%	52%	52%	52%	52%	52%	52%
	Weighted Average Key Summer	**40%**	**40%**	**40%**	**40%**	**40%**	**40%**	**40%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Critical Winter	45%	45%	45%	45%	45%	45%	45%
	Winter	50%	50%	50%	50%	50%	50%	50%
	Weighted Key Winter	**49%**	**49%**	**49%**	**49%**	**49%**	**49%**	**49%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
Positive Cumulative Effects								
Routes unauthorized to motorized public access (positive impact)	Critical Summer	2%	9%	10%	10%	9%	9%	10%
	Fawning	2%	10%	12%	12%	10%	10%	11%
	Weighted Average Key Summer	**0%**	**9%**	**11%**	**11%**	**9%**	**9%**	**11%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	2%	25%	25%	25%	24%	25%	25%
	Winter	2%	17%	17%	17%	17%	17%	17%
	Weighted Average Key Winter	**2%**	**22%**	**22%**	**22%**	**22%**	**22%**	**22%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Total Cumulative Effects								
Overall Relative Cumulative Impact Score = Sum Total of All Routes (**Note**: Some overlap may occur where route categories intersect)	**Cumulative Key Summer (%)**	**48%**	**41%**	**40%**	**40%**	**41%**	**41%**	**40%**
	Cumulative Key Summer Ranking	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Cumulative Key Winter (%)	**67%**	**49%**	**49%**	**49%**	**51%**	**49%**	**49%**
	Cumulative Key Winter Ranking	**High**	**Mod**	**Mod**	**Mod**	**High**	**Mod**	**Mod**

* Alternative 1 includes motorized trails un-authorized for motorized use under continued cross country travel

Loyalton-Truckee Deer Herd

The Loyalton-Truckee Deer Herd has more than twice the amount of key summer range (~70%) compared to key winter ranges (~30%) (Table 3.03-18). Overall cumulative effects (Table 3.03-25) within the Loyalton-Truckee Deer Herd (including motorized trails un-authorized for motorized use that are proposed to be added to the NFTS, existing system routes, and non-motorized routes on both NFS and non-NFS lands), indicate all the alternatives "highly" reduce habitat effectiveness within key deer summer habitats where between 60% (Alternatives 2, 3, 4, 6, & 7- lowest) and 72% (Alternative 1-highest) are cumulatively affected. Existing NFS system and non-NFS routes influences approximately 58% key winter habitats (NFS - 34%, non-NFS - 24%). Alternative 1 poses the greatest risk to reduced habitat effectiveness within key summer ranges where approximately 52% of key summer range is influenced by all motorized and non-motorized route. Under Alternative 1, cross-country motorized travel, including use of motorized trails un-authorized for motorized use, reduces habitat effectiveness by an average of 14% within key summer ranges (critical summer 14%, fawning-13%) where current existing NFS and non-NFS motorized routes are already highly influencing critical summer ranges. This additional reduction in habitat effectiveness could pose a considerable cumulative impact to the Loyalton-Truckee Deer Herd. Increased stress from this use could affect this herd's population numbers, especially since unmanaged cross-country travel would continue at an unknown rate in the future.

Alternative 2 adds minimal cumulative effects (<1%) from motorized trails added to the NFTS 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 trails would be added to the NFTS. The majority of existing motorized trails un-authorized for motorized use within key winter habitat would not be added to the NFTS under the action alternatives, where deer would benefit. However, since these motorized trails 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.

On average, Alternative 1 directly and indirectly affects an average of 9% of key winter ranges from cross-country motorized travel, including use on motorized trails un-authorized for motorized use. Overall cumulative effects from all existing NFS, non-NFS, and this continued cross-country travel with concentrated use on motorized trails un-authorized for motorized use influences a moderate proportion (39%) 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 from all motorized and non-motorized routes under all the action alternatives. All the action alternatives would cumulatively affect approximately 30% of key winter ranges by all motorized and non-motorized routes. Under the action alternatives, approximately 9% of key winter range influenced by existing motorized trails un-authorized for motorized use would be beneficial where disturbance from motorized use would not occur, including 2,173 acres where cross-country motorized travel would be prohibited.

Table 3.03-25. Loyalton-Truckee Deer Herd – Proportion of Key Deer Ranges 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								
Motorized routes (negative impact)	Critical Summer	14%	0%	0%	0%	0%	0%	0%
	Fawning	13%	0%	0%	0%	0%	0%	0%
	Weighted Average Key Summer	**14%**	**<1%**	**0%**	**0%**	**0%**	**0%**	**0%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	10%	1%	0%	1%	1%	1%	1%
	Winter	8%	0%	0%	0%	0%	0%	0%
	Weighted Average Key Winter	**9%**	**<1%**	**0%**	**<1%**	**<1%**	**<1%**	**<1%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Cumulative effects of past, present, and proposed actions								
Existing motorized and non motorized routes - NFS and non NFS lands (negative impact)	Critical Summer	40%	40%	40%	40%	40%	40%	40%
	Fawning	25%	25%	25%	25%	25%	25%	25%
	Weighted Average Key Summer	**38%**	**38%**	**38%**	**38%**	**38%**	**38%**	**38%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Critical Winter	25%	25%	25%	25%	25%	25%	25%
	Winter	40%	40%	40%	40%	40%	40%	40%
	Weighted Average Key Winter	**30%**	**30%**	**30%**	**30%**	**30%**	**30%**	**30%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
Positive Cumulative Effects								
Decommissioned routes or routes unauthorized to motorized public access (positive impact)	Critical Summer	0%	13%	14%	14%	13%	14%	14%
	Fawning	1%	13%	13%	13%	13%	13%	13%
	Weighted Average Key Summer	**<1%**	**13%**	**14%**	**14%**	**13%**	**14%**	**14%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	1%	9%	10%	9%	9%	9%	9%
	Winter	0%	8%	8%	8%	8%	8%	8%
	Weighted Average Key Winter	**<1%**	**9%**	**9%**	**9%**	**9%**	**9%**	**9%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Total Cumulative Effects								
Overall cumulative impact = sum total of all routes	**Cumulative Key Summer %**	**52%**	**~39%**	**38%**	**38%**	**38%**	**38%**	**38%**
	Cumulative Key Summer Ranking	**High**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Cumulative Key Winter %	**39%**	**<31%**	**30%**	**<31%**	**<31%**	**<31%**	**<31%**
	Cumulative Key Winter Ranking	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**

* Alternative 1 includes miles of motorized trails un-authorized for motorized use under 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 Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System 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 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. 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 2007, approximately 64,000 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 trails are being proposed for development in the near future. The development and use of these trails 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 3.00-1 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit reissuances. Table 3.03-26 below summarizes cumulative impacts from reasonably foreseeable projects and a description of the potential impact to mule deer and their habitat.

Table 3.03-26. 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 – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in aspen and oak habitats.	• Short-term adverse impacts during harvest. • Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	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
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve riparian and meadow habitat quality used for forage and fawning.	Beneficial cumulative impact by improving long-term forage and fawning habitat 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.

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 motorized trails un-authorized for motorized use, 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 trails 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 motorized trails un-authorized for motorized use depending on the alternative. It is expected that non-motorized use may occur on these motorized trails un-authorized for motorized use 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 motorized trails un-authorized for motorized use 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 the future.

In addition, Alternatives 4, 5, & 6 would benefit deer on winter ranges through the implementation of wet weather closures on native surfaced roads and trails.

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 13,595 acres out of 99,238 acres of mule deer habitat would be affected within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. This will add to existing cumulative effects by approximately 13.6%. Alternative 1 could contribute to a downward trend in mule deer habitat effectiveness within oak-associated and hardwood/conifer habitats on the Tahoe NF. Alternative 5 will affect 1,699 acres out of 99,238 acres mule deer habitat or 1.7% of the Tahoe NF oak-associated hardwood and hardwood/conifer habitat. Alternative 5 will not alter existing trend in oak-associated hardwood and hardwood/conifer habitat on the Tahoe NF. The remaining action alternatives do not directly or indirectly affect oak-associated hardwood and hardwood/conifer habitat, therefore, no cumulative effects will occur from implementation of alternatives 2, 3, 4, 6, or 7.

The change is the class of vehicles will have no effect to mule deer habitat, since the change in class of vehicles on existing motorized routes will 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 65,239 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 65,239 acres of oak-associated hardwood and hardwood/conifer habitat.

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 oak-associated hardwood and hardwood/conifer 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 National Forest System lands in the Sierra Nevada. The trend is slightly increasing (within the last decade, changing from 5% to 7% of the acres on National Forest System lands).

Population Status and Trend. The mule deer has been monitored in the Sierra Nevada at various sample locations by herd monitoring (spring and fall) and hunter survey and associated modeling (CDFG 2007). California Department of Fish and Game (CDFG) conducts surveys of deer herds in early spring to determine the proportion of fawns that have survived the winter, and conducts fall counts to determine herd composition (CDFG 2007). This information, along with prior year harvest information, is used to estimate overall herd size, sex and age rations, and the predicted number of bucks available to hunt (ibid). These data indicate 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 13,595 acres (1.7% of Sierra Nevada-wide habitat) affected by cross country travel, including use on existing motorized trails un-authorized for motorized use. Alternative 5 results in 1,699 acres or 0.1% of Sierra Nevada-wide habitat affected, where mule deer habitat within oak-associated hardwood and hardwood/conifer habitat types would be reduced. The remaining action alternatives (Alt 2, Alt 3, Alt 4, Alt 6, and Alt 7) do not affect oak-associated hardwood and hardwood/conifer habitat. Based on the small percentage of habitat affected, the Tahoe NF Motorized Travel Management Project will not alter the existing habitat trend, nor will it lead to a change in the distribution of mule deer across the Sierra Nevada bioregion.

Compliance with the Forest Plan and Other Direction

The Tahoe NF LRMP (1990) provides management direction for deer habitat management as follows:

> *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 trails to the NFTS and designated “open areas” were analyzed within key deer habitats for the major deer herds on the Tahoe NF, including Downieville herd, Nevada City Herd, Blue Canyon herd, and the Loyalton-Truckee herd. The analysis of effects indicated that Alternative 1 least complies with 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 motorized trails un-authorized for motorized use, 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 alternative, Alternative 5 least limits vehicle access , while Alternative 3 most limits access. Alternatives 2, 4, 6, and 7 complies with LRMP deer direction similarly, somewhat less than Alternative 3, and slightly more than Alternative 5. 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 motorized trails un-authorized for motorized use depending on the alternative. In addition, Alternatives 4, 5, & 6 would benefit deer on winter ranges through the implementation of wet weather closures on native surfaced roads and motorized trails.

> *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 under for each alternative and disclosed in the sections above under Environmental Consequence 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 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 roads and motorized trails 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 which 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

Effects common to all oak woodland and oak-conifer species

Changes in Class of Vehicles: Although oak associated species' responses to motorized vehicle use varies depending upon the type of vehicle, in addition to the intensity, timing, speeds, and amount of 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 all wildlife species. Therefore, changes in the class of vehicles would not vary in their effects to oak 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 where oak associated species would benefit from reduced noise disturbance when wet weather restrictions would be implemented.

Prohibition of Cross Country Travel. Alternative 1 poses the greatest risk to oak associated species where cross country travel would not be prohibited on 65,239 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 65,239 acres.

Analysis Measures

Motorized Route Density: Motorized route density provides a relative index of 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, such as 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.

Direct and Indirect Effects

Motorized Route Density: The direct and indirect effects to oak associated species was determined by assessing the proportion of pure oak and oak-conifer habitats with proposed motorized route densities between 0 and 6 miles/square mile (Table 3.03-27) across the Tahoe NF. The direct and indirect effects of proposed motorized routes is the differences in route densities between the alternatives. Under Alternative 1, with continued cross-country motorized use, including continued use of existing motorized trails un-authorized for motorized use, 85% 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 bat 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 76% of oak habitat with motorized route densities exceeding 2 miles/square mile. The remaining alternatives would have similar proportions of oak habitats (75-76%) where motorized route densities would exceed 2 miles/square mile.

Table 3.03-27. Proportion of Oak Habitat 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	15	25	25	25	24	24	25
2-4 miles/square mile	43	60	60	60	57	61	60
4-6 mile/square mile	38	13	13	13	17	13	13
6+ miles/square mile	4	2	2	2	2	2	2

*Alternative 1 includes route density of existing motorized trails un-authorized for motorized use, with continued cross country travel.

Summary of Direct and Indirect Effects

Table 3.03-28 summarizes the overall net effect to oak and oak-conifer habitat from the proposed actions from motorized trail additions to the National Forest Transportation System, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-28. Oak and Oak-Conifer Associated Species - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Trail Additions	Has the lowest proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and the greatest proportion of habitat in the highest motorized route density categories (.>4 miles/square mile) when compared to all the action alternatives.	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), when compared to Alt 1. Similar to Alts 3, 4, & 7	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), when compared to Alt 1. Similar to Alts 2, 4, & 7	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), when compared to Alt 1,. Similar to Alts 2. 4, & 7	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), when compared to Alt 1. Slightly higher route densities in the lowest motorized route density categories than Alts 2, 3, 4, & 7.	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), when compared to Alt 1. Slightly higher route densities in the lowest motorized route density categories than Alts 2, 3, 4, & 7.	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), similar to Alts 2, 3, & 4
Cross Country Travel	Negatively effects 65,239 oak and oak-conifer habitat acres where cross country travel would continue	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	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 effects 65,239 oak and oak-conifer habitat acres where cross country travel would not be prohibited, resulting in the greatest proportion of habitat within the highest motorized route density categories	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lowest proportion of habitat in the highest motorized route density categories. Similar to Alts 3, 4, & 7.	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lowest proportion of habitat in the highest motorized route density categories. Similar to Alts 2, 4, & 7.	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lowest proportion of habitat in the highest motorized route density categories. Similar to Alts 2, 3, & 7.	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lower proportion of habitat in the highest motorized route density categories than Alt 1 and slightly higher than 2, 3, 4, & 7. Similar to Alt 6.	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lower proportion of habitat in the highest motorized route density categories than Alt 1 and slightly higher than 2, 3, 4, & 7. Similar to Alt 5.	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lowest proportion of habitat in the highest motorized route density categories. Similar to Alts 2, 3, & 4.

* Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects

Cumulative Effects Boundary Space and Time

Cumulative effects to oak associated species, including wild turkey, gray squirrel, band-tailed pigeon, and the pallid bat, are analyzed on the west side of the Tahoe NF within habitats identified as pure oak woodland and mixed oak-conifer woodland. The timeframe for analyzing cumulative effects is the same for all other species.

Overall Cumulative Effects of Past, Present and Reasonably Foreseeable Actions

A number of cumulative impacts within oak habitats on the Tahoe NF that may potentially affect oak associated wildlife is attributed by various activities, including vegetation/fuels, wildfires, recreation, hunting, and urban expansion. The direct and indirect impacts of vegetation and fuels management projects potentially will add to cumulative impacts to oak-associated species, though past, current and future planned projects. In recent years, the majority of the vegetation/fuels reduction projects where oaks are present are designed to enhance oak species by removing competing conifers.

In 2007, over 2,000 acres of vegetation/fuels projects enhanced oak habitats.

Urban expansion within the boundaries of the Tahoe NF is a high level of concern when considering the amount of checkerboard ownership, especially on the west side of the Forest where oak habitats are prevalent. Route proliferation and urban expansion on private land adds to cumulative impacts to oak associated species, particularly the pallid bat. Disturbance and/or loss of potential pallid bat roost sites from route proliferation under Alternative 1 poses a risk to pallid bat populations on the Tahoe NF.

Alternative 1 poses considerable risk of adding cumulative impacts to oak associated species, since Alternative 1 does not prohibit unmanaged cross country travel, and the potential for future route proliferation on both NFS and non-NFS lands in the near future is likely to increase compared to all the action alternatives. Alternative 5 slightly increases cumulative impacts to oak associated species compared to the other action alternatives.

Shrubland (West-Slope Chaparral) Habitat (Fox Sparrow)

The fox sparrow was selected as the MIS for shrubland (chaparral) habitat on the west-slope of the Sierra Nevada, comprised of montane chaparral (MCP), mixed chaparral (MCH), and chamise-redshank chaparral (CRC) as defined by the California Wildlife Habitat Relationships System (CWHR) (CDFG 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).

Habitat Factor used for Analysis: For the proposed alternatives, the habitat factor 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 trails to be added to the National Forest Transportation System (NFTS). 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 motorized trails un-authorized for motorized use.

Current Condition of the Habitat Factor(s) in the Project Area: 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.

Direct and Indirect Effects to Habitat

Change 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 fox sparrow. Therefore, changes in the class of vehicles would not vary in their effects to 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, 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. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, the fox sparrow habitat effectiveness would not be enhanced when native surfaced motorized routes are under wet weather seasonal restrictions. Cross country travel on existing motorized trails un-authorized for motorized use would have the greatest amount of disturbance to fox sparrow habitat, where the highest number of fox sparrow habitat would not receive the benefit of reduced disturbance associated with motorized use during the wet weather season.

Prohibition of Cross Country Travel. Under Alternative 1, cross country travel would continue, potentially affecting 39,639 acres of shrubland (west slope chaparral) habitat, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the fox sparrow. For the action alternatives, cross country travel would be prohibited on 39,639 acres, where disturbance, avoidance, abandonment would be reduced or eliminated. Existing LRMP motorized prohibitions would remain in effect.

Motorized Trail additions to the National Forest Transportation System (NFTS). The direct and indirect effects to fox sparrow shrubland habitat from proposed trail additions to the NFTS 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 3.03-29). Approximately 5,754 acres or 0.6% of Sierra Nevada-wide habitat would be affected by continued cross country travel on existing motorized trails un-authorized for motorized use. Alternative 5 has the next highest direct and indirect effects to fox sparrow habitat, where 1,534 shrubland acres or 0.2% of Sierra Nevada-wide habitat would be affected by proposed motorized trail additions to the NFTS. Alternatives 2, 6, and 7 are similar in their affects to shrubland habitat, where 383 acres or 0.04% 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 3.03-29. Acres Cross Country Travel Prohibitions and Proportion of Fox Sparrow MIS habitat within a 200-meter "Zone of Influence" of Proposed Routes

Fox Sparrow MIS Habitat		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Acres Cross Country Travel within Shrubland habitat								
Acres shrubland habitat where cross country travel would be prohibited	45,766 TNF habitat acres	0	39,639	39,639	39,639	39,639	39,639	39,639
Acres shrubland habitat where cross country travel would not be prohibited		39,639	0	0	0	0	0	0
Proportion of Fox Sparrow MIS habitat within a 200-meter "Zone of Influence" of Proposed Route Additions								
		Alt 1[1]	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Acres Shrubland (west-slope chaparral types)	Habitat Acres	9,590	767	0	0	2,302	767	767
Proportion of Habitat in Sierra Nevada	922,000	1%	0.1%	0%	0%	0.2%	0.1%	0.1%
Habitat Security Risk in Sierra Nevada bioregion		Low	Low	Low	Low	Low	Low	Low
Proportion of Habitat in Tahoe NF boundary[2]	62,928	15.2%	1.2%	0%	0%	3.7%	1.2%	1.2%
Habitat Security Risk in Sierra Nevada bioregion		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use that would continue 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 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 Direct and Indirect Effects

Table 3.03-30 summarizes the overall net effect to fox sparrow habitat from the proposed actions from motorized trail additions to the National Forest Transportation System (NFTS), prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-30. Fox Sparrow - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Trail Additions to the NFTS	Negatively affects the greatest proportion of fox sparrow shrubland habitat (15%) on the TNF from continued use on existing motorized trails un-authorized for motorized use	Negatively affects 1% fox sparrow shrubland habitat from proposed motorized trail additions to the NFTS, similar to Alts 6, & 7.	Does not affect fox sparrow habitat, no motorized trail additions to the NFTS proposed	Does not affect fox sparrow habitat within a 200 meter zone of influence of propose motorized trail additions to the NFTS	Negatively affects approx. 4% of fox sparrow shrubland habitat from proposed motorized trail additions to the NFTS, next greatest following Alt 1.	Negatively affects approx.1% of fox sparrow shrubland habitat from proposed motorized trail additions to the NFTS, similar to Alts 2 & 7.	Negatively affects 1% of fox sparrow shrubland habitat from proposed motorized trail additions to the NFTS, similar to Alts 2 & 6.
Cross Country Travel	Negatively affects fox sparrow 39,639 acres of shrubland habitat where cross country travel continued, including within15% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within approx.14% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within 15% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within approx.15% habitat within a 200-meter zone of motorized trails un-authorized for motorized use	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within 11% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within approx.14% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within.14% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	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 fox sparrow 39,639 acres of shrubland habitat where cross country travel continued, including within15% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within approx.14% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within 15% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within approx.15% habitat within a 200-meter zone of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within 11% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within approx.14% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within.14% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.

* Alternative 1 includes existing routes unauthorized to motorized public use 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 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 wheeled 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 Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System 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, mastications, 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.

Cumulative Effects Conclusion

Alternative poses the greatest cumulative effects to fox sparrow MIS shrubland habitat on the Tahoe NF, where 9,590 acres out of 62,928 acres of fox sparrow habitat would be affected within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. This will add to existing cumulative effects by approximately 15.2%. Alternative 1 could contribute to a downward trend in fox sparrow habitat effectiveness within shrubland habitat (west slope chaparral on the Tahoe NF. Alternative 5 will affect 2,302 acres out of 62,928 acres fox sparrow shrubland habitat or 3.7% of the Tahoe NF fox sparrow shrubland habitat. Alternative 5 will only result in a small downward trend in habitat effectiveness on the Tahoe NF. Alternatives 2, 6, and 7 affects 767 out of 62,928 acres fox sparrow shrubland habitat or 1.2% of the fox sparrow habitat on the Tahoe NF, and will 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 will 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 effect fox sparrow habitat for all of the proposed 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 avoidance.

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 National Forest System 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 will directly, indirectly, and cumulatively affect between 5,754 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 0.6% of the total Sierra Nevada-wide, the Tahoe NF Motorized Travel Management Project will not change the existing trend in the habitat, nor will it lead to a change in the distribution fox sparrows across the Sierra Nevada bioregion.

Early and Mid Seral Coniferous Forest Associated Species - Mountain Quail: Affected Environment

Introduction: The mountain quail was selected as the MIS for early and mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat on the Tahoe NF, as amended by in the Sierra Nevada Forests Bioregional EIS. Early seral coniferous forest habitat is comprised primarily of seedlings (<1” dbh), saplings (1”-5.9” dbh), and pole-sized trees (6”-10.9” dbh). Mid seral coniferous forest habitat is comprised primarily of small-sized trees (11”-23.9” dbh). The mountain quail is found particularly on steep slopes, in open, brushy stands of conifer and deciduous forest and woodland,

and chaparral; it may gather at water sources in the summer, and broods are seldom found more that 0.8 km (0.5 mi) from water (CDFG 2005).

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 blue grouse 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.

Early and Mid Seral Coniferous Forest Associated Species - Mountain Quail: Environmental Consequences

Analysis Measures

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 trail 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 motorized trails un-authorized for motorized use 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.

Current Condition of the Habitat Factor(s) in the Project Area: 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.

Direct and Indirect Effects

Change in Class of Vehicles: Although mountain quail responses to motorized vehicle use may vary depending upon the type of vehicle, in addition to the intensity, timing, speeds, and amount motorized vehicle use, specific mountain quail responses are not well understood. For this analysis, it is assumed that all vehicle types result in the same disturbance to mountain quail and other shrub associated species.

Overall, the change is the class of vehicles would not likely have an effect to mountain quail habitat, since the change in class of vehicles on existing motorized routes will generally not affect or alter mountain quail 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.

Wet weather seasonal restrictions: 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. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, the mountain quail 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 use on existing motorized trails un-authorized for motorized use, would result in the greatest amount of disturbance to mountain quail within early and mid seral coniferous forest habitats.

Prohibition of 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.

Proposed Motorized Trail Additions to the National Forest Transportation System (NFTS): Tables 3.03-31 and 3.03-32 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 (23,775 acres or 4.4% of Sierra Nevada-wide habitat) and mid seral (69,224 acres or 2.5% of Sierra Nevada-wide habitat) coniferous habitat affected. For the action alternatives, Alternative 5 results in the next greatest amount of both early and mid seral habitat affected by proposed motorized trail additions to the NFTS, which affects 6,293 acres (1.2% of Sierra Nevada-wide habitat) and 13,312 acres (0.5% of Sierra Nevada-wide habitat), respectively. The remaining action alternatives affect between 0 acres (Alt 3 – lowest) to 1,399 acres (Alt 2 & Alt 6 - highest) of early seral habitat; and between 0 acres to 2,663 acres of mid seral conifer habitat. For all the alternatives, the proportion of Sierra Nevada-wide early and mid seral habitat affected by motorized routes results in a low risk to habitat security for mountain quail.

Table 3.03-31. Proportion of Mountain Quail Early Seral Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Proposed Motorized Trail Additions to the National Forest Transportation System (NFTS)

Fox Sparrow MIS Habitat	Total Habitat Acres[2]	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Early Seral Coniferous Forest		23,775	1,399	0	699	6,293	1,399	699
Proportion of Sierra Nevada Habitat	546,000	4.4%	0.3%	0%	0.1%	1.2%	0.3%	0.1%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat[2]	89,863	26%	1%	0%	0%	7%	1%	1%
Habitat Security Risk in Tahoe NF		**Moderate**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1]Alternative 1 includes existing motorized trails un-authorized for motorized 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.

Table 3.03-32. Proportion of Mountain Quail Mid Seral Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Proposed Motorized Trail Additions to the National Forest Transportation System (NFTS)

Fox Sparrow MIS Habitat	Total Habitat Acres[2]	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Shrubland (west-slope chaparral types)		69,224	2,663	0	2,663	13,312	5,325	2,663
Proportion of Sierra Nevada Habitat	2,766,000	2.5%	0.1%	0%	0.1%	0.5%	0.2%	0.1%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat	402,539	17%	1%	0%	1%	3%	1%	1%
Habitat Security Risk in Tahoe NF		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1]Alternative 1 includes existing motorized trails un-authorized for motorized 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 Direct and Indirect Effects

Table 3.03-33 summarizes the overall net effect to mountain quail mid and early seral habitat from the proposed actions from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-33. Mountain Quail - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Trail Additions to the NFTS	Negatively affects the greatest proportion of early (26%) and mid seral (17%) mountain quail habitat (total 43%) on the TNF from continued use on existing motorized trails un-authorized for motorized use.	Negatively affects 2% early and mid seral mountain quail habitat from proposed motorized trail additions to the NFTS, similar to Alts 6, & 7.	Does not affect mountain quail habitat, no motorized trail additions to NFTS proposed.	Negatively affects 1% of mid seral mountain quail habitat from proposed motorized trail additions to NFTS, slightly lower than Alts 2, 6, & 7.	Negatively affects 10% of early and mid seral mountain quail habitat from proposed motorized trail additions to NFTS, next greatest following Alt 1.	Negatively affects less than 2% of early and mid seral mountain quail habitat from proposed motorized trail additions to NFTS, similar to Alts 2 & 7.	Negatively affects 2% of early and mid seral mountain quail habitat from proposed motorized trail additions to NFTS, similar to Alts 2 & 6.
Cross Country Travel	Negatively affects 344,961 acres of habitat where cross country travel not prohibited, including within 43% early and mid seral habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within approx.41% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within approx.43% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within approx.42% within a 200-meter zone of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within 33% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within 41% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within. 41% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	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 344,961 acres of habitat where cross country travel not prohibited, including within 43% early and mid seral habitat within a 200-meter zone of influence of existing routes motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within approx.41% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within approx.43% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within approx.42% within a 200-meter zone of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within 33% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within 41% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within. 41% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.

*Alternative 1 includes existing routes unauthorized to motorized public use 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 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 mid and early 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 Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System 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 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. 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 mountain quail, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Between 1994 and 2007, approximately 94,000 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 3.03-34 summarizes a list of the reasonably foreseeable future projects and their potential direct, indirect, and cumulative impacts.

Table 3.03-34. 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	13	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in aspen and oak habitats.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	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
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 26% early seral coniferous forest habitat (23,775 acres out of 89,863 TNF habitat acres) and 17% mid seral coniferous forest habitat (69,224 out of 402,539 TNF habitat acres), totaling 43% of early and mid coniferous forest habitat on the Tahoe NF. Alternative 5 follows, by affecting 7% early seral and 3% mid seral coniferous forest habitats, from proposed motorized trail additions to the NFTS within a 200 meter zone of influence. The remaining action alternatives affect between 0 and 2% 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 will 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 mountain quail 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 effect 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 National Forest System lands in the Sierra Nevada. Within the last decade, the trend for early seral is slightly decreasing (from 9% to 5% of the acres on National Forest System lands) and the trend for mid seral is slightly increasing (from 21% to 25% of the acres on National Forest System 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 will affect 23,775 acres (3.5% of Sierra Nevada wide habitat) of early seral coniferous forest and 69,775 acres (2.5% of Sierra Nevada-wide habitat) of mid seral coniferous forest habitat important to mountain quail under Alternative 1. The action alternatives will affect between 0 acres and 4,895 acres (Alt 3 & 4 - lowest to Alt 5 - highest) of early seral coniferous habitat, and between 0 acres and 7,987 acres of mid seral coniferous forest habitat. All the action alternatives result in a low percentage of total early and mid seral habitat (0% to 1.3% of Sierra Nevada-wide mid and early seral habitat) affected by motorized routes. Alternative 1, does not prohibit cross country travel, including use on motorized trails un-authorized for motorized use, where approximately 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 will not alter the existing trend in early seral and mid seral coniferous habitats, nor will it lead to a change in the distribution of mountain quail across the Sierra Nevada bioregion.

Sooty Grouse (Blue Grouse): Affected Environment

Introduction: Blue grouse are a Management Indicator Species (MIS) on the Tahoe NF. Blue grouse were chosen to represent mature conifer forests on the Tahoe NF. Blue grouse have the potential to be affected by road and motorized trail-associated factors. The relationship between roads and motorized trails 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.

Sooty Grouse (Blue Grouse): Environmental Consequences

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).

Habitat Factor(s) for the Analysis: The habitat factor used in this analysis for the action alternatives was the amount of late seral open canopy coniferous forest habitat that fell within the 200-meter zone of influence of proposed motorized trail additions to the National Forest Transportation System (NFTS). For alternative 1, no action, the amount of late seral open canopy coniferous forest habitat that fell within the 200-meter zone of influence of existing motorized trails un-authorized for motorized use was determined. 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.

Current Condition of the Habitat Factor(s) in the Project Area: 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 tress with sparse canopy cover and 5 (medium/large trees with open canopy cover).

Direct and Indirect Effects to Habitat

Change in Class of Vehicles. Overall, the change is the class of vehicles would not likely have an effect or alter the condition of late seral open coniferous forest habitat for the sooty grouse. In general, some smoothed surfaced roads may become rough surfaced roads through changed road maintenance, but this will not likely result in a measurable change in the condition or amount of sooty grouse habitat at the forest-wide scale. 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 in localized areas. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives.

Wet Weather Seasonal Restrictions. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where blue grouse 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. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, the blue grouse 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 motorized trails un-authorized for motorized use, would result in the greatest amount of disturbance to mountain within early and mid seral coniferous forest habitats.

Prohibition of 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.

Motorized Trail Additions to the National Forest Transportation System (NFTS). Based on the analysis conducted, Alternative 1 affects the most amount of late seral open canopy coniferous forest with a 200-meter zone of influence of existing motorized trails un-authorized for motorized use, which would continue associated with cross country travel. Alternative 1 affects 13,302 (17.7% of Sierra Nevada-wide habitat) (Table 3.03-35). Alternative 5 results in 2,046 acres (2.7%) of late seral open canopy coniferous forest affected by proposed motorized trail additions to the NFTS. Alternatives 2, 4, and 6, similarly affected 1,023 acres of sooty grouse habitat or 1.4% of Sierra Nevada-wide habitat. Alternatives 3 and 7 do not affect late seral open canopy coniferous forest habitat within a 200-meter zone of influence.

Table 3.03-35. Prohibition of Cross Country Travel and Proportion of Sooty (Blue) Grouse Late Seral Open Canopy Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Proposed Motorized Trail Additions to the National Forest Transportation System (NFTS)

Sooty Grouse MIS Habitat		**Alt 1[1]**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Prohibition of Cross Country Travel within Late Seral Open Canopy Coniferous Forest Sooty Grouse Habitat								
Acres of sooty grouse habitat where cross country travel is prohibited	21,216 acres Tahoe NF habitat acres	0	17,178	17,178	17,178	17,178	17,178	17,178
Acres sooty grouse habitat where cross country travel would not be prohibited		17,178	0	0	0	0	0	0
Proportion of Sooty (Blue) Grouse Late Seral Open Canopy Coniferous Forest MIS habitat within 200-meter "Zone of Influence" of Proposed Motorized Trail Additions to the NFTS								
Acres Sooty Grouse Habitat - Late Seral Open Coniferous Forest		3,943	197	0	197	789	197	197
Proportion of Sierra Nevada Habitat	75,000	5.3%	0.3%	0%	0.3%	1.1%	0.3%	0.3%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat[2]	35,389	11%	0.6%	0%	0.6%	2.2%	0.6%	0.6%
Habitat Security Risk in Sierra Nevada		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1] Alternative 1 includes existing motorized trails un-authorized for motorized 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 Direct and Indirect Effects

Table 3.03-36 summarizes the overall net effect to sooty grouse habitat from the proposed actions from motorized trail additions to the National Forest Transportation System (NFTS), prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-36. Sooty Grouse - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Trail Additions to the NFTS	Negatively affects the greatest proportion (11%) of sooty grouse habitat on the TNF from continued use on existing motorized trails un-authorized for motorized use.	Negatively affects less than 1% of sooty grouse habitat from proposed motorized trail additions to the NFTS, similar to Alts 4, 6, & 7.	Does not affect sooty grouse habitat, no motorized trail additions to NFTS proposed	Negatively affects less than 1% of sooty grouse habitat from proposed motorized trail additions to NFTS, similar to Alts 2, 6, & 7.	Negatively affects 2% of sooty grouse habitat from proposed motorized trail additions to NFTS, next greatest following Alts 1.	Negatively affects less than 1% of sooty grouse habitat from proposed motorized trail additions to NFTS, similar to Alts 2, 4, & 7.	Negatively affects less than 1% of sooty grouse habitat from proposed motorized trail additions to NFTS, similar to Alts 2, 4, & 6.
Cross Country Travel	Negatively affects 17,178 acres of habitat where cross country travel not prohibited, including within 11% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.11% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% within a 200-meter zone of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.9% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	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 17,178 acres of habitat where cross country travel not prohibited, including within 11% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.11% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% habitat within a 200-meter zone of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.9% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.

* Alternative 1 includes existing routes unauthorized to motorized public use 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 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 blue 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 Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the blue 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 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. These treatments may not affect habitat for blue 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 blue 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 blue grouse. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have removed blue 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. Future increases in recreational use on the Tahoe NF is expected, and therefore, increased disturbance, displacement, avoidance, or illegal poaching to blue grouse could be expected, particularly during the summer months. Table 3.03-37 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 3.03-37 Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impact to Sooty Grouse	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover, foraging and reproductive habitat enhancement in aspen and oak habitats.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	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
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 11% (3,943 acres out of 35,389 Tahoe NF habitat acres) sooty grouse habitat would be affected within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Alternative 5 will cumulatively add 789 acres out of 35,389 acres sooty grouse habitat or approximately 2% of the Tahoe NF late seral open canopy coniferous habitat. Alternatives 2, 4, 6, and 7 will add approximately less than 1% (197 acres out of 35, 389 acres Tahoe NF habitat) to existing cumulative impacts. Alternative 3 does not directly or indirectly affect sooty grouse habitat, and therefore no cumulative impacts will be added under this alternative. The alternatives will not alter existing trend in late seral open canopy coniferous forest habitat.

The change is the class of vehicles will have no effect to sooty grouse habitat, since the change in class of vehicles on existing motorized routes will 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 National Forest System lands in the Sierra Nevada. The trend is slightly decreasing (from 3% to 1% within the last decade on National Forest System 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, 13,302 acres (17.7% of Sierra Nevada habitat) of late seral open canopy coniferous forest will be directly or indirectly affected, which could substantially disturb, displace, or cause avoidance to sooty grouse from cross country motorized travel, including on existing motorized trails un-authorized for motorized use. 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 2,046 acres (or 0 and 2.7% of Sierra Nevada-wide habitat) are influenced by proposed motorized trail additions to the NFTS. The Tahoe NF Motorized Travel Management Project action alternatives will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of sooty grouse across the Sierra Nevada bioregion.

Late-seral Closed Canopy Forest Associated Species: Affected Environment

The late seral coniferous forest 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 late-seral forests (closed and open 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 late seral coniferous forest associated wildlife species were identified that were 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 late seral coniferous 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 late seral 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 ≥11” dbh with >40% canopy cover). In addition, the Sierra Nevada Forest Plan Amendment provides broad management direction for Old Forest Emphasis Areas 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

Late Seral Closed Canopy Forest Associated Species: Environmental Consequences

Effects Common to All Late Seral Coniferous Forest Associated 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, 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, where old forest species would be benefited through the reduction of noise and disturbance associated with motorized use, especially motorized routes that are within old forest species habitats. 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.

Introduction to Analysis Measures for Late Seral Coniferous Forest Associated Species

Three primary metrics will be used to evaluate the effects of the alternatives to late-seral associated forest species as follows:

1. **Motorized Route density**: Motorized route density analysis is conducted at a Forest-wide scale to give an approximate coarse measure of habitat effectiveness for late seral coniferous forest species represented in the 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, & 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.
2. **Zone of influence**: the Zone of Influence is 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 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.
3. **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 miles of proposed motorized routes within Protected Activity Centers. Also, the number of miles occurring 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.

Introduction to Cumulative Effects for late seral closed canopy coniferous species

This analysis of cumulative effects focuses on the cumulative effects associated with roads and trails, including motorized and non-motorized use, and includes roads and trails on both National Forest System lands and non NFS lands (private).

For this analysis, cumulative effects are simply the sum total of direct and indirect effects of project alternatives plus past, and reasonably foreseeable future impacts of routes. Adverse cumulative impacts includes all motorized trails un-authorized for motorized use proposed for addition, existing motorized routes on both National Forest System (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 to motorized routes depending upon the intensity and level of use. Although, all motorized routes are not equal, and generally, 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 use is considered by assessing the potential for motorized route proliferation for each alternative.

Other cumulative effects to late-seral forest associated species include cumulative 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 late seral coniferous 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 sufficient analyzes any foreseeable future routes on the Tahoe NF.

Late Seral Coniferous Forest Habitat (CWHR types 4M, 4D, 5M, 5D, and 6)

Analysis Measures

Motorized Route Density in Late Seral Coniferous Forest (CWHR types 4M, 4D, 5M, 5D, & 6): The average route density of all motorized routes were determined within 7th field watersheds for mature/late seral coniferous or old forest habitat as defined by CWHR types 4M, 4D, 5M, 5D, and 6 on the Tahoe NF for each alternative (Table 3.03-38). Mature and late seral coniferous forest habitats with lower motorized route densities provides higher habitat connectivity (i.e. less habitat fragmentation) than those with greater route densities.

Zone of Influence at 60, 100, and 200 meters

For each of the proposed alternatives, the Zone of Influence within late- successional forest habitat (CWHR 4M, 4D, 5M, 5D, 6) was determined at three scales - within 60 meters, 100 meters, and 200 meters of motorized trails un-authorized for motorized use (Table 3.03-38). 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 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.

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.

Direct and Indirect Effects

Motorized Route Density in Late Seral Coniferous Forest (CWHR types 4M, 4D, 5M, 5D, & 6)

The average motorized route density within late seral coniferous forests were determined within 7th field watersheds for each alternative (Table 3.03-38). In general, lower motorized route densities correlate with higher habitat connectivity or conversely, higher motorized route densities equate to greater habitat fragmentation within late seral coniferous forest habitat. When comparing motorized route densities between 0-2 mi/mi^2, Alternative 1 has the lowest amount of late seral coniferous forest habitat with motorized route densities less than 2 miles/square mile (17%) as compared to the rest of the alternatives. Alternatively, Alternative 1 has the greatest amount of late seral coniferous forest habitat with motorized route densities exceeding 2 miles/square mile (83%), where the least amount of habitat connectivity for late seral coniferous forest associated species is provided compared to all the other alternatives. Alternatives 5, 6, 4, 2, 7 and 3 have progressively less fragmentation from route densities that exceed 2 miles/mi^2 within late seral coniferous forests (range 75% to 73%).

Table 3.03-38. Proportion of Late Seral Coniferous Forest Habitat (CWHR types 4M, 4D, 5M, 5D, & 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	17%	26%	27%	26%	25%	25%	26%
2-4 Miles/Square mile	44%	57%	57%	57%	53%	58%	57%
4-6 Miles/Square mile	32%	13%	12%	13%	17%	13%	13%
>6 Miles/Square mile	7%	4%	4%	4%	5%	4%	4%

Zone of Influence at 60, 100, and 200 meters

Zone of Influence at 60 Meters

A comparison of alternatives for mature/late seral coniferous forest (CWHR types 4M, 4D, 5M, 5D, and 6) indicates Alternative 1 contributes to the most habitat fragmentation (6%) through the loss of snags and down logs within 60 meters of existing motorized trails un-authorized for motorized use. Alternative 5 contributes to the next highest habitat fragmentation (1%) within the 60 meter Zone of Influence within mature and late seral coniferous forest habitat. Alternatives 2, 3, 4, 6, & 7 do not affect habitat fragmentation through potential loss of snags and logs within a 60 meter Zone of Influence for old forest associated species.

Zone of Influence at 100 Meters

Certain 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 (Delaney et al. 1999). At a 100 meter Zone of Influence, Alternative 1 contributes to the most direct and indirect effects to mature/late seral coniferous forest habitat, adversely reducing habitat effectiveness by 9% for some old forest associated species. Alternative 5 reduces habitat effectiveness for old forest species by 2%, followed by Alternative 2 reducing habitat effectiveness of late seral coniferous habitat by 1%. Alternatives 3, 4, 6 and 7 would not contribute to a loss of habitat effectiveness within mature/late seral coniferous forests.

Zone of Influence at 200 Meters

Comparing the Zone of Influence at 200 meters of motorized trails un-authorized for motorized use proposed to be added to the NFTS within mature and late seral coniferous forest as classified by CWHR types 4M, 4D, 5M, 5D, and 6, provides a relative indication of how the alternatives affect habitat effectiveness for many late seral coniferous 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 reduced habitat effectiveness for old forest species where 16% of mature/late seral coniferous forest habitat would be negatively influenced by cross-country motorized travel, including use of existing motorized trails un-authorized for motorized use. Alternative 5 contributes to 3% reduction in habitat effectiveness for old forest associated species, followed by

Alternatives 2 and 6 with a 1% to 2% reduction in habitat effectiveness. Alternatives 3, 4 and 7 would not contribute to a reduction in habitat effectiveness for late seral coniferous forest associated species at 200 meters as no motorized trails un-authorized for motorized use within late-seral forest would be added to the system.

Table 3.03-39. Proportion of CWHR 4M, 4D, 5M, 5D, & 6 influenced by motorized routes *or* percent of Late-Seral Forest within 60, 100, and 200 Meters of Motorized Routes

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Percent of late seral coniferous forest (CWHR 4M, 4D, 5M, 5D, & 6) within a 60 meter Zone of Influence	6%	0%	0%	0%	1%	0%	0%
Percent of late seral coniferous forest (CWHR 4M, 4D, 5M, 5D, & 6) within a 100 meter Zone of Influence	9%	1%	0%	0%	2%	0%	0%
Percent of late seral coniferous forest (CWHR 4M, 4D, 5M, 5D, & 6) within a 200 meter Zone of Influence	16%	1%	0	0%	3%	1%	0%

[1]Alternative 1 includes motorized trails un-authorized for motorized use

Summary of Direct and Indirect Effects

Table 3.03-40 summarizes the overall net effect to late seral coniferous forest habitat from the proposed actions from motorized trail additions to the National Forest Transportation System (NFTS), prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-40. Late Seral Coniferous Forest - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Trail Additions to the NFTS	Negatively affects the greatest proportion of late seral coniferous forest at 200 meters (16%) of existing motorized trails un-authorized for motorized use that would not be prohibited with cross country travel.	Negatively affects less than 1% of late seral coniferous forest habitat from proposed motorized trail additions to the NFTS at 200 meters	Does not affect late seral coniferous forest habitat, no motorized trail additions to NFTS proposed	Does not affect late seral coniferous forest habitat, within a 200 meter zone of influence of proposed motorized trail additions to NFTS.	Negatively affects less than 3% of late seral coniferous forest habitat from proposed motorized trail additions to NFTS at 200 meters	Negatively affects 1% of late seral coniferous forest habitat from proposed motorized trail additions to NFTS at 200 meters	Does not affect late seral coniferous forest habitat, within a 200 meter zone of influence of proposed motorized trail additions to NFTS.
Cross Country Travel	Negatively affects 267,952 acres of late seral coniferous forest habitat where cross country travel not prohibited, including within 16% habitat within a 200-meter zone of influence of existing routes motorized trails un-authorized for motorized use	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of existing motorized trails un-authorized for motorized use	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 13% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	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 267,952 acres of late seral coniferous forest habitat where cross country travel not prohibited, including within 16% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Increases fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 13% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.

* Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects

Cumulative Effects of Motorized Routes

Motorized Route Density: Alternative 1 will contribute to the greatest cumulative effects within late seral moderate to closed canopy coniferous forests from motorized route densities since unmanaged cross-country travel will not be prohibited and increase into the future. For all the other alternatives, the cumulative effects of motorized route density will be similar since cross-country travel will be prohibited, including the majority of existing motorized trails un-authorized for motorized use. Alternative 5 will have slightly greater cumulative effects compared to alternatives 2, 3, 4, 6 & 7. High motorized route densities, such as those under Alternative 1, with cross-country travel not prohibited, could be a limiting factor in the distribution and abundance for some mature/late seral coniferous forest associated species. Therefore, Alternative 1 poses the greatest risk to late seral coniferous forest species abundance and distribution, especially for species that require large patches of undisturbed habitat.

Zone of Influence: The cumulative effects to mature/forest forests (CWHR types 4M, 4D, 5M, 5D, 6 within a 60, 100, and 200 meter Zone of Influence are compared for the proposed alternatives (Tables 3.03-41, 3.03-42 and 3.03-43).

60 Meter Zone of Influence

When comparing the relative cumulative effects to mature/late seral moderate to closed canopy coniferous forests within a 60 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 = 27%) that poses the greatest risk to habitat fragmentation through potential loss of snags and down logs that may be removed for public safety along motorized and non-motorized routes (Table 3.03-35). In addition, Alternative 1 would contribute significantly to the proliferation of motorized trails un-authorized for motorized use because unmanaged cross country motorized travel would not be prohibited into the future and would have a high likelihood of increasing into the future. Alternative 5 has the second greatest overall cumulative impacts from habitat fragmentation within late-seral forests (cumulative impact score = 18%). The remaining alternatives do not add to cumulative effects of existing, past, and future since no motorized trails un-authorized for motorized use within late-seral forests would be added to the NFTS, and, therefore, direct and indirect impacts would not add to cumulative effects for alternatives 2, 3, 4, 6, and 7.

Table 3.03-41. Cumulative Effects for Proportion of Late-seral Forest within a 60 meters of All Routes *of* Percent of Late-seral Forest (CWHR 4M, 4D, 5M, 5D, 6) within Zone of Influence of 60 meters 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 additions to NFTS (negative impact)[1]	0%	0%	0%	0%	1%	0%	0%
Existing motorized trails un-authorized for motorized use	6%	0%	0%	0%	0%	0%	0%
Routes unauthorized to motorized public use (positive impact)[3]	0%	6%	6%	6%	4%	6%	6%
Acres prohibited to cross country travel	0	267,695	267,695	267,695	267,695	267,695	267,695
Acres where cross country travel is not prohibited	267,695	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes- NFS lands (negative impact)	15%	15%	15%	15%	15%	15%	15%
Existing motorized routes on private land - non-NFS lands (negative impact)	4%	4%	4%	4%	4%	4%	4%
Existing non-motorized routes (negative impact)[2]	2%	2%	2%	2%	2%	2%	2%
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	**27%**	**15%**	**15%**	**15%**	**18%**	**15%**	**15%**

[1] Alternative 1 includes the existing motorized trails un-authorized for motorized use, while all action alternatives include proposed additions of motorized trails to the NFTS.

[2] Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60 meters

[3] Includes both system roads and motorized trails un-authorized for motorized use.

100 Meter Zone of Influence

When comparing the relative cumulative effects to mature/late seral coniferous forests within a 100 meter Zone of Influence by adding together all 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 = 37%) that poses the greatest risk of reducing habitat effectiveness for old forest associated species (Table 3.03-36). In addition, Alternative 1 would contribute considerably to the proliferation of motorized trails un-authorized for motorized use because unmanaged cross country motorized travel would continue and would have a high likelihood of increasing into the near future. Alternative 5 has the second greatest overall cumulative impacts to late seral coniferous forest habitat where reduced habitat effectiveness would occur (cumulative impact score = 27%). Alternatives 2 and 6 contribute to the next highest overall cumulative impacts, but overall cumulative impacts are only slightly greater than Alternatives 3, 4, and 7 where no proposed additions of motorized trails un-authorized for motorized use to the NFTS would influence late seral coniferous habitats across the Tahoe NF.

Table 3.03-42. Cumulative Effects - Proportion of Late-seral Forest Habitat (CWHR 4M, 4D 5M 5D, 6) within 100 meters of Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of proposed alternatives							
Proposed motorized trail additions to the NFTS (negative impact)	0%	1%	0%	0%	2%	0%	0%
Continued Cross country travel on existing motorized trails un-authorized for motorized use	11%	0%	0%	0%	0%	0%	0%
Prohibition of cross country travel on existing motorized trails un-authorized for motorized use (positive impact)	0	9%	9%	9%	8%	9%	9%
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is prohibited	0	267,952	267,952	267,952	267,952	267,952	267,952
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is not prohibited	267,952	0	0	0	0	0	
Cumulative Effects of past, present, and proposed actions							
Existing motorized routes- NFS lands (negative impact)	20%	20%	20%	20%	20%	20%	20%
Existing routes non-NFS lands (private) (negative impact)	6%	6%	6%	6%	6%	6%	6%
Existing non-motorized routes (negative impact)[1]	2%	2%	2%	2%	2%	2%	2%
Decommissioned routes – (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Net Cumulative Effects equals the total of all impacts, both positive and negative							
Proportion of late-seral habitat inflluenced within 100 meters of all routes	**37%**	**29%**	**28%**	**28%**	**30%**	**28%**	**28%**
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is prohibited	**0**						

[1] Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60 meters

200 Meter Zone of Influence

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 = 59%) and poses the greatest risk to habitat connectivity, as well as other negative cumulative impacts associated with routes within old forest habitat due to approximately 9% of old forest habitat that would be influenced by continued cross-country motorized travel on 267,952 acres, including continued use of existing motorized trails un-authorized for motorized use (Table 3.03-37). In addition, Alternative 1 would contribute considerably add to the proliferation of motorized trails un-authorized for motorized use since unmanaged cross-country motorized travel would continue into the future and would have a high likelihood of increasing. All the action alternatives are similar in their overall cumulative impact within a 200 meter Zone of Influence that affects between 43 to 46 percent of late-seral habitat. No direct or indirect impacts would occur from implementing Alternatives 3 and 7, since no motorized trails would be added to the NFTS or added within late-seral forests, and, therefore, direct and indirect effects would not be added to existing cumulative effects under these two alternatives.

Table 3.03-43. Cumulative Effects for Percent of Late Seral Coniferous Forest (CWHR 4M, 4D, 5M,5D, 6) within 200 meters of Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of proposed alternatives							
Proposed motorized trail additions to the NFTS (negative impact)	0%	1%	0%	1%	3%	1%	0%
Cross country travel on existing motorized trails un-authorized for motorized use (negative impact)	16%	0%	0%	0%	0%	0%	0%
Prohibition of cross country travel on existing motorized trails un-authorized for motorized use (positive impact)	0%	16%	16%	16%	14%	16%	16%
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is prohibited (positive impact)	0	267,952	267,952	267,952	267,952	267,952	267,952
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel would not be prohibited (negative impact)	267,952	0	0	0	0	0	
Cumulative effects of past, present, and proposed actions							
Existing motorized routes- NFS lands (negative impact)	29%	29%	29%	29%	29%	29%	29%
Existing motorized routes on private land - non-NFS lands (negative impact)	10%	10%	10%	10%	10%	10%	10%
Existing non-motorized routes (negative impact)[1]	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	**59%**	**44%**	**43%**	**44%**	**46%**	**44%**	**43%**
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is prohibited	**0**	**267,952**	**267,952**	**267,952**	**267,952**	**267,952**	**267,952**
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel would continue (negative impact)	**267,952**	**0**	**0**	**0**	**0**	**0**	

[1]Non-motorized -assumption made that 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 Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System lands and private lands within the Tahoe NF boundary. Some, but not all, of these activities will 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

Analysis Measures

Motorized Route density: Motorized route density analysis is conducted at a Forest-wide scale to give an approximate coarse measure of habitat effectiveness for late seral coniferous forest 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.

Direct and Indirect Effects

Motorized Route Density in Old Forest Emphasis Areas (OFEAs)

The average motorized route densities within Old Forest Emphasis Areas (OFEAs) were determined within 7th field watersheds for each alternative (Table 3.03-44). In general, lower motorized route densities correlate with higher habitat connectivity or conversely, higher motorized route densities equate to greater habitat fragmentation of OFEAs. When comparing motorized route densities between 0-2 mi/mi^2, Alternatives 2, 3, 4, 7, 6 and 5 are similar in the amounts of habitat connectivity (range 27-28%). Alternative 1 provides the least amount of habitat connectivity (17%) within OFEAs as compared to all the other alternatives.

Table 3.03-44. Proportion of Old Forest Emphasis Areas with motorized route densities between 0 miles per square mile and >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	17%	28%	28%	28%	27%	27%	28%
2-4 Miles/Square Mile	48%	59%	59%	60%	56%	60%	60%
4-6 Miles/Square Mile	32%	11%	12%	11%	15%	12%	11%
>6 Miles/Square Mile	3%	1%	1%	1%	2%	1%	1%

Zone of Influence in Old Forest Emphasis Areas (OFEAs)

The zones of influence within OFEAs are analyzed for the proposed alternatives within 60 meters and within 200 meters of proposed additions of motorized trails to the National Forest Transportation System (NFTS) (Table 3.03-46 and Table 3.03-47).

Zone of Influence at 60 Meters

A comparison of alternatives for OFEAs indicates Alternative 1 contributes to the most habitat fragmentation (6%) through the loss of snags and down logs within 60 meters of proposed motorized trail additions to the NFTS. Alternative 5 contributes to the next highest habitat fragmentation within the 60 meter Zone of Influence. Alternatives 2, 3, 4, 6, & 7 do not affect habitat fragmentation through potential loss of snags and logs within a 60 meter Zone of Influence for old forest associated species.

Zone of Influence at 200 Meters

Comparing the Zone of Influence at 200 meters of proposed motorized trails un-authorized for motorized use 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 motorized trails un-authorized for motorized use. Alternative 5 contributes to 5% reduction in habitat effectiveness for old forest associated species, followed by Alternative 2 at 2% reduction in habitat effectiveness. Alternatives 6 and 7 both contribute to 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 3.03-45 summarizes the overall net effect to Old Forest Emphasis Areas (OFEAs) from the proposed actions from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-45. 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
Proposed Motorized Trail Additions to NFTS	Negatively affects the greatest proportion of OFEAs at 200 meters (16%) of existing motorized trails un-authorized for motorized use that would not be prohibited with cross country travel.	Negatively affects 1% of OFEAs within 200 meters of proposed motorized trail additions to NFTS	Does not affect late seral coniferous forest habitat, no motorized trail additions to NFTS proposed	Does not affect OFEAs within 200 meters of proposed motorized trail additions to NFTS.	Negatively affects 4% OFEAs within 200 meters of proposed motorized trail additions to NFTS.	Negatively affects 1% of OFEAs within 200 meters of proposed motorized trail additions to NFTS	Does not affect late OFEAs within a 200 meter zone of influence of proposed motorized trail additions to NFTS.
Cross Country Travel	Negatively affects 394,847 acres of OFEAs where cross country travel is not prohibited, including within 16% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 12% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	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 394,847 acres of OFEAs where cross country travel is not prohibited, including within 16% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Increases fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing routes motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 12% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.

* Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects OFEAs

Cumulative Effects from Motorized Routes

The cumulative effects to OFEAs within a 60 and 200-meter Zone of Influence are compared for the proposed alternatives (Tables 3.03-46 and 3.03-47).

60-Meter Zone of Influence

When comparing the relative cumulative effects to OFEAs within a 60-meter Zone of Influence by summing the direct and indirect effects of alternatives and the cumulative effects of past, present, and future actions, Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 23%) that poses the greatest risk to habitat fragmentation through potential loss of snags and down logs that may be removed for public safety along motorized and non-motorized routes. In addition, Alternative 1 would contribute significantly to the proliferation of motorized trails un-authorized for motorized use because unmanaged cross country motorized travel would continue into the future and has a high likelihood of increasing. Alternative 5 slightly increases cumulative impacts within OFEAs (cumulative impact score = 18%, where 1% of motorized trails un-authorized for motorized use added to the NFTS would contribute to additional habitat fragmentation). The remaining alternatives do not add to cumulative effects of existing, past, and future since no motorized trails un-authorized for motorized use would be added to the NFTS would influence OFEAs within a 60 meter Zone of Influence, and therefore direct and indirect impacts would not add to cumulative effects for alternatives 2, 3, 4, 6, and 7.

Table 3.03-46. Cumulative Effects to Old Forest Emphasis Areas within a 60-meter "Zone of Influence" of All Routes within the boundary of the Tahoe NF

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of proposed alternatives							
Proposed motorized trail additions to NFTS (negative impact)[1]	0%	0%	0%	0%	1%	0%	0%
Cross country travel on existing motorized trails un-authorized for motorized use	6%	0%	0%	0%	0%	0%	0%
Prohibition of cross country travel on existing motorized trails un-authorized for motorized use (positive impact)	0%	5%	6%	5%	4%	5%	5%
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is prohibited	0	394,847	394,847	394,847	394,847	394,847	394,847
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel would not be prohibited (negative impact)	394,847	0	0	0	0	0	0
Cumulative Effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	12%	12%	12%	12%	12%	12%	12%
Existing motorized routes on private land - non-NFS lands (negative impact)	4%	4%	4%	4%	4%	4%	4%
Existing non-motorized routes (negative impact)[1]	1%	1%	1%	1%	1%	1%	1%

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Cumulative Effects							
Overall Cumulative Effects equals the total impacts of all routes, both positive and negative	**23%**	**16%**	**17%**	**17%**	**18%**	**17%**	**17%**
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is prohibited (positive impact)	**0**	**394,847**	**394,847**	**394,847**	**394,847**	**394,847**	**394,847**
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is not prohibited (negative impact)	**394,847**	**0**	**0**	**0**	**0**	**0**	**0**

[1] Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60 meters.

200-Meter Zone of Influence

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 = 52%) that poses the greatest risk to habitat connectivity and other negative cumulative impacts associated with motorized routes within OFEAs due to approximately 16% of OFEAs that are influenced by motorized cross-country travel, including continued use of existing motorized trails un-authorized for motorized use. In addition, Alternative 1 would contribute significantly to the continued proliferation of motorized trails un-authorized for motorized use because unmanaged cross-country motorized travel would continue into the future and would have a high likelihood of increasing. Alternative 5 has the second greatest contribution to overall cumulative impacts within OFEAs (cumulative impact score = 44%) primarily due to the percentage of acres impacted by proposed additions of motorized trails to the NFTS. Alternatives 2 and 6 slightly contribute to existing cumulative impacts (overall cumulative impact scores = 41%). No direct or indirect impacts would occur in Alternatives 3, 4 or 7, since no motorized trails within OFEAs would be added to the NFTS, and therefore direct and indirect effects would not be added to existing cumulative effects.

Table 3.03-47. Cumulative Effects to Old Forest Emphasis Areas within a 200-meter Zone of Influence of All Routes within the Boundary of the Tahoe NF

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of proposed alternatives							
Proposed Motorized trail additions to NFTS (negative impact)[1]	0%	1%	0%	0%	4%	1%	0%
Cross country travel on existing motorized trails un-authorized for motorized use (negative impact)	16%	0%	0%	0%	0%	0%	0%
Prohibition of cross country travel on existing motorized trails un-authorized for motorized use (positive impact)	0%	20%	21%	20%	17%	20%	20%
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is prohibited (positive impact)	0	394,847	394,847	394,847	394,847	394,847	394,847
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is not prohibited (negative impact)	394,847	0	0	0	0	0	0

	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)	9%	9%	9%	9%	9%	9%	9%
Existing non-motorized routes (negative impact)[1]	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	**52%**	**41%**	**40%**	**40%**	**44%**	**41%**	**40%**
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is prohibited (positive impact)	0	394,847	394,847	394,847	394,847	394,847	394,847
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is not prohibited (negative impact)	394,847	0	0	0	0	0	0

[1] Non-motorized -assumption made that 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 Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest system lands and private lands within the Tahoe NF boundary. Some, but not all, of these activities will 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.:

- *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.
- *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 motorized trails un-authorized for motorized use. Alternative 3 minimizes fragmentation of old forest habitat the most of all the action alternatives since no motorized trail 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 180 designated California spotted owl Protected Activity Centers. Protected Activity Centers are delineated around spotted owl territorial pairs or territorial individuals. The Sierra Nevada Forest Plan Amendment (2004) provides direction to designate Protected Activity Centers (PACs) 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 (not including the 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 (Table 3.03-48). PACs and HRCAs are comprised of the best available habitat encompassing approximately 300 and 700 acres, respectively.

Table 3.03-48. Number of Tahoe NF Spotted owl PACs by Ranger District

Ranger District	Number of PACs
American River	46
Yuba River	110
Sierraville	11
Truckee	13
Total	**180**

Spotted owl population monitoring on the Tahoe NF varies considerably from year to year. Consistent spotted owl territory monitoring on the Forest was initiated in the early 1980s and reached a peak a decade later. Currently, most spotted owl monitoring on the Forest is conducted to support project-level analyses. Tahoe NF spotted owl territory monitoring between 1980 and 2006 ranges from a low of 7 per year to a high of 75 per year, with an average of 31% per year (Table 3.03-49).

Table 3.03-49. Number of Tahoe NF Spotted Owl PACs monitored each year

Year PACs Monitored	Number of PACs monitored
1980	12
1981	21
1982	37
1983	22
1984	8
1985	16
1986	20
1987	35
1988	23
1989	39
1990	60
1991	75
1992	68
1993	21
1994	27
1995	26
1996	36
1997	37
1998	7
1999	16
2000	21
2001	45
2002	57
2003	31
2004	29
2005	26
2006	12

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).

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 two spotted owls were killed by a vehicle on the Eldorado NF. The risk of spotted owl mortality from illegal shooting is also a possibility, but the degree to which this is happening is unknown as well.

Disturbance at a specific Site and Physiological Response: 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 is not conclusive at this point.

A study by Wasser et al. (1997) found that stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located <0.41 km from a major logging road compared to spotted owls in areas >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 <12meters and <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 late seral coniferous forest 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. Few snags would be expected to be retained along roads used by the public that are considered to be hazard trees. Hazard trees are those trees that pose a risk of falling on a road or facility including recreational facilities such as campgrounds, trailheads, etc. In addition, the amount of logs and snags along roadsides are expected to be reduced from public fuelwood gathering.

Caveats for determining the alternatives impacts to spotted owl from motorized routes: 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 Nesting Habitat (PACs) and Nest Locations

Analysis Measures

Disturbance at a specific site: Disturbance to spotted owl PACs and nest sites is analyzed for the alternatives at two scales - within PACs and within .25 miles of spotted owl Activity Centers or nest sites or nest groves.

1) 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 motorized trail additions to the NFTS within spotted owl PACs is compared to determine how the various alternatives have the potential to impact breeding spotted from noise disturbance and other factors associated with motorized use.

2) A 0.25 miles radius circle of spotted owl Activity Centers (nest or nest stand). Activity Centers represent known spotted owl nesting locations that may include most recently known nest site or nest stand. The miles of proposed motorized trail additions within a 0.25 mile radius of spotted owl Activity Centers is 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.

Direct and Indirect Effects to Breeding Spotted Owls (Disturbance at a Specific Site)

Protected Activity Centers

The miles of proposed motorized trails to be added to the NFTS are compared to determine how the various alternatives have the potential to impact breeding spotted from noise disturbance and other factors associated with motorized use.

Table 3.03-50 displays by alternative the total miles of motorized trail additions to the NFTS within spotted owl Protected Activity Centers (PACs), and the number and percentage of PACs affected. Alternatives 3 and 4 do not propose any motorized trail additions to the NFTS within spotted owl PACs. Alternative 1 clearly is a worse case scenario, where cross-country motorized travel, including use on approximately 81 miles of existing motorized trails un-authorized for motorized use, would continue to contribute to direct and indirect impacts to 133 (74%) spotted owl Protected Activity Centers. Alternative 5 proposes approximately 13 miles of motorized trails to be added to the NFTS that would contribute to direct and indirect effects to 34 spotted owl PACs (19%). Alternatives 2 & 6 are similar in their impacts to spotted owl PACs. Alternative 2 proposes approximately 3 miles of motorized trail additions to the NFTS within 11 PACs (6%), while Alternative 6 proposes approximately 3 miles of motorized trails to be added to the NFTS within 10 PACs (6%). Within Alternative 6, four PACs (PC096, PC116, SI015, SI060) are impacted by proposed motorized trail additions to the NFTS ranging from over ¼ mile up to 1 mile per PAC. The remaining six PACs are affected by short spurs that provide access to dispersed recreation sites, totaling less than ¼ mile for Alternative 6.

Table 3.03-50. Miles of Proposed Motorized trail 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 trail additons to the NFTS within Spotted Owl Protected Activity Centers (PACs)	0	3.2	0	0	12.5	2.5	2.3
Miles of Existing motorized trails un-authorized for motorized use associated with not prohibiting cross country travel	80.6	0	0	0	0	0	0
Number of Spotted Owl PACs Intersected by motorized trail additions to the NFTS	133	11	0	0	34	10	4
Percent of PACs Affected by motorized trail additions to the NFTS (Total Tahoe NF PACs = 180)	0%	6%	0%	0%	19%	6%	2%
Percent of PACs Affected by continued cross country travel on motorized trails un-authorized for motorized use (N= 180)	74%	0%	0%	0%	0%	0%	0%
Acres of PACs enhanced by prohibition of cross country travel	0	50,712	50,712	50,712	50,712	50,712	50,712
Acres of PACs where cross country travel would not be prohibited	50,712	0	0	0	0	0	0

* Alternative 1 includes existing motorized trails un-authorized for motorized use due to the continuance of cross country travel.

Within 0.25 Mile Radius Circle of Activity Centers (Nest Site or Nest Stand)

When considering the potential effects of the alternatives on breeding spotted owls within a 0.25 mile radius circle (Table 3.03-51), Alternative 1 clearly poses the greatest risk from noise disturbance to breeding owls by allowing motorized cross-country travel to continue, including on approximately 13 miles of existing motorized trails un-authorized for motorized use. Alternative 5 poses the next greatest risk of noise disturbance to breeding owls, where approximately 2 miles of motorized trails would be proposed for addition to the NFTS. Alternatives 3 and 4 do not pose a risk to breeding spotted owls, since no motorized trail additions to the NFTS are proposed within 0.25 mile radius circle of known or suspected nest stands. Alternatives 2, 6, and 7 pose a negligible potential impact to breeding spotted owls, since 0.1 miles of motorized trails or less are proposed to be added to the NFTS within the 0.25 mile radius circle of spotted owl activity centers.

Table 3.03-51. Miles of motorized trails added to the National Forest Transportation System (NFTS) within 0.25 Mile Radius Circle of California Spotted Owl Activity Center (Nest Site or Nest Stand)

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of Proposed motorized trails added to NFTS within 0.25 mile radius circle of Activity Centers (nest site or nest stand)	0	0.1	0	0	2.1	<0.1	<0.1
Miles of Existing motorized trails un-authorized for motorized use associated with Continued Cross Country Travel	12.8	0	0	0	0	0	0
Acres of Cross Country Travel Prohibition within 0.25 miles of Activity Centers	0	18,560	18,560	18,560	18,560	18,560	18,560
Acres of Cross Country travel not prohibited within 0.25 miles of Activity Centers	18,560	0	0	0	0	0	0

* Alternative 1 includes existing motorized trails un-authorized for motorized use due to the continuance of cross country travel.

Cumulative Effects to Breeding 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 180 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 Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on the 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 2007, four wildfires (Cottonwood, Pendola, Star, and Bassetts) resulted in burning approximately 4,000 acres of spotted owl habitat (1,869 PAC acres; 2,172 HRCA acres outside PACs) affecting 10 spotted owl PACs. 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 2007, over 13,000 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 Q, Wildlife 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 Routes

Cumulative effects to breeding spotted owls 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 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 trail additions to the NFTS (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 “motorized trails un-authorized for motorized use” or “decommissioned.” Motorized trails un-authorized for motorized use 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.

Cumulative Effects to Breeding Owls within Protected Activity Centers

When considering the cumulative effects of all motorized and non-motorized routes on both National Forest System lands and non-National Forest System lands, Alternative 1 has the greatest cumulative miles of routes (298 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 3.03-52). 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 populations. Because Alternative 1 does not prohibit public motor vehicle cross-country travel on 56,540 acres of spotted owl PACs, it is expected that cumulative effects to spotted owl PACs would increase with the continued increased route proliferation in the future.

Alternative 5 has the next highest cumulative impact to breeding spotted owls, which cumulatively has approximately 230 miles of routes, both motorized and non-motorized. Alternatives 2, 6, & 7 have similar cumulative impacts to breeding spotted owls, where total cumulative route miles are approximately 220 miles. Alternatives 3 and 4 do not add to existing cumulative impacts, since no motorized trails within PACs are proposed to be added to the NFTS. All the action alternatives would benefit from prohibiting cross country travel on 56,540 acres within spotted owl PACs.

Table 3.03-52. Cumulative Miles of Motorized and Non-motorized Routes within Spotted Owl Protected Activity Centers

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Miles of proposed motorized trail additions to NFTS (negative impact)[1]	0	3.2	0	0	12.5	2.5	2.3
Miles of existing motorized trails un-authorized for motorized use associated with cross country travel (negative impact)	80.1	0	0	0	0	0	0
Miles of motorized trails prohibited to motorized use (positive impact)	<1	77	80.1	80.1	68	78	78
Acres of Spotted Owl PACS where cross country travel is prohibited (positive impact)	0	50,712	50,712	50,712	50,712	50,712	50,712
Acres of Spotted Owl PACS where cross country travel is not prohibited (positive impact)	50,712	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Miles of Existing Routes on NFS lands (negative)	189	189	189	189	189	189	189
Miles of Existing Routes on non NFS lands (private) (negative)	8	8	8	8	8	8	8
Miles of Non-motorized routes (negative)	20	20	20	20	20	20	20
Miles of Decommissioned Routes (positive)	5	5	5	5	5	5	5
Net Cumulative Effect[2]							
Miles of All Motorized Routes witin PACs (overall negative cumulative effect)	**297.6**	**220.2**	**217**	**217**	**229.5**	**219.5**	**219.3**
Acres of Spotted Owl PACS where cross country travel is prohibited (positive cumulative effect)	**0**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**
Acres of Spotted Owl PACS where cross country travel is not prohibited (negative cumulative effect)	**50,712**	**0**	**0**	**0**	**0**	**0**	**0**

[1]Alternative 1 includes existing motorized trails un-authorized for motorized use with the continuance of cross country travel.

[2] Net Cumulative Impact = Sum Total of Impacts both positive and negative

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 spotted owl activity centers (nest site or nest stand), it can be noted that a similar theme emerges as compared to the cumulative effects of the proposed alternatives within PACs. Alternative 1 has the most cumulative miles (127 miles) of motorized and non-motorized routes compared to the rest of the alternatives (range 95 to 100 miles) (Table 3.03-53). Alternatives 2, 3, 4, 6, and 7 each have approximately 95 cumulative route miles within the 0.25 mile radius analysis circle; however, the actual miles of proposed additions of motorized trails un-authorized for motorized use, potentially affecting an owl nest site or nest grove site, is very low (range 0 miles to 0.2 miles). Therefore, it can be concluded that implementing alternatives 2, 3, 4, 6, or 7 would have very little additional cumulative impact to spotted owl PACs on the Tahoe 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 32 miles of existing motorized trails un-authorized for motorized use, followed by Alternative 5, which proposes to add 5 miles of motorized trails to the NFTS within 0.25 miles of activity centers.

Table 3.03-53. Cumulative Miles of Motorized and Non-motorized Routes within a .25 Mile Radius Circle of Spotted Owl Activity Centers (Nest/Roost Sites)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Miles of proposed motorized trail additions to NFTS (negative impact)	0	0.2	0	0	5.4	0.2	0.2
Miles of Existing motorized trails un-authorized for motorized use where cross country travel would not be prohibited (negative impact)	32.1	0	0	0	0	0	0
Miles of motorized trails where use would be prohibited (positive impact)	0.0	31.9	32.1	32.1	26.8	31.9	32.0
Acres within 0.25 mile radius circle of Spotted owl Activity Centers where cross country travel is prohibited (positive impact)	0	18,560	18,560	18,560	18,560	18,560	18,560
Acres within 0.25 mile radius circle of Spotted owl Activity Centers where cross country travel is not prohibited (negative impact)	18,560	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Miles of existing motorized routes - NFS lands (negative impact)	77.7	77.7	77.7	77.7	77.7	77.7	77.7
Miles of existing routes on non-NFS lands (private) (negative impact)	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Miles of existing non-motorized routes (negative impact)	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Miles of decommissioned routes (positive impact)	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Net Cumulative Effect[2]							
Miles of All Motorized Routes (overall negative impacts)	127.0	94.9	94.7	94.7	100.3	94.7	94.7
Acres within 0.25 mile radius circle of Spotted owl Activity Centers where cross country travel is prohibited (positive impacts)	0	18,560	18,560	18,560	18,560	18,560	18,560
Acres within 0.25 mile radius circle of Spotted owl Activity Centers where cross country travel is not prohibited (negative impact)	18,560	0	0	0	0	0	0

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use associated with the continuance of cross country travel.

[2] Net Cumulative Impact = Sum Total of Impacts both positive and negative

Summary of Cumulative Effects to Breeding Spotted Owls

An analysis of breeding spotted owls on the Tahoe NF at two scales (within PACs and within a 0.25 mile radius circle), 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 potentially pose even greater threats to breeding spotted owl populations on the Tahoe NF. Under all of the other alternatives, cross-country motorized travel would be prohibited.

Spotted Owl Habitat Fragmentation and Edge Effects

Analysis Measures

Zone of Influence within PACs and HRCAs: In addition to determining the habitat fragmentation within CWHR types 4M, 4D, 5M, 5D, & 6, described previously, zones of influence were determined within spotted owl PACs and HRCAs at three scales - within 60 meters, 100 meters, and 200 meters of motorized routes.

Direct and Indirect Effects

Zone of Influence within PACs

Habitat fragmentation and edge effects were described for late seral coniferous forest associated species within late seral coniferous forest types (CWHR types 4M, 4D, 5M, 5D, & 6) and within Old Forest Emphasis Areas (OFEAs) under the section “Effects Common to All Late Seral coniferous forest Associated Species.” Those analyses provided a forest-wide view of how the project alternatives affect spotted owl habitat fragmentation within late seral coniferous forest 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.

Zone of Influence at 60, 100, and 200 meters

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 project alternatives are analyzed for the amount of habitat fragmentation and edge effects occurring by considering the Zone of Influence within PACs at three spatial scales - within 60 meters, 100 meters, and 200 meters of motorized trails un-authorized for motorized use (Table 3.03-54). 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. Since absolute noise disturbance thresholds of concern for California spotted owls has not been established, 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).

Zone of Influence at 60 Meters

A comparison of alternatives within spotted owl PACs on the Tahoe NF indicates Alternative 1 contributes to the most habitat fragmentation (7%) through the loss of snags and down logs within 60 meters of existing motorized trails un-authorized for motorized use which would be expected to continue to be used under continued cross-country travel. Alternative 5 contributes to the next highest habitat fragmentation (1%) within the 60 meter Zone of Influence within mature and late seral coniferous forest habitat. Alternatives 2, 6, & 7 affect an insignificant amount (<1%) of spotted owl PACs and, therefore, overall fragmentation would not be affected. Alternatives 3 and 4 do not propose any additions of motorized trails un-authorized for motorized use within 60 meters of PACs and, therefore, would not affect habitat within spotted owl PACs through the potential loss of snags and logs within a 60-meter Zone of Influence.

Zone of Influence at 100 Meters

The spotted owl has been shown to be sensitive to noise disturbance generated by helicopters within a distance of 100 meters (Delaney et al. 1999). At a 100-meter Zone of Influence, Alternative 1 adversely reduces spotted owl habitat effectiveness within PACs by 11% of spotted owl PACs. Alternative 5 reduces habitat effectiveness of spotted owl PACs by 2%. Alternatives 2, 3, 4, 6, and 7 do not pose a concern for habitat fragmentation within spotted owl PACs across the Tahoe NF within a 100-meter Zone of Influence. Less than 1% of habitat within PACs would be affected by the addition of motorized trails to the NFTS in Alternatives 2, 6 and 7.

Zone of Influence at 200 Meters

Comparing the Zone of Influence at 200 meters of proposed motorized trail additions to the NFTS, within spotted owl PACs shows Alternative 1 reduces habitat effectiveness for spotted owls considerably at 20%. Alternative 5 contributes to 3% reduction in habitat effectiveness of spotted owl PACs. Alternatives 2 and 6 reduce habitat effectiveness within PACs by 1% or less. Alternatives 3 and 4 would not effect overall habitat effectiveness of spotted owl PACs since no motorized trails un-authorized for motorized use are proposed in spotted owl habitat within PACs.

Table 3.03-54. Proportion of California spotted owl PACs within 60, 100, and 200 Meters of Proposed Motorized Route Additions

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Percent of spotted owl PACs within a 60 meter Zone of Influence of Proposed Additions of motorized trails to the NFTS	7%	<1%	0%	0%	1%	<1%	<1%
Percent of spotted owl PACs within a 100 meter Zone of Proposed Additions of motorized trails to the NFTS	11%	<1%	0%	0%	2%	<1%	<1%
Percent of spotted owl PACs within a 200 meter Zone of Influence of Proposed Additions of motorized trails to the NFTS	20%	1%	0%	0%	3%	1%	<1%

*Alternative 1 includes existing motorized trails un-authorized for motorized use with the continuance of cross country travel.

Cumulative Effects to Habitat Fragmentation and Edge Effects within California Spotted Owl PACs

Zone of Influence at 60, 100, and 200 meters

The cumulative effects to spotted owl PACs within a 60-, 100-, 200-meter Zone of Influence are compared for the proposed alternatives (Tables 3.03-55., 3.03-56, and 3.03-57).

60-Meter Zone of Influence

When comparing the relative cumulative effects to spotted owl PACs within a 60-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 = 23%) and, therefore, poses the greatest risk to spotted owl PAC habitat fragmentation through potential loss of snags and down logs that may be removed for public safety along motorized and non-motorized routes. In addition, Alternative 1 would contribute significantly to the proliferation of motorized trails un-authorized for motorized use because unmanaged cross country motorized travel would continue into the future and has a high likelihood of increasing. Alternative 5 slightly increases cumulative impacts from habitat fragmentation within spotted owl PACs (cumulative impact score = 17%) where 1% of spotted owl PACs would be influenced by the addition of motorized trails to the NFTS. Alternatives 2, 3, 4, 6, and 7 do not add to cumulative effects or add a nominal impact, since less than 1% are proposed for addition to the NFTS that influence PACS within 60 meters of proposed motorized trails to be added to the NFTS. In addition, under the action alternatives, cross country travel would be prohibited, including on motorized trails un-authorized for motorized use, affecting 6% to 7% of PACs. In addition the prohibition of cross country travel would enhance habitat effectiveness within 50,712 acres within all PACs.

Table 3.03-55. Cumulative Effects - Percent of Spotted Owl Protected Activity Centers within 60 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							
Proposed motorized trail additions to NFTS (negative impact)[1]	0%	<1%	0%	0%	1%	<1%	<1%
Miles of Existing motorized trails un-authorized for motorized use, where cross country travel is not prohibited (negative impact)	7%	0%	0%	0%	0%	0%	0%
Miles of motorized trails un-authorized for motorized use, where cross country travel would be prohibited (positive impact)	0%	7%	7%	7%	6%	7%	7%
Acres of Spotted owl Activity Centers, where cross country travel is prohibited (positive impact)	0	50,712	50,712	50,712	50,712	50,712	50,712
Acres of Spotted owl Activity Centers, where cross country travel is not prohibited (negative impact)	50,712	0	0	0	0	0	0

	Alt 1[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)	14%	14%	14%	14%	14%	14%	14%
Existing routes on non-NFS lands (private) (negative impact)	1%	1%	1%	1%	1%	1%	1%
Existing non-motorized routes (negative impact)[2]	1%	1%	1%	1%	1%	1%	1%
Decommissioned routes (positive impact)	0%	0%	0%	0%	0%	0%	0%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**23%**	**16%**	**16%**	**16%**	**17%**	**16%**	**16%**
Acres of spotted PACs where cross country travel is prohibited (positiive impact)	**0**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**
Acres of Spotted owl Activity Centers, where cross country travel would continue (negative impact)	**50,712**	**0**	**0**	**0**	**0**	**0**	**0**

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use 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

100-Meter Zone of Influence

Table 3.03-56 displays the relative cumulative impacts for each of the alternatives within a 100- meter Zone of Influence. Comparing the relative cumulative effects to spotted owl PACs within a 100-meter Zone of Influence (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions) indicates that, Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 36%) and, therefore, poses the greatest risk to habitat connectivity and edge effects associated with routes within spotted owl PACs. In Alternative 1, approximately 11% of PAC acres are influenced by the continued use of existing motorized trails un-authorized for motorized use associated with the continuation of cross-country motorized travel,. In addition, Alternative 1 would contribute significantly to the continued proliferation of motorized trails un-authorized for motorized use because unmanaged cross-country motorized travel would continue into the future and would have a high likelihood of increasing. Alternative 5 has the second greatest contribution to overall cumulative impacts within spotted owl PACs on the Tahoe NF (cumulative impact score = 27%), due to 2% of acres impacted by proposed additions of motorized trails to the NFTS. Alternatives 2, 3, 4, 6 and 7 either do not add or only minimally add to existing cumulative impacts within 100 meters of spotted owl PACs across the Tahoe NF.

Table 3.03-56. Cumulative Effects - Proportion of Spotted Owl Protected Activity Centers within 100 meters 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							
Proposed motorized trail additions to the NFTS (negative impact)	0%	<1%	0%	0%	2%	<1%	<1%
Miles of Existing motorized trails un-authorized for motorized use, where cross country travel would not be prohibited (negative impact)	11%	0%	0%	0%	0%	0%	0%
Miles of motorized trails un-authorized for motorized use, where cross country travel would be prohibited (positive impact)	0%	11%	11%	11%	9%	11%	11%
Acres of spotted PACs where cross country travel would not be prohibited (negative impact)	0	50,712	50,712	50,712	50,712	50,712	50,712
	50,712	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	21%	21%	21%	21%	21%	21%	21%
Existing routes on non-NFS lands (private) (negative impact)	2%	2%	2%	2%	2%	2%	2%
Existing non-motorized routes (negative impact)[1]	2%	2%	2%	2%	2%	2%	2%
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	**36%**	**25%**	**25%**	**25%**	**27%**	**25%**	**25%**
Acres of spotted PACs where cross country travel is prohibited (positiive impact)	**0**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**
Acres of spotted PACs where cross country travel is not prohibited (negative impact)	**50,712**	**0**	**0**	**0**	**0**	**0**	**0**

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use 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.

200 Meter Zone of Influence

Table 3.03-57 displays the cumulative effects of the proposed alternatives of 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 = 59%) 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 motorized trails un-authorized for motorized use within spotted owl PACs. In addition, Alternative 1 would contribute to continued route proliferation because unmanaged cross-country motorized travel would continue into the future. Alternative 5 has the second greatest contribution to overall cumulative impacts within PACs (cumulative impact score = 42%), primarily due to the percentage of acres impacted by proposed additions of existing motorized trails un-authorized for motorized use to the NFTS. Alternatives 3 and 4 do not add to existing cumulative effects, since no routes within 200 meters of PACs would be added to the NFTS. Alternatives 2, 6, and 7 affect 1% or less spotted owl habitat within 200 meters of PACs. In addition, cross country travel including use on existing motorized trails un-authorized for motorized use would be prohibited under all the action alternatives.

Table 3.03-57. Cumulative Effects - Proportion of Spotted Owl Protected Activity Centers within 200 meter Zone of Influence of All Routes

	Alt1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Proposed motorized trail additions to the NFTS (negative impact)[1]	0%	1%	0%	0%	3%	1%	<1%
Miles of Existing motorized trails un-authorized for motorized use, where cross country travel would continue (negative impact)	20%	0%	0%	0%	0%	0%	0%
Miles of motorized trails un-authorized for motorized use, where cross country travel would be prohibited (positive impact)	0%	20%	20%	20%	17%	20%	20%
Acres of spotted PACs where cross country travel is prohibited (positiive impact)	0	50,712	50,712	50,712	50,712	50,712	50,712
Acres of spotted PACs where cross country travel would not be prohibited (negative impact)	50,712	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	32%	32%	32%	32%	32%	32%	32%
Existing routes on non-NFS lands (private) (negative impact)	4%	4%	4%	4%	4%	4%	4%
Existing non-motorized routes (negative impact)[2]	3%	3%	3%	3%	3%	3%	3%
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	**59%**	**40%**	**39%**	**39%**	**42%**	**40%**	**39%**
Acres of spotted PACs where cross country travel is prohibited (positiive impact)	**0**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**
Acres of spotted PACs where cross country travel would not be prohibited (negative impact)	**50,712**	**0**	**0**	**0**	**0**	**0**	**0**

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use 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 to PACs at 60, 100, and 200 meter Zones of Influence

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 National Forest System lands and non-National Forest System lands. The Zone of Influence at 60, 100, and 200 meters were used to determine potential habitat fragmentation from the influence of noise, edge effects, and habitat alteration associated with motorized and non-motorized routes. Ultimately, Alternative 1 clearly poses the greatest cumulative effects at all three scales (60, 100, and 200 meter of Zone of Influence), followed by Alternative 5. Continued motorized cross-country travel, including continued use of existing motorized trails un-authorized for motorized use, under Alternative 1 would add to existing cumulative impacts by 7% within PACs at 60 meters and increases to 11% and 20% at 100 and 200 meters Zone of Influence, respectively. Implementing Alternative 1 poses the greatest concern to habitat fragmentation to spotted owl habitat within PACs. Alternative 5 would add to existing cumulative impacts by 1%, 2%, and 3% within a 60-meter, 100-meter, and 200-meter Zone of Influence, respectively. The remaining alternatives only slightly contribute to additional cumulative impacts at all 3 zones of influence, but would not likely affect overall habitat fragmentation within spotted owl PACs at the Forest-wide scale and, therefore, should not affect breeding success for spotted owls on the Tahoe NF.

Direct and Indirect Effects to Fragmentation and Edge Effects within Home Range Core Areas (HRCAs)

Zone of Influence at 60, 100, and 200 meters

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.

To evaluate habitat fragmentation, noise disturbance, and edge effects on spotted foraging habitat or HRCAs, the Zone of Influence of proposed motorized routes within spotted owl HRCAs was determined for each alternative within 60, 100, and 200 meters (Table 3.03-58).

Zone of Influence at 60 Meters

A comparison of alternatives within spotted owl HRCAs on the Tahoe NF indicates Alternative 1 contributes to the most habitat fragmentation (7%) through the potential loss of snags and down logs within 60 meters and due to continued cross country travel, including use on existing motorized trails un-authorized for motorized use. Alternative 5 contributes to the next highest habitat fragmentation (1%) within the a 60-meter Zone of Influence within HRCAs. Alternatives 2, 4, 6 and 7 affects less than 1% of all HRCA acres on the Tahoe NF from habitat fragmentation along proposed routes within a 60 meter distance. Alternative 3 does not affect habitat connectivity or habitat fragmentation within HRCAs through the potential loss of habitat components such as snags or down logs.

Zone of Influence at 100 Meters

At a 100 meter Zone of Influence, Alternative 1 adversely reduces spotted owl habitat effectiveness due to habitat fragmentation and noise disturbance within HRCAs by 11%. Alternative 5 reduces habitat effectiveness within spotted owl HRCAs by 2%, followed by Alternative 2 and 6 at 1%. Alternatives 3, 4, and 7 do not pose a concern for habitat fragmentation within spotted owl PACs across the Tahoe NF within a 100 meter Zone of Influence.

Zone of Influence at 200 Meters

Comparing the Zone of Influence at 200 meters of motorized trails to be added to the NFTS within spotted owl HRCAs, shows Alternative 1 reduces habitat effectiveness for spotted owls considerably at 20%. Alternative 5 contributes to 3% reduction in habitat effectiveness within spotted owl HRCAs on the Tahoe NF. Alternatives 2, 4, 6 and 7 reduce habitat effectiveness within HRCAs by 1%. Alternatives 3 would not effect overall habitat effectiveness within spotted owl HRCAs at a 200 meter Zone of Influence.

Table 3.03-58. Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within 60, 100, and 200 Meters influenced by Proposed Motorized Routes

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Percent of spotted owl HRCAs within a 60- meter Zone of Influence of Proposed motorized trail additions to NFTS	7%	<1%	0%	<1%	1%	<1%	<1%
Percent of spotted owl HRCAs within a 100- meter Zone of Proposed motorized trail additions to NFTS	11%	1%	0%	<1%	2%	1%	<1%
Percent of spotted owl HRCAs within a 200- meter Zone of Influence of Proposed motorized trail additions to NFTS	20%	1%	0%	1%	3%	1%	1%

* Alternative 1 includes existing motorized trails un-authorized for motorized use associated with the continuance of cross country travel.

Cumulative Effects to HRCAs

Zone of Influence at 60, 100, and 200 meters

The cumulative effects to spotted owl HRCAs within a 60, 100, 200 meter Zone of Influence are compared for the proposed alternatives (Tables 3.03-59., 3.03-60, and 3.03-61). 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.

60 Meter Zone of Influence

Comparing the relative cumulative effects to spotted owl HRCAs within a 60-meter Zone of Influence (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions), indicates Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 23%) that poses the greatest risk to spotted owl HRCAs habitat fragmentation through potential loss of snags and down logs that may be removed for public safety along motorized and non-motorized routes (Table 3.03-59). In addition, Alternative 1 would contribute significantly to the proliferation of motorized trails un-authorized for motorized use because unmanaged cross country motorized travel would continue into the future and has a high likelihood of increasing. Alternative 5 has the second greatest overall cumulative impacts from habitat fragmentation within spotted owl HRCAs (cumulative impact score = 17%), followed by Alternatives 2, 3, 4, 6, and 7 (cumulative impact score = 16%). Habitat connectivity within HRCAs would be maintained for all the action alternatives, since these alternatives add 1% or less to cumulative effects of existing, past, and reasonably foreseeable future impacts, since few or no proposed motorized trail additions to the NFTS would affect spotted owl HRCAs across the Tahoe NF within a 60 meter Zone of Influence. In addition, route proliferation would not continue into the future for all of the action alternatives due to the prohibition of cross country motorized travel.

Table 3.03-59. Cumulative Effects - Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within a 60 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 trail additions to the NFTS (negative impact)	0%	<1%	0%	<1%	1%	<1%	<1%
Continued use of existing motorized trails un-authorized for motorized use (negative impact)	7%	0%	0%	0%	0%	0%	0%
Routes prohibited for motorized use as a result of prohibition of cross country travel (positive impact)	0%	7%	7%	7%	6%	7%	7%
Acres of HRCAs where cross country travel is prohibited (positive impact)	0	98,806	98,806	98,806	98,806	98,806	98,806
Acres of HRCAs where cross country travel is not prohibited (negative impact)	98,806	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	14%	14%	14%	14%	14%	14%	14%
Existing motorized routes on non-NFS lands (private) (negative impact)	1%	1%	1%	1%	1%	1%	1%
Existing non-motorized routes (negative impact)[2]	1%	1%	1%	1%	1%	1%	1%
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	**23%**	**16%**	**16%**	**16%**	**17%**	**16%**	**16%**
Acres of HRCAs where cross country travel is prohibited (positive impact)	**0**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**
Acres of HRCAs where cross country travel is not prohibited (negative impact)	**98,806**	**0**	**0**	**0**	**0**	**0**	**0**

[1] Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60 meters

100 Meter Zone of Influence

Table 3.03-60 displays the relative cumulative impacts for each of the alternatives within a 100 meter Zone of Influence. Comparing the relative cumulative effects to spotted owl HRCAs within a 100 meter Zone of Influence (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions) indicates that, Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 35%) and, therefore, poses the greatest risk to habitat connectivity and edge effects associated with routes within spotted owl HRCAs. In Alternative 1, by not prohibiting cross-country travel, approximately 11% of HRCA acres are influenced by continued use of existing motorized trails un-authorized for motorized use. In addition, Alternative 1 would contribute significantly to the continued proliferation of motorized trails un-authorized for motorized use because unmanaged cross-country motorized travel would continue into the future and would have a high likelihood of increasing. Alternative 5 has the second greatest contribution to overall cumulative impacts within spotted owl HRCAs on the Tahoe NF (cumulative impact score = 26%). Alternatives 2 and 6 contribute slightly less (25%) to overall cumulative impacts when compared to Alternative 5. Alternatives 3, 4, and 7 do not add to existing cumulative impacts within spotted owl HRCAs across the Tahoe NF, and, therefore would not affect habitat connectivity within HRCAs.

Table 3.03-60. Cumulative Effects - Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within a 100-meter Zone of Influence of Proposed Addition 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 trail additions to NFTS (negative impact)	0	1%	0%	<1%	2%	1%	<1%
Continued use on motorized trails un-authorized for motorized use	11%	0%	0%	0%	0%	0%	0%
Routes prohibited to motorized use as a result of prohibition of cross country travel (positive impact)	0%	11%	11%	11%	10%	11%	11%
Acres of spotted owl HRCAs where cross country travel is prohibited (positive impact)	0	98,806	98,806	98,806	98,806	98,806	98,806
Acres of spotted owl HRCAs where cross country travel is not prohibited (negative impact)	98,806	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	20%	20%	20%	20%	20%	20%	20%
Existing routes on non-NFS lands (private) (negative impact)	2%	2%	2%	2%	2%	2%	2%
Existing non-motorized routes (negative impact)[1]	2%	2%	2%	2%	2%	2%	2%
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	**35%**	**25%**	**24%**	**24%**	**26%**	**25%**	**24%**
Acres of spotted owl HRCAs where cross country travel is prohibited (positive impact)	**0**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**
Acres of spotted owl HRCAs where cross country travel is not prohibited (negative impact)	**98,806**	**0**	**0**	**0**	**0**	**0**	**0**

[1]Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60 meters.

200 Meter Zone of Influence

Table 3.03-61 displays the cumulative effects of the proposed alternatives of motorized and non-motorized routes on NFS and non-NFS lands within spotted owl HRCAs. 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 = 35%) and, therefore, poses the greatest risk to habitat connectivity and other negative cumulative impacts (including noise disturbance) associated with routes within spotted owl HRCAs. In addition, Alternative 1 would contribute to continued route proliferation on 98,806 HRCA acres because unmanaged cross-country motorized travel would not be prohibited into the future. Overall cumulative effects of the action alternatives are similar (cumulative impact scores range from 24% to 26%). Alternatives 2, 5, 6, and 7 slightly add to cumulative impacts, where 1% of HRCA acres would be influenced by the addition of motorized trails to the NFTS. Alternative 4 minimally adds to existing cumulative effects, since only a small percentage (<1%) of HRCAs would be affected by motorized trail additions to the NFTS.

Alternative 3 would not add to cumulative effects, since no motorized trail additions to the NFTS are proposed. Finally, all cross country travel would be prohibited on 98,806 HRCA acres, including the use on existing motorized trails un-authorized for motorized use that affect approximately 11% of HRCAs within Alternatives 2, 3, 4, 5, 6, and 7.

Table 3.03-61. Cumulative Effects - Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within a 200-meter "Zone of Influence" of Proposed 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 trail additions to NFTS (negative impact)	0%	1%	0%	1%	3%	1%	1%
Continued use on motorized trails un-authorized for motorized use (negative)	20%	0%	0%	0%	0%	0%	0%
Cross country travel prohibited, including on existing motorized trails un-authorized for motorized use (positive impact)	0%	19%	20%	20%	17%	19%	20%
Acres of spotted owl HRCAs where cross-country travel is prohibited (positive impact)	0	98,806	98,806	98,806	98,806	98,806	98,806
Acres of spotted owl HRCAs where cross-country travel is not prohibited (negative impact)	98,806	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	30%	30%	30%	30%	30%	30%	30%
Existing routes on non-NFS lands (private) (negative impact)	4%	4%	4%	4%	4%	4%	4%
Existing non-motorized routes (negative impact)[1]	4%	4%	4%	4%	4%	4%	4%
Decommissioned routes (positive impact)	2%	2%	2%	2%	2%	2%	2%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**58%**	**39%**	**38%**	**39%**	**41%**	**39%**	**39%**
Acres of spotted owl HRCAs where cross-country travel is prohibited (positive impact)	**0**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**
Acres of spotted owl HRCAs where cross-country travel is not prohibited (negative impact)	**98,806**	**0**	**0**	**0**	**0**	**0**	**0**

[1] 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 60-meter, 100-meter, and 200-meter Zone of Influence of all motorized and non-motorized within NFS and non-NFS were determined 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 7%, 11%, 20% of spotted owl HRCAs within a 60-meter, 100-meter, and 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 (see Appendix L, Wildlife Biological Evaluation). 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 project 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 project 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 project alternatives will 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, the 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 motorized trails un-authorized for motorized use, which would continue without prohibiting cross country travel. Alternative 1 reduces habitat effectiveness by 17% (28,200 acres out of 164,957 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.

Alternative 5 affects approximately 6,807 acres (0.7% of Tahoe NF habitat), and Alternatives 2, 4, and 6 similarly affect 972 acres of late seral closed canopy coniferous forest habitat or 0.1% of Tahoe NF habitat within a 200-meter zone of influence of proposed motorized trail 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 proposed motorized trail additions to the NFTS. The Tahoe NF Motorized Travel

Management Project action alternatives will 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 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 National Forest System lands in the Sierra Nevada. The trend is slightly increasing (from 7% to 9% within the last decade on National Forest System lands).

Population Status and Trend 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 3% of Sierra Nevada habitat) by the alternatives, the Tahoe NF Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of California spotted owl across the Sierra Nevada bioregion.

Summary of Direct and Indirect, Impacts to Spotted Owls

When considering all the direct, indirect, and cumulative impact to spotted owls within PACs, within 0.25 miles of activity centers, and within HRCAs, Table 3.03-62 summarizes the overall net effect to California spotted owl from the proposed actions from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-62. California Spotted Owl - Summary of Overall Net Direct, Indirect, and Cumulative Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Trail additions to NFTS	Negatively affects the greatest proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs (i.e. 20% motorized trails un-authorized for motorized use	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H	Does not affect spotted owl PACs, within 0.25 miles of activity centers, and within HRCAs	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H .	Negatively affects a small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 3% H	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H
Cross Country Travel	Negatively affects PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is not prohibited	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 19% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 20% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 19% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 17% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 19% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited public use (i.e., 20% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)
	0%	19%	20%	20%	17%	19%	20%
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	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 PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is not prohibited. Increases disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.

* Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

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 between 7 to 20% PAC acres within a 60 to 200-meter zone of influence of existing routes unauthorized to motorized public use. Compared to Alternative 1, The action alternatives all reduce overall effects to spotted owl PACs by prohibiting cross country travel, including between 7% to 20% PAC acres within a 60 to 200-meter zone of influence of existing routes unauthorized to motorized public use. 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 94 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 goshawks 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 have 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 and sometimes nests are located along roads and trails when they are not yet in use. Additionally, roads and trails provide flight access for goshawk. When the snow melts, these sites can potentially be areas of conflict as these roads and trails are used by people. Joslin and Youmans (1999) recommends 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, the wider the road, the more the 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

Analysis Measures

Disturbance to Breeding Northern Goshawk

The direct and indirect effects to breeding Northern goshawk may be measured by the amount of disturbance that may be generated from noise or other motorized trail and road associated factors within the following:

1) **Protected Activity Centers (PACs)**. PACs are delineated surrounding all known and newly discovered breeding territories on National Forest System 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” dbh 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.

2) 0.25 miles radius circle of goshawk Activity Centers (nest or nest stand).

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.

Direct and Indirect Effects to Breeding Northern Goshawks

Disturbance to Breeding Northern Goshawk

Protected Activity Centers

The miles of proposed motorized trails 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 3.03-63 displays the total miles of motorized trails that are proposed to be added to the NFTS within goshawk Protected Activity Centers (PACs) by alternative. It also displays the number and percentage of PACs affected by proposed motorized trail additions to the NFTS for each alternative. There are a total of 97 goshawk PACs designated on the Tahoe NF. Alternative 3 does not propose any motorized trails to be added to the NFTS within goshawk PACs, and therefore, would not cause direct or indirect effects to breeding goshawk within PACs. Alternative 1 contributes significantly to direct and indirect effects to breeding goshawk, where cross-country motorized travel would continue, including motorized use of over 29 miles of existing motorized trails un-authorized for motorized use, where 68% of goshawk PACs (66 PACs) on the Tahoe NF would be subjected to disturbance from continued use. Alternative 5 proposes approximately 6 miles of motorized trails to be added to the NFTS that would contribute to direct and indirect effects to 18% of the Tahoe NF goshawk PACs (25 PACs). Alternative 6 proposes approximately 1 mile of motorized trail additions to the NFTS (SV-005, TKN-JN, and TKN-5) affecting 3 goshawk PACs (Perazzo Meadow PAC, Wornmill PAC, Castle Valley PAC).;; over 1 mile of additional motorized trails affecting 4 PACs, and approximately ¼ mile of routes accessing dispersed recreation sites affecting 3 PACs.

Alternative 2 would affect a total of 4 goshawk PACs, where approximately 1 mile of motorized trail additions to the NFTS (SV-005, TKN-J9, TKN-J5) would affect 3 PACs (Perazzo Meadow PAC, Wornmill PAC, and Castle Valley PAC. Alternative 6 would include the same impacts as Alternative 2, except route SV-005 within the Perazzo Meadow PAC would not be added to the NFTS. Implementing Alternative 7 would impact 2% of goshawk PACs on the Tahoe NF, where the Wornmill and Castle Valley PACs could be negatively affected with additions of routes TKN-J9 and TKN-J5, respectively.

Table 3.03-63. Miles of Proposed Motorized Trail Additions to the NFTS within Northern Goshawk 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 trail additions to the NFTS within Goshawk Protected Activity Centers (PACs)	0	1.4	0	0.02	5.8	1.1	0.8
Miles of Existing motorized trails un-authorized for motorized use within Goshawk Protected Activity Centers (PACs) that would continue to be use under cross country travel	29.4	0	0	0	0	0	0
Miles of motorized trails un-authorized for motorized use within Goshawk Protected Activity Centers (PACs) prohibited to motorized use with cross country travel	0	28	29.4	29.4	23.6	28.3	28.6
Number of Goshawk PACs Intersected by motorized trails added to the NFTS	66	4	0	0	17	3	2
Percent of Goshawk PACs Affected by Motorized trail additions to the NFTS (Total Tahoe NF Goshawk PACs = 97)	68%	5%	0%	0	18%	4%	2%
Acres Prohibited to Motorized Cross Country Travel within Goshawk PACs	0	20,036	20,036	20,036	20,036	20,036	20,036
PAC Acres Where Cross Country Travel is not prohibited	20,036	0	0	0	0	0	0

* Alternative 1 includes existing motorized trails un-authorized for motorized use associated with cross country travel

0.25 Mile Radius Circle of Goshawk Activity Centers (Nest Site or Nest Stand)

Table 3.03-64 displays the potential effects of the proposed alternatives on breeding goshawk within a 0.25 mile radius circle of goshawk Activity Centers (nest site or nest stand). Alternative 1 poses the greatest risk from noise disturbance to breeding goshawk by allowing continued cross-country motorized travel, including motorized use on over 17 miles of existing motorized trails un-authorized for motorized use within 0.25 miles of goshawk activity centers. Alternative 5 poses the next greatest risk of noise disturbance from motorized vehicles to breeding goshawk, where approximately 4 miles of motorized trails would be added to the NFTS within the 0.25 mile radius circle of goshawk nest sites. Alternatives 2, 6, and 7 poses the next greatest direct and indirect impacts compared to Alternative 5, where approximately 1 mile of motorized trails within the 0.25 mile radius circle of goshawk activity centers would be added to the NFTS. Alternatives 3 and 4 do not, or only minimally, directly or indirectly affect breeding goshawk, where 0 - <0.1 mile are proposed within 0.25 mile radius circle of known or suspected goshawk nest sites/stands.

Table 3.03-64. Miles of Proposed Motorized Routes within 0.25 Mile Radius Circle of Northern Goshawk Activity Center (Nest Site or Nest Stand)

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of motorized trail additions to the NFTS within 0.25 mile radius circle of Activity Centers (nest site or nest stand)	0	0.7	0	0.01	3.6	0.3	0.2
Continued use on existing motorized trails un-authorized for motorized use	17.6	0	0	0	0	0	0
Acres within 0.25 mile of Activity Centers where cross-country travel is prohibited (positive impact)	0	10,384	10,384	10,384	10,384	10,384	10,384
Acres within 0.25 mile of Activity Centers where cross-country travel is not prohibited (negative impact)	10,384	0	0	0	0	0	0

*Alternative 1 includes existing motorized trails un-authorized for motorized use associated with cross country travel.

Summary of Direct and Indirect Impacts to Northern Goshawk

When considering all the direct, indirect, and cumulative impact to the northern goshawk within PACs, and within 0.25 miles of activity centers, Table 3.03-65 summarizes the overall net effect to the northern goshawk from the proposed actions from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-65. Northern Goshawk - Summary of Overall Net Direct and Indirect, Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized trail additions to NFTS	Negatively affects the greatest proportion of goshawk habitat within PACs and within 0.25 miles of activity centers, (i.e. 29 miles of motorized trails un-authorized for motorized use affecting 68% of PACs continued with cross country travel	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., approx. 1 mile of proposed route additions affecting 5% of PACs.	Does not affect goshawk habitat within PACs and within 0.25 miles of activity centers	Negatively affects a very small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., 0.02 mile of	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., approx. 6 miles of proposed route additions affecting 18% of PACs.	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., 1 mile of proposed route additions affecting 4% of PACs.	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., approx. 1 mile of proposed route additions affecting 2% of PACs.
Cross Country Travel	Negatively affects 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is not prohibited (i.e. 29.4 miles of motorized routes affects 68% of PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28 miles of motorized trails un-authorized for motorized use within 64% of TNF PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of motorized trails un-authorized for motorized use, within 68% of TNF PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of motorized trails un-authorized for motorized use within 68% of TNF PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 23.6 miles of motorized trails un-authorized for motorized use within 50% of TNF PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28.3 miles of motorized trails un-authorized for motorized use within 64% of PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited public use (i.e., reduces impacts of 28.6 miles of motorized trails un-authorized for motorized use within 66% of PACs)
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	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 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel continues (i.e. 29.4 miles of motorized routes affects 68% of PACs). Increases disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28 miles of motorized trails un-authorized for motorized use within 64% of TNF PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of motorized trails un-authorized for motorized use, within 68% of TNF PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of motorized trails un-authorized for motorized use within 68% of TNF PACs) Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 23.6 miles of motorized trails un-authorized for motorized use within 50% of TNF PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28.3 miles of motorized trails un-authorized for motorized use within 64% of PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited public use (i.e., reduces impacts of 28.6 miles of motorized trails un-authorized for motorized use within 66% of PACs). Reduces disturbance and habitat fragmentation.

* Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects to Breeding Goshawk

Cumulative Effects Boundary (space and time)

The cumulative effects geographic boundary for breeding 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 breeding 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. The ban of cross country travel on motorized trails un-authorized for motorized use and decommissioned routes would result in the number of miles and acreage that would benefit goshawk because motorized use would no longer occur on these routes, since they would become revegetated over time. 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. Goshawk are known to exhibit territorial behavior, and have been known to dive bomb hikers during critical breeding periods.

Disturbance to Breeding Northern Goshawk

Protected Activity Centers

Considering the cumulative effects of all motorized and non-motorized routes on both National Forest System lands and non-National Forest System lands, indicates Alternative 1 has the most cumulative miles of routes (123 miles) within goshawk PACs on the Tahoe NF, and therefore poses the greatest overall potential risk and cumulative impacts to breeding goshawk on the Tahoe NF (Table 3.03-66). Alternative 5 has the next highest cumulative impact to breeding goshawk, with a cumulative total of 99 miles of routes. Alternatives 2, 6, & 7 have similar cumulative impacts to breeding goshawk, where total cumulative route miles within PACs range between 93 and 95. Alternatives 3 and 4 do not add to existing cumulative impacts, since no motorized routes within goshawk PACs are proposed.

Table 3.03-66. Cumulative Miles of All Routes within Goshawk PACs on Tahoe NF

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Miles of motorized trails added to NFTS (negative impact)	0	1.4	0	0	5.8	1.1	0.8
Miles of motorized trails un-authorized for motorized use, where cross country travel is not prohibited (negative impact)	29.4	0	0	0	0	0	0
Miles of motorized trails un-authorized for motorized use, where cross country travel is prohibited (positive impact)	0	28.0	29.4	29.3	23.6	28.3	28.5
Acres within goshawk PACs where cross-country travel is prohibited (positive impact)	0	20,036	20,036	20,036	20,036	20,036	20,036
Acres within goshawk PACs where cross-country travel is not prohibited (negative impact)	20,036	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Miles of existing motorized routes - NFS lands (negative impact)	85.2	85.2	85.2	85.2	85.2	85.2	85.2
Miles of Existing motorized routes on private land - non-NFS lands (negative impact)	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Miles of Existing non-motorized routes (negative impact)	7.94	7.94	7.94	7.94	7.94	7.94	7.94
Miles of Decommissioned routes (positive impact)	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Total Cumulative Effects							
Total Cumulative Impact = Sum Total of Negative Impacts minus positive impacts	**122.9**	**94.5**	**93.5**	**93.5**	**99.3**	**94.6**	**94.3**
Acres within goshawk PACs where cross-country travel is prohibited (positive impact)	**0**	**20,036**	**20,036**	**20,036**	**20,036**	**20,036**	**20,036**
Acres within goshawk PACs where cross-country travel is not prohibited (negative impact)	**20,036**	**0**	**0**	**0**	**0**	**0**	**0**

* Alternative 1 includes existing motorized trails un-authorized for motorized use associated with cross country travel.

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 (76 miles) followed by Alternative 5 (62 miles) (Table 3.03-67). Alternatives 2, 3, 4, 6, and 7 have slightly lower cumulative route miles within the 0.25 mile radius analysis circle; however, the actual miles of motorized trails un-authorized for motorized use to be added potentially affecting 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 alternatives 2, 3, 4, 6, or 7 would have very little additional cumulative impact to breeding 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 18 miles of existing motorized trails un-authorized for motorized use within 0.25 mile of goshawk activity centers, followed by Alternative 5, with approximately 4 miles of motorized trails added to the NFTS.

Table 3.03-67. Miles of All Routes within 0.25 mile of Goshawk Activity Centers (nest site or nest stand) on the Tahoe NF

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Miles of motorized trail additions to NFTS (negative impact)	0	0.7	0	0	3.6	0.3	0.2
Miles of existing motorized trails un-authorized for motorized use (negative impact)	17.6	0	0	0	0	0	0
Miles of motorized trails prohibited for motorized use (positive impact)	0.1	17.0	17.7	17.7	14.7	17.5	17.5
Acres within 0.25 mile of goshawk activity center where cross country travel is prohibited (positive impact)	0	10,384	10,384	10,384	10,384	10,384	10,384
Acres within 0.25 mile of goshawk activity center where cross country travel is not prohibited (negative impact)	10,384	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Miles of existing motorized routes - NFS lands (negative impact)	51.1	51.1	51.1	51.1	51.1	51.1	51.1
Miles of existing motorized routes on private land - non-NFS lands (negative impact)	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Miles of existing non-motorized routes (negative impact)	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Miles of decommissioned routes (positive impact)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Total Cumulative Effects							
Net Cumulative Impact = Sum Total of Negative Impacts minus positive impacts							
Miles of routes of motorized public use	**76.0**	**59.1**	**58.4**	**58.4**	**62.0**	**58.7**	**58.6**
Acres within 0.25 mile of goshawk activity center where cross country travel is prohibited (positive impact)	**0**	**10,384**	**10,384**	**10,384**	**10,384**	**10,384**	**10,384**
Acres within 0.25 mile of goshawk activity center where cross country travel is not prohibited (negative impact)	**10,384**	**0**	**0**	**0**	**0**	**0**	**0**

Analysis Measures for Fragmentation and Edge Effects within Northern Goshawk Protected Activity Centers

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, & 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.

Direct and Indirect Effects to Fragmentation and Edge Effects within Northern Goshawk Protected Activity Centers

Habitat fragmentation and edge effects were described for late seral coniferous associated species within late seral coniferous forest types (CWHR types 4M, 4D, 5M, 5D, & 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 project 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.

Zone of Influence at 400 meters (0.25 miles)

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 project 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 trails added to the NFTS (Table 3.03-68). 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%. 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 not be affected by implementing Alternative 3.

Table 3.03-68. Percent of Tahoe NF Goshawk Protected Activity Centers within a 400-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							
Percent of Goshawk PACs affected by motorized trail additions to NFTS (negative impact)	0%	2%	0%	1%	6%	2%	1%
Percent of Goshawk PACs affected by continued use on existing motorized trails un-authorized for motorized use	34%	0	0	0	0	0	0
Acres of Goshawk PACs where cross country travel is prohibited (positive impact)	0	20,036	20,036	20,036	20,036	20,036	20,036
Acres of Goshawk PACs where cross country travel is not prohibited (negative impact)	20,036	0	0	0	0	0	0

Cumulative Effects within a 400-meter Zone of Influence

Table 3.03-69 displays 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 has the greatest overall cumulative impact (cumulative impact score = 85%) and, therefore, poses the greatest risk to habitat connectivity and other negative cumulative impacts (including 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. Alternative 5 has the second greatest contribution to overall cumulative impacts within goshawk PACs (cumulative impact score = 61%). Overall cumulative effects of the remaining alternatives are similar (cumulative impact score ranges from 55% to 57%). Alternatives 2 and 6, would increase existing cumulative effects by 2%, and Alternatives 4 and 7 would increase existing cumulative impacts by 1%, from the addition of motorized trails to the NFTS. Alternative 3 does directly or indirectly effect habitat within 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 motorized trails un-authorized for motorized use, goshawk would benefit 26% to 30% of goshawk PAC acres. Over time, these routes would eventually become revegetated and recover. The rate of recovery would depend on the site specific vegetation and soil conditions. Finally, the prohibition of cross country travel would benefit goshawk on 20,036 PAC acres, where disturbance, avoidance, and abandonment would be reduced.

Table 3.03-69. 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 trail additions to NFTS (negative impact)[1]	0%	2%	0%	1%	6%	2%	1%
Continued use on existing motorized trails un-authorized for motorized use (negative impact)	34%	0	0	0	0	0	0
Motorized trails prohibited for motorized use (positive impact)[2]	0%	29%	30%	30%	26%	30%	30%
Acres of goshawk PACs where cross country travel is prohibited (positive impact)	0	20,036	20,036	20,036	20,036	20,036	20,036
Acres of goshawk PACs where cross country travel is not prohibited (positive impact)	20,036	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	42%	42%	42%	42%	42%	42%	42%
Existing motorized routes on private land - non-NFS lands (negative impact)	8%	8%	8%	8%	8%	8%	8%
Existing non-motorized routes (negative impact)	5%	5%	5%	5%	5%	5%	5%
Decommissioned routes (positive impact)	4%	4%	4%	4%	4%	4%	4%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**85%**	**57%**	**55%**	**56%**	**61%**	**57%**	**56%**
Acres of goshawk PACs where cross country travel is prohibited (positive impact)	**0**	**20,036**	**20,036**	**20,036**	**20,036**	**20,036**	**20,036**
Acres of goshawk PACs where cross country travel is not prohibited (positive impact)	**20,036**	**0**	**0**	**0**	**0**	**0**	**0**

[1] Alternative 1 includes the existing motorized trails un-authorized for motorized use, while all action alternatives include motorized trail additions to the NFTS .

[2] Includes both system roads and motorized trails un-authorized for motorized use.

Cumulative Effects from Past, Present and Future Vegetation/Fuels Management Projects and Past Wildfires

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on the and private lands within the Tahoe NF boundary. Some, but not all, of these activities will 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 2007, four wildfires (Cottonwood, Pendola, Star, and Bassetts) resulted in burning approximately 4,000 acres of suitable goshawk acres burned affecting 8 goshawk PACs across an estimated 1,300 acres. 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 2007, over 13,000 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 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 will continue to be the primary activity affecting goshawk habitat on the Tahoe (see Appendix Q, Wildlife Cumulative Effects). Although these treatments may reduce habitat quality (i.e. nesting habitat reduced to foraging habitat), it is expected that suitable habitat will be maintained, and it is anticipated that these treatments will 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 (see Appendix L, Wildlife Biological Evaluation). 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 project alternatives and the additional activities occurring within the cumulative effects analysis area. Based on this information, the project 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 project alternatives will not likely affect Forest-wide northern goshawk population trends. However, the uncertainty of long term effects to goshawk from increasing disturbance from motorized vehicle use poses an unknown risk. 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 greater than 50% goshawk activity centers would be impacted by continued cross-country travel, including use on existing motorized trails un-authorized for motorized use. 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. Alternative 5 also poses a moderate amount of risk to nesting goshawk, where the addition of motorized trails to the NFTS would influence an additional 17% of goshawk nest sites within ¼ mile. Therefore, Alternatives 1 and 5 could contribute to downward goshawk habitat and population trends over time.

All the remaining action alternatives would influence known goshawk nest sites between 0 and 4% within ¼ mile, and this should not affect the distribution and abundance of goshawk on the Tahoe NF. Therefore, alternatives 2, 3, 4, 6, and 7 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 29 miles of existing routes unauthorized to motorized public use. 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 50% (Alt 5 - reduces the least) to 68% (Alt 3 - reduces the most) of PACs would be reduced, including on 23 to 29 miles of existing routes unauthorized to motorized public use. Analysis of the alternatives within 0.25 mile of activity centers (i.e. nest sites) indicates a similar pattern as found for goshawk PACs.

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

American Marten

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). Martens selected stands with 40 to 60 percent canopy closure for both resting and foraging and avoided stands with less than 30 percent canopy closure (Spencer et al. 1983). Martens generally avoid habitats that lack overhead cover, presumably because these areas do not provide protection from avian predators (Allen 1982, USDA 1994, Spencer et al. 1983).

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). While marten use small openings, and particularly meadows for foraging, these openings must occupy a small percent of the landscape. Martens have not been found in landscapes with greater than 25 percent of the area in openings (Hargis and Bissonette 1999; Potvin et al. 2000). As landscapes become fragmented, the combination of increasing isolation and decreasing patch size of suitable habitat compounds the results of simple habitat loss (Andren 1994). For species like marten, 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). Gaines et al. (2003) reported than marten may be affected by the following road and motorized trail-associated factors: trapping, collisions, displacement or avoidance, habitat loss or fragmentation, snag reduction, down log reduction, edge effects, movement barrier or filter, and route for competitors. These factors are discussed below.

Pacific Fisher

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. Vehicular collision is a known source of fisher mortality (Heinemeyer 1993 In USDA 2001). 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.

Suitable habitat for the fisher occurs primarily on the west side of the Tahoe NF. Roads can contribute to habitat fragmentation where the fisher generally avoids 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). These indirect effects on fisher habitat could negatively affect the ability for fishers to be successfully reintroduced to the Tahoe NF. 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. Indirect effects would also include the effects on prey populations that may also avoid or be killed by vehicles.

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

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 individual martens. 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). Marten road mortality on the Tahoe NF, may be of concern since Interstate-80, State highways 89, 49, and 20 bisect their habitat. Collisions are much less likely to occur along the slower-speed native surface trails that are being evaluated for addition to the NFTS in this project.

Habitat Loss and Fragmentation, Edge Effects, Movement Barriers, Displacement or Avoidance: 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 and trails can fragment habitat, thus affecting the ability of marten to use otherwise suitable habitat on either side of the route.

The loss and fragmentation of suitable habitat by roads and development is thought to have played a 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.

Roads can fragment habitat and affect the ability of the animals to use otherwise suitable habitat on either side of the road, and the associated presence of vehicles and humans, can cause animals to avoid otherwise suitable habitats near roads. 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.

Routes for Competitors: Martens avoid habitats that lack overhead cover presumably because these areas do not provide protection from avian predators. Roads that are driven during the winter months may allow coyotes to enter into marten winter habitat, affecting marten through competition or direct mortality from predation. This has been identified as a significant threat within lynx habitat. Since both lynx and marten have unique morphologies that allow them to occupy deep snow habitats where they have a competitive advantage over carnivores, such as coyotes and bobcats, human modifications of this habitat, such as winter road use, over-the-snow travel, and snowmobile trails, can eliminate this advantage and increase access for predators and competitors. This has been identified as a potentially significant risk factor in the Sierra Nevada worthy of further investigation.

Snag and Down Log Reduction: High levels of coarse woody debris (snags, downed logs, root masses, large branches) is 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 will 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 a Specific Location (meadows) - marten only: Various studies in the Sierra Nevada indicate marten to have a strong preference for meadows and forest-meadow edges for foraging (USDA Forest Service 2001). 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 eliminates these risk factors, 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 late seral coniferous forest habitat (CWHR types 4M, 4D, 5M, 5D & 6), Old Forest Emphasis Areas (OFEAs), and Tahoe NF Forest Carnivore Network. Late seral coniferous forest habitat (CWHR types 4M, 4D, 5M, 5D & 6) 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 3 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 late seral coniferous forest 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.

Analysis Measures

Wet Weather Seasonal Closures and Change in Class of Vehicles: The effects of Wet Weather Seasonal Closures and Change in Class of Vehicles are discussed previously under the section "Effects Common to All Late Seral Coniferous Forest Associated Species."

Prohibition of Cross Country Travel

Motorized Route and Area Additions

Route Density: The magnitude of effects caused by habitat loss and fragmentation, displacement or avoidance, routes for competitors (as described above) 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.

Zone of Influence: Studies indicate marten habitat use declines within a distance within exceeding 300 meters from roads. For this analysis, a Zone of Influence of 300 meters from motorized routes was determined, and the proportion of marten habitat occurring within this zone was analyzed. Within this zone, changes to habitat such as fragmentation, edge effects, and the reduction of snags and down wood, would also occur. These factors would be expected to influence a smaller area (probably about 60 meters) adjacent to motorized routes. Thresholds associated with this measure have not been established, but relative changes in habitat effectiveness for marten can be evaluated and compared.

Number of Meadows Affected by Motorized Routes – marten only: In the Sierra Nevada, marten to have a strong preference for meadows and forest-meadow edges for foraging (USDA Forest Service 2001). Routes that are adjacent to and intersect meadows can alter meadow hydrology and vegetation which may have a negative effect on prey abundance. The number of meadows that are intersected by proposed routes is the indicator used to measure the effects on wet meadow habitat that is important for the marten.

Direct and Indirect Effects: American Marten and Pacific Fisher

Prohibition of 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, & 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.

Motorized Trail Additions and Open Areas Designations

Designation of Open Areas. Alternative 2 designates motorized open areas at Greenhorn, Eureka Diggings, and Reservoir Areas at Stampede, Boca, and Prosser 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. Eureka Diggings is devoid of vegetation. 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.

Motorized Trail Additions – Motorized Route Density, Zones of Influence, and Meadows

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 3.03-70 within late seral coniferous forest habitat (suitable marten habitat), within Old Forest Emphasis Areas, and within the Tahoe Forest Carnivore Network for each of the alternatives. Habitat connectivity for marten within these areas are important considerations, since higher route densities may affect marten population densities. Alternative 1 results in 83% to 85% of areas managed for marten (OFEAs-83%, Carnivore Network-85%, and late seral coniferous forest forests (CWHR 4, 5, 6)-83%) 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 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 in greater than 74% of areas managed for marten (OFEAs, Forest Carnivore Network, and late seral coniferous forest forests) with route densities exceeding 2 miles per square mile.

As motorized route densities are reduced, habitat connectivity for marten is likely to be improved (Robitaille and Aubry 2000). The connectivity of higher elevation habitats that are unaffected 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 trails to the NFTS in IRAs, it provides greater connectivity of marten and fisher habitat as compared to the other alternatives which propose some motorized trail additions to the NFTS within these areas.

Table 3.03-70. Proportion of Tahoe NF Lands with Motorized Route Densities >2 miles/square mile within Late Seral Coniferous Forest, Old Forest Emphasis Areas, & Tahoe Carnivore Network

	Alt 1*	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Late seral coniferous forest Forest (CWHR 4M, 4D, 5M, 5D, & 6)	83%	74%	73%	74%	75%	75%	74%
Old Forest Emphasis Areas	83%	72%	72%	72%	73%	73%	72%
Carnivore Network	85%	76%	75%	76%	77%	76%	76%

* For Alternative 1, route density within mature and late seral coniferous forest forest (CWHR 4M, 4D, 5M, 5D & 6), Old Forest Emphasis Areas (OFEAs), and Carnivore Network includes existing motorized trails un-authorized for motorized use, as well as existing NFTS routes and non-NFTS routes.

60-meter Zone of Influence: Effects to Snags and Logs

Table 3.03-71 shows the proportion of late seral coniferous forest, OFEAs, and Forest Carnivore Network within a 60-meter Zone of Influence of motorized trail additions to the NFTS. Alternative 1 would result in an additional 6 percent of late-seral forest and OFEAs occurring within 60-meter Zone of Influence of existing motorized trails un-authorized for motorized use, which could continue to be used as part of cross-country travel. Seven percent of Tahoe NF Carnivore Network would be affected by these routes in Alternative 1. Road and trail-associated factors within this zone are thought to affect marten in a variety of ways, including human-caused mortality, changes in behavior, and changes to habitat. Changes to habitat, such as reduction in the amount of coarse woody debris, add to disturbance effects within this zone, reducing the suitability of habitat within approximately 60 meters of existing motorized trails un-authorized for motorized use. Considering the variety of ways that road and trail-associated factors are suspected of affecting marten (habitat avoidance, habitat loss through fragmentation, increased competition and predation), cross-country travel, including use of existing motorized trails un-authorized for motorized use, will have a high degree of influence on marten habitat in Alternative 1 (Table 3.03-71). Alternative 5 would influence late seral coniferous forest marten habitat and OFEAs within a 60-meter Zone of Influence by 1% each, and would influence the Carnivore Network by 2%. The remaining alternatives (Alternatives 2, 3, 4, 6, & 7) would not affect overall habitat connectivity within late seral coniferous forest habitat, OFEAs, or within the Forest Carnivore Network since proposed motorized routes would influence between 0 and <1% of these habitats depending on the alternative.

Table 3.03-71. Percent of mature and late seral coniferous forest (CWHR 4M, 4D, 5M, 5D & 6), Old Forest Emphasis Areas (OFEAs), and Carnivore Network within 60 meters of Motorized Trail Additions to the National Forest Transportation System NFTS) on the Tahoe NF

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Percent of late seral coniferous habitat (CWHR 4M, 4D, 5M, 5D & 6) within a 60-meter "Zone of Influence" of motorized trail additions to the NFTS	6%	<1%	0%	<1%	1%	<1%	<1%
Percent of OFEAs within a 60-meter "Zone of Influence" of motorized trail additions to the NFTS	6%	<1%	0%	0%	1%	<1%	<1%
Percent of Forest Carnivore Network within a 60-meter "Zone of Influence" of motorized trail additions to the NFTS	7%	0%	0%	0%	2%	0%	<1%

[1] Alternative 1 is the percent of mature and late seral coniferous forest (CWHR 4M, 4D, 5M, 5D & 6), Old Forest Emphasis Areas (OFEAs), and Carnivore Network within 60 meters of existing motorized trails un-authorized for motorized use associated with the continuance of cross country travel.

300-meter Zone of Influence within Carnivore Network, OFEAs, and Old Forest CWHR types (4M, 4D, 5M, 5D, & 6)

The proportion of Carnivore Network, OFEAs, and Old Forest CWHR types (4M, 4D, 5M, 5D, & 6) within a 300-meter Zone of Influence is displayed in Table 3.03-72.

When increasing the Zone of Influence to 300-meter, substantially higher amounts of marten and fisher habitat are influenced by motorized trail additions to the NFTS. Within a 300-meter Zone of Influence, Alternative 1 results 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 25% reduction in habitat connectivity within the Carnivore Network, a 20% reduction in habitat connectivity in Old Forest Emphasis Areas, and a 21% reduction in habitat connectivity in Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6).

Within a 300-meter Zone of Influence, Alternative 5 would reduce habitat connectivity for marten and fisher by 6% in the Carnivore Network, 5% in the Old Forest Emphasis Areas, and 5% in the Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6).

The remaining alternatives would reduce habitat connectivity substantially less than Alternative 1 and somewhat lower than Alternative 5. Reduction in habitat connectivity would range between 0 and 2 percent within the Carnivore Network, OFEAs, and Old Forest habitats (CWHR 4M, 4D, 5M, 5D, 6) for the remaining alternatives.

Table 3.03-72. Percent of Carnivore Network, OFEAs, and Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6) within a 300-meter "Zone of Influence" of motorized trail additions to the National Forest Transportation System (NFTS)

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Carnivore Network	25%	2%	0%	1%	6%	2%	1%
Old Forest Emphasis Areas (SNFPA)	20%	1%	0%	1%	5%	1%	1%
Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6)	21%	1%	0%	1%	5%	1%	1%

* Alternative 1 includes the existing motorized trails un-authorized for motorized use, while all action alternatives include proposed motorized trail additions to the NFTS.

Number of Meadows Affected by Motorized Trail Additions to the National Forest Transportation System (NFTS) (Foraging habitat: marten only)

The number of wet meadows that are intersected by proposed motorized trail additions to the NFTS under each alternative is shown in Table 3.03-73. Out of 518 wet meadow sites on the Tahoe NF, Alternative 1 would result in 81 meadow sites (16%) intersected by existing motorized trails un-authorized for motorized use. These meadows could continue to receive motorized use under continued cross-country travel with the potential to directly and indirectly affect marten is considerable. Direct impacts to marten may occur from direct disturbance while marten are foraging within and adjacent to these 81 meadow sites. Indirect affects to marten can occur from the intersection of motorized routes and wet meadows through changes in wet meadow condition, particularly meadow drying and loss of meadow vegetation. Loss of meadow vegetation and drying of meadows can affect the abundance and distribution of prey species available to marten, particularly meadow voles.

Alternative 5 would result in 9 wet meadows (2%) that are intersected by motorized trail additions to the NFTS. Alternatives 2 and 6 result in approximately 1% wet meadows (Alt 2 - 7 meadows, Alt 6 – 5 meadows) intersected by motorized trail additions to the NFTS. Alternatives 4 and 7 result in yet fewer wet meadows intersected by motorized trail additions to the NFTS, where less than one percent of all wet meadows would be directly and indirectly affected by proposed additions. Alternative 3 does not propose any additions of motorized trails to the NFTS, and therefore would not affect marten prey species within wet meadows. Under alternative 1, cross country travel could continue within 9,167 acres of wet meadow habitat; whereas, cross country travel would be prohibited in 9,167 acres of wet meadow habitat, which would be beneficial to marten and their prey species.

Table 3.03-73. Number of Meadows Intersected by Motorized Trail Additions to the National Forest Transportation System (NFTS)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Wet Meadows Intersected by motorized trail additions to the NFTS (518 total)	0	7	0	1	9	5	3
Miles Intersected by motorized trail additions to the NFTS	0	0.5	0	0.04	1.1	0.5	0.4
Number of Wet Meadows Intersected by motorized trails un-authorized for motorized use that would continue to be used associated with cross country travel	81	0	0	0	0	0	0
Miles Meadows Intersected motorized trails un-authorized for motorized use that would continue to be used associated with cross country travel	14	0	0	0	0	0	0
Acres of Wet Meadows Where Cross Country Travel Would Be Prohibited	0	9,167	9,167	9,167	9,167	9,167	9,167
Acres of Wet Meadows Where Cross Country Travel is not prohibited	9,167	0	0	0	0	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 3.03-74 summarizes the overall net effect to the American marten and Pacific fisher from the proposed actions from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-74. 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
Motorized trail additions to the NFTS	Negatively affects the greatest proportion of marten and fisher habitats with continued with cross country travel	Negatively affects a small proportion of marten and fisher habitat	Does not affect marten and fisher habitats	Negatively affects a small proportion of marten and fisher habitat .	Negatively affects a small proportion of marten and fisher habitat	Negatively affects a small proportion of marten and fisher habitat	Negatively affects a small proportion of marten and fisher habitat
Cross Country Travel	Negatively affects between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is not prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	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 between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is not prohibited. Increases disturbance and habitat fragmentation, with the greatest proportion of motorized route densities >2 mi/mi^2.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation, by reducing motorized route densities by approx. 10%, compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 10% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited). Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 10% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 9% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 9% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 10%, compared to Alternative 1.

* Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects

Cumulative Effects of Motorized Routes

Forest Carnivore Network within a 60-meter Zone of Influence

Comparing the relative cumulative effects to Forest Carnivore Network within a 60-meter Zone of Influence (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions), indicates Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 23%) and, therefore, poses the greatest risk to marten and fisher by increased habitat connectivity fragmentation through potential loss of snags and down logs that may be removed for public safety along motorized and non-motorized routes (Table 3.03-75). In addition, Alternative 1 would contribute significantly to the proliferation of motorized trails un-authorized for motorized use because unmanaged cross-country motorized travel would continue into the future and has a high likelihood of increasing based on estimates in growth of ATV and motorcycle use and sales in recent years. Alternative 5 has the second greatest overall cumulative impacts from habitat fragmentation and other road and trail associated factors such as avoidance, loss of snags and logs, and edge effects within the Tahoe NF Forest Carnivore Network (cumulative impact score = ~18%), followed by Alternatives 2, 6, and 7 (cumulative impact scores = ~17%). Habitat connectivity within the Forest Carnivore Network would be maintained for all the action alternatives since motorized trail additions to the NFTS would either minimally affect or would have no effect on the Tahoe Forest Carnivore Network (range 0-2%), and route proliferation would not continue into the future for all of the action alternatives due to prohibition of cross country motorized travel.

Table 3.03-75. Cumulative Percent of Carnivore Network within a 60-meter "Zone of Influence" of Motorized Routes

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized trail additions to the NFTS (negative impact)[1]	0%	1%	0%	0%	2%	0%	0%
Continued use on existing motorized trails un-authorized for motorized use (negative impact)	7%	0%	0%	0%	0%	0%	0%
Motorized trails prohibited to motorized public use (positive impact)[2]	0%	7%	7%	7%	6%	7%	7%
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	14%	14%	14%	14%	14%	14%	14%
Existing routes on private land - non-NFS lands (negative impact)	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Existing non-motorized routes (negative impact)	2%	2%	2%	2%	2%	2%	2%
Decommissioned routes (positive impact)	0%	0%	0%	0%	0%	0%	0%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**~23%**	**17%**	**~16%**	**~16%**	**~18%**	**17%**	**<17%**

[1] Alternative 1 includes the existing motorized trails un-authorized for motorized use, while all action alternatives include motorized trail additions to the NFTS

[2] May include both system roads and motorized trails un-authorized for motorized use.

300-meter Zone of Influence within Carnivore Network, OFEAs, and Old Forest CWHR types (4M, 4D, 5M, 5D, & 6)

The cumulative proportion of Carnivore Network, OFEAs, and Old Forest CWHR occurring within a 300-meter Zone of Influence of motorized trail additions to the NFTS, existing motorized routes on NFS and non-NFS lands, and non-motorized routes for all the alternatives types is shown in Tables 3.03-76, 3.03-77, and 3.03-78. 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 motorized trails un-authorized for motorized use, 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 32 and 35% of marten and fisher habitat within the Carnivore Network, OFEAs, and Old Forest CWHR types. Under Alternative 1, continued cross-country motorized travel, with continued use of existing motorized trails un-authorized for motorized use, would influence an additional 20 to 25% (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 substantial. Future route proliferation could substantially add to cumulative impacts due to unmanaged cross-country travel which would further add to habitat fragmentation which could seriously limit the distribution of marten and the future reestablishment potential of the fisher on the Tahoe NF.

Alternative 5 poses the next greatest risk of cumulative impacts to habitat connectivity for marten and fisher, where 5 to 6% of the Carnivore Network, OFEAs, and Old Forest CWHRs would be influenced by motorized trail additions to the NFTS. The remaining action alternatives are similar in their contribution to existing cumulative impacts. Within the Carnivore Network, OFEAs, and Old Forest CWHRs, marten and fisher habitat connectivity is reduced slightly (0% to 2%) within a 300- meter Zone of Influence. This amount of cumulative impact should not affect the overall distribution and abundance of marten on the Tahoe NF, and should not affect the future reintroduction of fisher on the Tahoe NF. Therefore, population viability for the marten would not be affected by alternatives 2, 3, 4, 6, and 7. Under these alternatives cross-country motorized travel would be prohibited and future route proliferation should be minimized.

Table 3.03-76. 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 trail additions to the NFTS (negative impact)	0%	2%	0%	1%	6%	2%	1%
Continued use on existing motorized trails un-authorized for motorized use (negative impact)	25%	0%	0%	0%	0%	0%	0%
motorized trails un-authorized for motorized use (positive impact)	0%	24%	25%	25%	21%	24%	25%
Acres of Carnivore Network where cross-country travel is prohibited (positive impact)	0	396,602	396,602	396,602	396,602	396,602	396,602
Acres of Carnivore Network where cross-country travel is not prohibited (negative impact)	396,602	0	0	0	0	0	0

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cumulative Effects of Past and Present							
Existing motorized routes - NFS lands (negative impact)	35%	35%	35%	35%	35%	35%	35%
Existing motorized routes on private land - non-NFS lands (negative impact)	4%	4%	4%	4%	4%	4%	4%
Existing non-motorized routes (negative impact)[1]	2%	2%	2%	2%	2%	2%	2%
Decommissioned routes (positive impact)	2%	2%	2%	2%	2%	2%	2%
Total Cumulative Effects							
Overall Relative Cumulative Impact Score = Sum Total of All Routes (**Note**: Some overlap may occur where route categories intersect)	**66%**	**43%**	**41%**	**42%**	**47%**	**43%**	**42%**
Acres of Carnivore Network where cross-country travel is prohibited (positive impact)	**0**	**396,602**	**396,602**	**396,602**	**396,602**	**396,602**	**396,602**
Acres of Carnivore Network where cross-country travel is not prohibited (negative impact)	**396,602**	**0**	**0**	**0**	**0**	**0**	**0**

[1] Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60

Table 3.03-77. 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 trail additions to the NFTS (negative impact)	0%	1%	0%	1%	5%	1%	1%
Continued use on existing motorized trails un-authorized for motorized use (negative)	20%	0%	0%	0%	0%	0%	0%
motorized trails un-authorized for motorized use (positive impact)	0%	20%	21%	20%	17%	20%	20%
Acres of Carnivore Network where cross-country travel is prohibited (positive impact)	0	394,847	394,847	394,847	394,847	394,847	394,847
Acres of Carnivore Network where cross-country travel is noty prohibited (negative impact)	394,847	0	0	0	0	0	0
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)	11%	11%	11%	11%	11%	11%	11%
Existing non-motorized routes (negative impact)[1]	5%	5%	5%	5%	5%	5%	5%
Decommissioned routes (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)	**68%**	**49%**	**48%**	**49%**	**53%**	**49%**	**49%**
Acres of OFEAs where cross-country travel is prohibited (positive impact)	**0**	**394,847**	**394,847**	**394,847**	**394,847**	**394,847**	**394,847**
Acres of Carnivore Network where cross-country is not prohibited (negative impact)	**394,847**	**0**	**0**	**0**	**0**	**0**	**0**

[1] Non-motorized -assumption made that non-motorized impact is limited to 60 meters from trail and that no impact occurs beyond 60 meters

Table 3.03-78. 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 trail additions to the NFTS (negative impact)	0%	1%	0%	1%	5%	1%	1%
Continued use on existing motorized trails un-authorized for motorized use where cross-country travel is not prohibited (negative impact)	21%	0%	0%	0%	0%	0%	0%
motorized trails un-authorized for motorized use where cross country travel is prohibited (positive impact)	0%	20%	21%	21%	18%	20%	21%
Acres of late-seral forests (CWHR 4, 5, 6) where cross-country travel is prohibited (positive impact)	0	267,952	267,952	267,952	267,952	267,952	267,952
Acres of late-seral forests (CWHR 4, 5, 6) where cross-country travel is not prohibited (negative impact)	267,952	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	34%	34%	34%	34%	34%	34%	34%
Existing motorized routes on - non-NFS lands (private) (negative impact)	13%	13%	13%	13%	13%	13%	13%
Existing non-motorized routes (negative impact)[1]	5%	5%	5%	5%	5%	5%	5%
Decommissioned routes (positive impact)	2%	2%	2%	2%	2%	2%	2%
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)	**73%**	**53%**	**52%**	**53%**	**57%**	**53%**	**53%**
Acres of late-seral forests (CWHR 4, 5, 6) where cross-country travel is prohibited (positive impact)	**0**	**267,952**	**267,952**	**267,952**	**267,952**	**267,952**	**267,952**
Acres of late-seral forests (CWHR 4, 5, 6) where cross-country travel is not prohibited (negative impact)	**267,952**	**0**	**0**	**0**	**0**	**0**	**0**

[1] 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 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.

Livestock grazing occurs on 31 active grazing allotments on the Tahoe NF, totaling 538,431 acres of NFS and private lands. In some meadows, livestock grazing has reduced the suitability of meadow vegetation for microtine rodents and other marten prey (USDA Forest Service 2001). 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 project Alternatives upon meadow habitat and condition.

Cumulative Effects to Meadows from Motorized and Non-motorized Routes

Cumulative effects are evaluated by assessing the number of wet meadows that are intersected by motorized trail 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 motorized trails un-authorized for motorized use 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 the project alternatives 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 motorized trails un-authorized for motorized use. 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 impacts since no motorized trails being added to the NFTS would intersect wet meadows. All the action alternatives benefit from the prohibition of cross country travel on 9,167 acres of wet meadow habitat, including on existing motorized trails un-authorized for motorized use, affecting between 78 and 81 meadows (15 to 16% of all meadows) where motorized vehicle use would be prohibited, as shown in Table 3.03-79.

Table 3.03-79. 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 trail additions to the NFTS (negative impact)[1]	0	7	0	1	9	5	3
Wet Meadows Intersected by existing motorized trails un-authorized for motorized use that would continue with the continuance of cross country travel (negative impact)	81	0	0	0	0	0	0
Wet Meadows Intersected by existing motorized trails un-authorized for motorized use due to the prohibition of cross country travel (positive impact)	1	78	82	81	76	78	80
Acres of wet meadow habitat prohibited to cross country travel	0	9,167	9,167	9,167	9,167	9,167	9,167
Acres of wet meadow where cross country travel is not prohibited	9,167	0	0	0	0	0	0

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
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)	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**

Overall Cumulative Effects Summary

Appendix Q (Wildlife 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. Past timber harvest and more recent fuels reduction treatments have reduced important habitat components in marten habitats. Between 2001 and 2006, fuels treatments on NFS lands have occurred on approximately 13,000 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. About 14,000 acres of fuels and vegetation treatments are planned to occur over the next few years based upon the projects listed in the Tahoe NF Schedule of Proposed Actions (see Appendix P). Some, but not all of them will 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 will 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, result in a lower adverse cumulative effects. Alternative 3 results in the least cumulative effects because, since no motorized trails are proposed for addition to the NFTS, motorized route densities in marten habitat remain lowest, and motorized trails would not be added to the NFTS in habitats of particular importance to marten (meadows). The combined effects of the project alternatives and other factors affecting marten and fisher habitats do not indicate that the magnitude of these combined effects will 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, where an additional 20 to 25% of marten habitat may be influenced by continued cross-country travel, including continued use of existing motorized trails un-authorized for motorized use 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 motorized trails un-authorized for motorized use, 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 will 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 trails 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 are significantly reduced compared to Alternative 1, no action. Habitat fragmentation from motorized routes will be considerably reduced. Future route proliferation will be minimized due to prohibition of unmanaged cross country motorized travel. In addition, wet weather restrictions on native surfaced routes will 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 trails un-authorized for motorized use, which would continue under continued cross country travel. Alternative 1 reduces habitat effectiveness by 17% (28,200 acres out of 164,957 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.

Alternative 5 affects approximately 6,807 acres (0.7% of Tahoe NF habitat), and Alternatives 2, 4, and 6 similarly affect 972 acres of late seral closed canopy coniferous forest habitat or 0.1% of Tahoe NF habitat within a 200-meter zone of influence of motorized trail 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 trail additions to the NFTS. The Tahoe NF Motorized Travel Management Project action alternatives will 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 National Forest System lands in the Sierra Nevada. The trend is slightly increasing (from 7% to 9% within the last decade on National Forest System lands).

Population Status and Trend. 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 3% of Sierra Nevada habitat) by the alternatives within a 200-meter zone of influence of motorized trail additions to the NFTS, the Tahoe NF Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of American marten across the Sierra Nevada bioregion.

Pacific Fisher Sensitive Species Determination

Due to the absence of the Pacific fisher on the Tahoe NF, the Tahoe NF Travel Management Project EIS will not affect the Pacific fisher (The Tahoe NF Biological Evaluation is incorporated by reference). Furthermore, this project as proposed will 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 will be prohibited, including use on existing motorized trails un-authorized for motorized use within suitable fisher habitat.

Compliance with Forest Plan and Other Direction

The Tahoe LRMP and Tahoe LRMP, as amended by the 2004 SNFPA ROD, provides 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 meadow (16%) from cross country travel on 14 miles of existing routes unauthorized to motorized public use. 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 motorized trails un-authorized for motorized use. 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 are not known to occur on the Tahoe NF, and therefore this standard and guideline does not apply. 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, & 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 and pallid bat are species chosen to represent this group, although many other species are snag dependent species including pileated woodpecker, white-headed woodpecker, red-breasted nuthatch, white-breasted nuthatch, and others. 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 (diameter breast height between 15 to 30 inches) and large (diameter breast height greater than 30 inches) snags are most important. The hairy woodpecker uses stands of large, mature trees and snags of sparse to intermediate density; cover is also provided by tree cavities (CDFG 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. Road and motorized trail-associated factors likely to affect these species are: edge effects and the reduction of snags and down logs. 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. Roads and trails may affect snag-associated species, including cavity-nesting birds and bats, in the following ways:

Snag and Log Reduction and Edge Effects: 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.

Snags in Green Forest Ecosystem Component Associated Species: Environmental Consequences

Analysis Measures

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 trails added to the National Forest Transportation System (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 motorized trails un-authorized for motorized use that could be affected by fuelwood or hazard tree removal.

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

Change in Class of Vehicles. Overall, the change is the class of vehicles would not effect or alter the condition of snags in green forest ecosystem component for the hairy woodpecker. In addition, some existing motorized NFTS roads may receive different maintenance resulting in higher number of snags retained along routes within 60 meters, which would provide additional snags for foraging and nesting in localized areas. The resulting roadway condition would depend upon the amount and type of vegetation present and the type of maintenance any given road receives.

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 of snags within green forests 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. 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 motorized trails un-authorized for motorized use, would result in the greatest amount of disturbance (reduced habitat effectiveness) to hairy woodpecker habitat within snags within green forests.

Prohibition of 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 the action alternatives, cross country travel would be prohibited on 637,148 acres, where disturbance, avoidance, abandonment would be reduced or eliminated.

Addition of Motorized Trails to the National Forest Transportation System (NFTS). Table 3.03-80 displays the alternatives affect hairy woodpecker habitat within a 60-meter zone of influence of motorized trail additions to the NFTS, 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% (58,006 acres out of 4,381,000 Sierra Nevada habitat acres) of hairy woodpecker habitat, under Alternative 1, where snags could be removed for public safety along existing motorized trails un-authorized for motorized use. Alternative 5 affects 0.2% (10,547 acres of 4,381,000 Sierra Nevada habitat acres) of hairy woodpecker habitat. Alternatives 2, 4, and 7, similarly affects 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.

Table 3.03-80. Prohibition of Cross Country Travel and Proportion of Snags in Green Forest Hairy Woodpecker habitat within a 60-meter "Zone of Influence" of Motorized Trail Additions to the National Forest Transportation System (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**
Prohibition of 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
Acres of hairy woodpecker habitat where cross country travel where cross country travel is not prohibited		637,148	0	0	0	0	0	0
Proportion of Snag Ecosystem Component in Green Forest Habitat (Hairy Woodpecker MIS Habitat) within 60-meter "Zone of Influence" of Motorized Trail Additions to the NFTS								
Acres – Hairy Woodpecker Green Forest Habitat[2]		58,006	2,637	0	2,637	10,547	2,637	2,637
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	1.3%	0.1%	0%	0.1%	0.2%	0.1%	0.1%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat	990,707	6%	0.3%	0%	0.3%	1%	0.3%	0.3%
Habitat Security Risk in Tahoe NF		Low	Low	Low	Low	Low	Low	Low

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use 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 3.03-81 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 3.03-81. Hairy Woodpecker - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized trail additions to the NFTS	Negative effects to 6% hairy woodpecker habitat	Negative effects to 0.3% hairy woodpecker habitat	No effect to hairy woodpecker habitat	Negative effects to 0.3% hairy woodpecker habitat	Negative effects to 1% hairy woodpecker habitat	Negative effects to 0.3% hairy woodpecker habitat	Negative effects to 0.3% hairy woodpecker habitat
Cross Country Travel	Negative impact - Continues on 637,148 hairy woodpecker habitat acres, affecting 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 5% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.
Wet Weather Restrictions	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat
Change in Class of Vehicles	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat
Overall Net Effect of Proposed Actions	Negative impact – cross country travel not prohibited on 637,148 hairy woodpecker habitat acres, affecting 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 5% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.

*Alternative 1 includes existing routes unauthorized to motorized public use 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 (>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 Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will 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 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. These treatments generally due 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 2007, approximately 94,000 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 3.03-82 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, non-motorized trail development, and special use permit re-issuances.

Table 3.03-82. 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	13	Short-term disturbance from harvest activities.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	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 6% (58,006 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 motorized trails un-authorized for motorized use. Alternative 5 affects 1% (10,547 acres of 990,707 Tahoe NF acres) of hairy woodpecker habitat. 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 trails to the NFTS, the Tahoe NF Motorized Travel Management Project will not alter the existing trend in the snags in green forest ecosystem component.

The change is the class of vehicles would not effect 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 (≥ 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 project alternatives, the Tahoe NF Motorized Travel Management Project will not alter existing trend in the habitat, nor will 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 streams, ponds, lakes, meadows, 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 (5^{th} field, 6^{th} field, and 7^{th} field). A detailed summary of the aquatic habitat modeling can be found in Chapter 3.02 (Soil and Watershed Resources).

The analysis measures used 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 & Aquatic Species section.

Riparian Associated Bird Species

Affected Environment

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 Alternatives

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 National Forest System lands and private lands in recent years (Table 3.03-83). Eight bald eagle territories with recent nesting activity are located on National Forest System lands. Four territories occur on private land at Donner Lake, Fordyce Lake, Spaulding Reservoir, and Milton Reservoir.

Table 3.03-83. Known Bald Eagle Nest Territories on the Tahoe NF

Territory Name	Ranger District	Ownership
New Bullards Bar	Yuba River Ranger District	Tahoe NF
Deer Creek	Yuba River Ranger District	Tahoe NF
Spaulding Lake	Yuba River Ranger District	Private
Stampede #1 (Dam)	Truckee Ranger District	Tahoe NF
Stampede #2 (Sagehen Arm)	Truckee Ranger District	Tahoe NF
Boca Reservoir	Truckee Ranger District	Tahoe NF
Prosser Reservoir	Truckee Ranger District	Tahoe NF
Donner Lake	Truckee Ranger District	Private
Independence Lake	Sierraville Ranger District	Tahoe NF
Webber Lake	Sierraville Ranger District	Tahoe NF
Fordyce Lake	Sierraville Ranger District	Private
Milton Reservoir	Sierraville Ranger District	Private

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 to access a popular reservoir used for recreational activities including fishing and boating. In addition, 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; and they take flight when activities occur within 600 feet. 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

Analysis Measures

Changes in Class of Vehicles: Although responses to motorized vehicle use can vary by individual bald eagles, 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 the bald eagle species. Therefore, changes in the class of vehicles would not vary in their direct effects of disturbance to the bald eagle for the alternatives. Changes in class of vehicle will also have no effect to nesting bald eagle habitats that comprise of coniferous forests adjacent to large bodies of water.

Prohibition of 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 and 800 meters of known nest sites.

Motorized Access to Boca, Stampede, and Prosser Reservoirs: Motorized access across dry land to Boca, Stampede, and Prosser Reservoirs during low water are assessed to determine their impact to nesting bald eagles.

Disturbance at a Specific Site (Motorized Route Miles): Motorized route miles 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

Change in Class of Vehicles. Although responses to motorized vehicle use can vary by individual bald eagles, 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 the bald eagle species. Therefore, changes in the class of vehicles would not vary in their direct effects of disturbance to the bald eagle for all the alternatives. Changes in class of vehicle will also have no effect to nesting bald eagle habitats that comprise of coniferous forests adjacent to large bodies of water.

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.

Prohibition of Cross Country Travel. Cross country travel will 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 will prevent the proliferation of new routes unauthorized to motorized public use and will 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 motorized trails un-authorized for motorized use in all the action alternatives. The prohibition of cross country travel will 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.

Additions of Motorized Trails to the National Forest Transportation System and Designation of Open Areas

Motorized Access to Boca, Stampede, and Prosser Reservoirs: Motorized access to Boca, Stampede, and Prosser reservoirs will not affect bald eagle nest territories under all the action alternatives, except for Alternative 2. Under Alternative 2, two bald eagle territories may potentially be impacted by "motorized access to Boca, Stampede, and Prosser reservoirs," where motorized access to the shoreline below 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 though 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.

Disturbance at a Specific Site (Motorized Route Miles)

Disturbance to bald eagle nest sites from project alternatives is analyzed by determining the number of miles of motorized trails added to the NFTS occurring between 0 and 400 meters, and between 400 and 800 meters from each bald eagle territory (Table 3.03-84). Factors associated with motorized trails 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 trails 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 3.03-84 indicates that Alternative 1 poses the greatest risk to nesting bald eagles on the Tahoe NF. Alternative 1 would potentially impact 6 bald eagle territories where continued cross-country travel would allow continued use on approximately 4 miles of existing motorized trails un-authorized for motorized use 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 amount of impacts where motorized trails within 400 meters of a nest site range between about 0.5 mile to 1 mile per territory.

Alternative 5 would pose the next greatest impact from motorized trail additions to the NFTS, where 5 bald eagle territories could potentially be impacted. However, under Alternative 5, 3 of the 5 bald eagle territories would only have about 0.1 mile of motorized trails added to the NFTS within 400 meters of nest sites (Stampede Dam, Stampede at Sagehen Arm, and Prosser Reservoir). Under Alternative 5, Boca Reservoir and Deer Creek territories would potentially be impacted by about 1 mile of motorized trail additions to the NFTS each where disturbance to nesting bald eagle could potential pose a risk to reproductive success, especially if dispersed recreation adjacent to nest sites occurs. Nearly 5 additional miles of motorized trails are added to the NFTS within 400 to 800 meters of nest sites.

Alternatives 2 & 7 are similar in the amount of direct and indirect impacts to nesting eagles, where only 0.1 mile of motorized trails within 400 meter of nest sites at Prosser Reservoir would be added to the NFTS.

Alternatives 3, 4, and 6 do not propose any motorized trail additions to the NFTS within 400 meters of bald eagle nest sites, and therefore direct and indirect effects to nesting eagles would not be expected. Within 400 to 800 meters of nest sites, an additional 0.1 mile of motorized trails to the NFTS would contribute to disturbance from motorized routes for Alternatives 4 & 6, but should not cause a considerable impact to nesting eagles for this small amount of mileage at a distance beyond 400 meters. No additional motorized trails would be added to the NFTS within 400 to 800 meters of nest sites under Alternative 3.

Table 3.03-84. Miles of Motorized Trails added to the National Forest Transportation System (NFTS) within 0 to 400 meters and within 400 to 800 meters of Bald Eagle Nest Sites

Territory Name	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
New Bullards Bar							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	0	0	0	0	0	0	0
Deer Creek							
0 to 400 meters	**1.0**	0	0	0	**0.6**	0	0
400 to 800 meters	**1.0**	0	0	0	**0.8**	0	0
Spaulding Lake (pvt)							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	0	0	0	0	0	0	0
Stampede Nest #1 (Dam)							
0 to 400 meters	**0.1**	0	0	0	**0.1**	0	0
400 to 800 meters	**1.4**	**0.1**	0	**0.1**	**1.5**	**0.1**	**0.1**
Stampede Nest #2 (Sagehen Arm)							
0 to 400 meters	**0.1**	0	0	0	**0.1**	0	0
400 to 800 meters	**0.8**	0	0	0	**0.8**	0	0
Boca Reservoir							
0 to 400 meters	**0.9**	0	0	0	**0.9**	0	0
400 to 800 meters	**0.6**	0	0	0	**0.6**	0	0
Prosser Reservoir							
0 to 400 meters	**1.1**	**0.1**	0	0	**0.1**	0	**0.1**
400 to 800 meters	**1.2**	**0.7**	0	0	**2.2**	0	**0.7**
Donner Lake (pvt)							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	0	0	0	0	0	0	0
Independence Lake							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	0	0	0	0	0	0	0
Webber Lake							
0 to 400 meters	**0.4**	0	0	0	0	0	0
400 to 800 meters	**0.9**	0	0	0	0	0	0
Fordyce Lake							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	0	0	0	0	0	0	0
Milton Reservoir (pvt)							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	**0.2**	0	0	0	0	0	0
Total Proposed Motorized Route Miles For All Nest Sites							
Motorized trail additions to the NFTS (negative impact)[1]	0	0.2	0.0	0.0	1.1	0.0	0.2
0 to 400 meters	**3.6**	**0.1**	**0**	**0**	**1.8**	**0**	**0.1**
400 to 800 meters	**6.1**	**0.8**	**0**	**0.1**	**5.9**	**0.1**	**0.8**
Total (0 to 800 meters)	**9.7**	**0.9**	**0**	**0.1**	**7.7**	**0.1**	**0.9**

*Alternative 1 includes existing routes unauthorized to motorized public use that would continue under cross country travel

Summary of Direct and Indirect Effects

Table 3.03-85 summarizes the overall net direct and indirect effect of the alternatives from motorized trail additions to the National Forest Transportation System (NFTS), prohibition of cross country travel, wet weather restrictions, and changes in class of vehicles.

Table 3.03-85. Bald Eagle - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized trail additions to the NFTS	Negative effects to 8 bald eagle nest territories for a total of 9.7 miles (3.7 miles within 400 meters, and 6 miles within 400 meters to 800 meters of nest site).	Negative effects to 2 bald eagle nest territories for a total of 0.8 miles (0.1 miles within 400 meters, and 0.7 miles within 400 meters to 800 meters of nest sites).	No effect to bald eagle nest territories.	Negative effects to 1 bald eagle nest territories for a total of 0.1 miles within 400 meters of nest site.	Negative effects to 5 bald eagle nest territories for a total of 7.5 miles (2.8 miles within 400 meters, and 4.7 miles within 400 meters to 800 meters of nest sites).	Negative effects to 1 bald eagle nest territories for a total of 0.1 miles within 400 meters of nest site.	Negative effects to 2 bald eagle nest territories for a total of 0.8 miles (0.1 miles within 400 meters, and 0.7 miles within 400 meters to 800 meters of nest sites).
Cross Country Travel	Continues on 814 acres within 400 meters of bald eagle nests, including on 3.6 miles of existing motorized trails un-authorized for motorized use, and prohibited on 0.6 miles.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.5 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 2.8 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.5 miles of existing motorized trails un-authorized for motorized use.
Wet Weather Restrictions	No effect	No effect	No effect	Positive Benefit - reduced disturbance during nesting season.	Positive Benefit - reduced disturbance during nesting season.	Positive Benefit - 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
Overall Net Effect of Proposed Actions	Negative impacts to bald eagle where cross country travel is not prohibited, on 814 to 3,299 acres including on 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.5 miles of existing motorized trails un-authorized for motorized use.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.6 miles of existing motorized trails un-authorized for motorized use; and reduced effects from wet weather restrictions.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 2.8 miles of existing motorized trails un-authorized for motorized use; and reduced effects from wet weather restrictions.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.6 miles of existing motorized trails un-authorized for motorized use; and reduced effects from wet weather restrictions.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.5 miles of existing motorized trails un-authorized for motorized use.

*Alternative 1 includes existing routes unauthorized to motorized public use 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 analyzes the cumulative effects of motorized routes occurring on NFS and private lands within the Tahoe NF.

Cumulative Effects Boundary

The cumulative effects for the bald eagle includes 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 has 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 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 project 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 4 miles of existing motorized trails un-authorized for motorized use within 400 meters of a bald eagle nest site, which would potentially result in direct disturbance to nesting bald eagles (Table 3.03-86). 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 activity, may result in significant adverse cumulative effects to nesting bald eagles.

Alternative 5 would contribute to adverse cumulative impacts by allowing motorized use on approximately 2 miles within 400 meters of bald eagle nest sites. When considering the total cumulative impact of all motorized routes (NFS and non-NFS), nearly 4 miles of motorized routes would occur within 400 meters of bald eagle nest sites under Alternative 5. However, wet weather closures proposed under Alternative 5 would provide some added benefit to water quality and bald eagle foraging habitat.

Alternatives 2 and 7 adds only about 0.1 mile of motorized trails to the NFTS that would contribute additional cumulative impacts to nesting bald eagles at Prosser Reservoir. However, since bald eagles have successfully reproduced at Prosser Reservoir, this amount of existing recreational use does not appear to affect nesting success. Alternatives 3, 4, and 6 do not result in direct or indirect effects to known nest sites, and therefore they do not contribute to existing cumulative impacts. In addition, alternatives 4 and 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 2.6 to 3.6 miles of existing motorized trails un-authorized for motorized use 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 motorized trails un-authorized for motorized use 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 3.03-86. Cumulative Effects of Motorized Route miles within 0 to 400 meters of Bald Eagle Nest Sites

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized Trail additions to NFTS (negative impact)[1]	0	0.1	0.0	0.0	1.8	0.0	0.1
Existing motorized trails un-authorized for motorized use with the continuance of cross country travel (negative impact)	3.6	0	0	0	0	0	0
Miles of motorized trails un-authorized for motorized use with the prohibition of cross country travel (positive impact)	0.6	3.5	3.6	3.6	2.6	3.6	3.5
Acres within 400 meters of bald eagle nest sites where cross country travel is prohibited (postive impact)	0	814	814	814	814	814	814
Acres within 400 meters of bald eagle nest sites where cross country travel is not prohibited (negative impac)	814	0	0	0	0	0	0

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cumulative effects of past, present, and proposed actions							
Miles of existing motorized routes - NFS lands (negative impact)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Miles of 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
Miles of existing non-motorized routes (negative impact)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miles of decommissioned routes (positive impact)	0.0	4.1	4.2	4.2	1.5	4.1	4.1
Net Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**5.4**	**0.9**	**1.8**	**1.8**	**3.6**	**1.8**	**0.9**
Acres within 400 meters of bald eagle nest sites where cross country travel is prohibited	**0**	**814**	**814**	**814**	**814**	**814**	**814**

Table 3.03-87 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 that are within closer proximity to nest sites (i.e. routes < 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 3.03-87. Cumulative Effects of Motorized Route miles within 400 to 800 meters of Bald Eagle Nest Sites

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized trail additions to NFTS (negative impact)	0	0.7	0.0	0.1	4.7	0.7	0.7
Continued use on motorized trails un-authorized for motorized use	5.9	0	0	0	0	0	0
Miles of motorized trails prohibited to motorized use due to the prohibition of cross country travel (positive impact)	1.4	6.0	6.0	6.0	6.0	6.0	6.0
Acres where cross country travel is prohibited within 400 to 800 meters of bald eagle nest sites (positive impact)	0	3,299	3,299	3,299	3,299	3,299	3,299
Acres where cross country travel is not prohibited within 400 to 800 meters of bald eagle nest sites (negative impact)	3,299	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Miles of existing motorized routes - NFS lands (negative impact)	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Miles of existing motorized routes on private land - non-NFS lands (negative impact)	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Miles of existing non-motorized routes (negative impact)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miles of decommissioned routes (positive impact)	0.4	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	**23.1**	**15.0**	**14.1**	**14.2**	**18.8**	**14.8**	**14.8**
Acres where cross country travel is prohibited within 400 to 800 meters of bald eagle nest sites	0	3,299	3,299	3,299	3,299	3,299	3,299

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 will 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 indicate 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

Analysis Measures

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 through the reduction of erosion and sedimentation that could occur from wet season motorized use for each of the alternatives.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for their effects to willow flycatcher occupied and emphasis habitat.

Number of Occupied and Emphasis Willow Flycatcher Sites affected by Motorized Trail additions to the National Forest Transportation System (NFTS) and designation of "Open Areas": To evaluate the effects of motorized routes on willow flycatcher habitat, the number of willow flycatcher Occupied and Emphasis meadow sites containing motorized routes is determined. The Sierra Nevada Framework Plan Amendment ROD (2004) designated Occupied and Emphasis Habitats for willow flycatcher. Occupied habitat 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.

Direct and Indirect Effects

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 that are intersected by native, surfaced motorized routes, through the reduction of erosion and sedimentation that could occur from wet season motorized use. 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.

Prohibition of 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 motorized trails un-authorized for motorized use. 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 motorized trails un-authorized for motorized use within 20 to 23 willow flycatcher meadows. Under Alternative 1, cross country travel would continue, including on 3.8 miles of existing motorized trails un-authorized for motorized use within 22 meadows (Table 3.03-88), potentially causing disturbance to willow flycatcher and habitat degradation.

Additions of Motorized Trails to the National Forest Transportation System (NFTS) and Designation of “Open Areas”

Direct and indirect effects of the project alternatives are evaluated by determining the number of proposed motorized trail additions to the NFTS and designation of “Open Areas” that intersect delineated willow flycatcher meadow meadows on the Tahoe NF.

Number of Occupied and Emphasis Willow Flycatcher Meadows: Table 3.03-88 displays the willow flycatcher Occupied and Emphasis meadow sites on the Tahoe NF that are potentially affected by the project alternatives. Under Alternative 1, 22 (61%) willow flycatcher meadow sites would be intersected by existing motorized trails un-authorized for motorized use (3.8 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 13 meadows (31%) have been identified as Occupied willow flycatcher sites, where approximately 1.2 miles of existing motorized trails un-authorized for motorized use 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 degradation where routes potentially affect meadow vegetation and hydrology.

Implementation of Alternative 5 would have the next greatest direct and indirect impacts to breeding willow flycatchers at Occupied sites and within Emphasis meadow sites. Alternative 5 affects a total of 4 willow flycatcher emphasis sites (13%) and no Occupied willow flycatcher sites.

Alternatives 2, 3, 4, 5, 6, and 7 do not propose motorized trail additions to the NFTS within Occupied willow flycatcher habitat where willow flycatchers are known to breed. Therefore, direct impacts to breeding willow flycatchers under these alternatives are not expected to occur.

Alternatives 2 and 6 have the same indirect impacts to willow flycatchers, where a total of 4 (11%) Emphasis willow flycatcher sites are intersected by motorized trail additions to the NFTS. Alternatives 7 and 2 progressively affect fewer willow flycatcher habitat Emphasis sites.

Table 3.03-88. Number of willow flycatcher meadow sites intersected by motorized trail additions to the National Forest Transportation System (NFTS) and affected by cross country travel

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Willow Flycatcher meadow sites intersected by motorized trail additions to the NFTS							
Occupied Meadows (13) (Motorized trail miles)	4 (1.16)	0	0	0	0	0	0
Emphasis Meadows (30) (Motorized trail miles)	18 (2.68)	2 (0.13)	0	1 (0.02)	4 (0.27)	2 (0.13)	1 (0.12)
Total	**22 (3.84)**	**2 (0.13)**	**0**	**1 (0.02)**	**4 (0.27)**	**2 (0.13)**	**1 (0.12)**
Cross Country Travel							
Total Acres of Cross Country Travel Prohibited within Willow Flycatcher Meadows	**0**	**3,075**	**3,075**	**3,075**	**3,075**	**3,075**	**3,075**
Occupied Meadows	0	1,747	1,747	1,747	1,747	1,747	1,747
Emphasis Meadows	0	1,328	1,328	1,328	1,328	1,328	1,328
Total Acres Cross Country Travel Not Prohibited within Willow Flycatcher Meadows	**3,075**	**0**	**0**	**0**	**0**	**0**	**0**
Occupied Meadows	1,747	0	0	0	0	0	0
Emphasis Meadows	1,328	0	0	0	0	0	0
Total Number of Willow Flycatcher Sites Intersected by motorized trails that would be prohibited to motorized public use (positive impact)	**1**	**21**	**23**	**22**	**20**	**21**	**22**
Total Miles	**0.02**	**3.7**	**3.9**	**3.9**	**3.6**	**3.7**	**3.8**
# Occupied Sites	1	5	5	5	5	5	5
Miles within Occupied	0.02	1.18	1.18	1.18	1.18	1.18	1.18
# Emphasis Sites	0	16	18	17	15	16	17
Miles within Emphasis	0	2.55	2.68	2.67	2.42	2.55	2.57

*Alternative 1 includes existing motorized trails un-authorized for motorized use with continued cross country travel.

Designated "Open Areas" - Eureka Diggings, Greenhorn, and Reservoir Areas: The addition of designated "Open Areas" at Eureka Diggings, Greenhorn, and Reservoir areas 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.

Summary of Direct and Indirect Effects

Table 3.03-89 summarizes the overall net direct and indirect effect of the alternatives from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and changes in class of vehicles.

Table 3.03-89. Willow Flycatcher - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized trail additions to the NFTS	Negative effects to 4 occupied meadows (1.2 miles). Negative effects to 18 emphasis meadows (2.7 miles).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 2 emphasis meadows negatively affected (0.13 miles).	No effect to Occupied meadows (0 meadows intersected). No effect to emphasis meadows (0 emphasis meadows intersected).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 1 emphasis meadows (0.02 mi).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 4 emphasis meadows (0.27 mi).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 2 emphasis meadows (0.13 mi).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 1 emphasis meadow (0.12 mi).
Cross Country Travel	Continues on 3,075 willow flycatcher habitat acres, including within 22 meadows on 3.8 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 21 meadows on 3.7 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 23 meadows on 3.9 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 22 meadows on approx. 3.9 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 20 meadows on approx. 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 21 meadows on approx. 3.7 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 22 meadows on approx. 3.8 miles of existing motorized trails un-authorized for motorized use.
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.	No effect	Minor negative effect.	Localized negative effects.	Localized negative effects.	Minor negative effect.

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negative effect from continued cross country travel on 22 willow flycatcher meadows on 3.8 miles of existing motorized trails un-authorized for motorized use with continued cross country travel on 3,075 acres.	Benefits willow flycatcher on 3,075 acres, Including within 21 meadows on 3.7 miles of existing motorized trails un-authorized for motorized use where cross country travel is prohibited.	Benefits willow flycatcher on 3,075 acres, including within 23 meadows on 3.9 miles of existing motorized trails un-authorized for motorized use where cross country travel is prohibited.	Benefits willow flycatcher 3,075 acres, including within 22 meadows on approx. 3.9 miles of existing motorized trails un-authorized for motorized use.	Benefits willow flycatcher on 3,075 acres, including within 20 meadows on 3.6 miles of existing motorized trails un-authorized for motorized use where cross country travel is prohibited.	Benefits willow flycatcher on 3,075 acres, including within 21 meadows on 3.7 miles of existing motorized trails un-authorized for motorized use where cross country travel is prohibited.	Benefits willow flycatcher on 3,075 acres, including within 22 meadows on 3.8 miles of existing motorized trails un-authorized for motorized use where cross country travel is prohibited.

*Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of 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 & 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 effects.

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 3.03-90 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 and 5 are the only alternatives that contribute to existing cumulative impacts to Occupied willow flycatcher sites. Alternative 1 cumulatively adds, approximately 1.2 miles on existing motorized trails un-authorized for motorized use, 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 remaining 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 may 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 motorized trails un-authorized for motorized use on approximately 1.2 miles within 5 Occupied meadow sites.

Emphasis Habitat

Emphasis Habitat are 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 motorized trails un-authorized for motorized use that intersect 18 Emphasis sites (60% of all Emphasis sites) for a total of about 2.7 miles.

The remaining alternatives result in substantially less impacts to willow flycatcher emphasis habitats. Alternative 5 poses the next greatest risk to willow flycatcher emphasis sites where proposed motorized trail additions to the NFTS would add to cumulative impacts within 4 Emphasis sites (13% of all Emphasis sites). Alternatives 4 and 6 result in 1 and 2 Emphasis sites (3 and 7% of all Emphasis sites) intersected by motorized trail additions to the NFTS, for less than ¼ mile each. Alternative 7 adds cumulative impacts to 1 emphasis site totaling 0.1 mile. Alternative 3 does not add to existing cumulative impacts to Emphasis habitats, since no motorized trail additions to the NFTS would intersect 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 motorized trails un-authorized for motorized use 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 59 times for a total of about 12 miles by routes of any category. Over 30% of meadows identified as Occupied are impacted by existing motorized trails un-authorized for motorized use, 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 41 times totaling about 8.5 miles. The remaining action alternatives do not add to existing cumulative impacts to Occupied habitat, but alternatives 2, 4, 5, 6, and 7 do contribute to cumulative impacts to 1 to 4 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 3.6 miles to 3.9 miles of motorized trails un-authorized for motorized use (Alt. 5 lowest, Alt. 3 & 4 greatest) within key 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 motorized trails un-authorized for motorized use would continue and likely proliferate.

Foreseeable future projects on the Tahoe NF include undertaking a variety of meadow restoration projects that will result in benefits to willow flycatcher (i.e. Perazzo Meadows) and its habitat.

Table 3.03-90. Willow Flycatcher Meadows - Number of Occupied and Emphasis Meadows Intersected by Routes - Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Number of Willow Flycatcher Sites Intersected by motorized trail additions to the NFTS (negative impact)[1]	**22**	**2**	**0**	**0.02**	**4**	**2**	**1**
Total Miles	**3.84**	**0.13**	**0**	**0.02**	**0.27**	**0.13**	**0.12**
# Occupied Sites	4	0	0	0	0	0	0
Miles within Occupied	1.16	0	0	0	0	0	0
# Emphasis Sites	18	2	0	1	4	2	1
Miles within Emphasis	2.68	0.13	0	0.02	0.27	0.13	0.12

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Number of Willow Flycatcher Sites Intersected by Motorized trails that would be prohibited to motorized use associated with the prohibition of cross country travel (positive impact)	**1**	**21**	**23**	**22**	**20**	**21**	**22**
Total Miles	**0.02**	**3.7**	**3.9**	**3.9**	**3.6**	**3.7**	**3.8**
# Occupied Sites	1	5	5	5	5	5	5
Miles within Occupied	0.02	1.18	1.18	1.18	1.18	1.18	1.18
# Emphasis Sites	0	16	18	17	15	16	17
Miles within Emphasis	0	2.55	2.68	2.67	2.42	2.55	2.57
Cumulative effects							
Total Number of Willow Flycatcher Sites Intersected by Existing NFTS motorized routes - NFS lands (negative impact)	**24**	**24**	**24**	**24**	**24**	**24**	**24**
Total Miles	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**
# Occupied Sites	9	9	9	9	9	9	9
Miles within Occupied	1.15	1.15	1.15	1.15	1.15	1.15	1.15
# Emphasis Sites	15	15	15	15	15	15	15
Miles within Emphasis	1.83	1.83	1.83	1.83	1.83	1.83	1.83
Total Number of Willow Flycatcher Sites Intersected by Existing motorized routes on - non-NFS lands (private) (negative impact)	**7**	**7**	**7**	**7**	**7**	**7**	**7**
Total Miles	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**
# 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
# Emphasis Sites	5	5	5	5	5	5	5
Miles within Emphasis	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Total Number of Willow Flycatcher Sites Intersected by Existing non-motorized routes (negative impact)	**6**	**6**	**6**	**6**	**6**	**6**	**6**
Total Miles	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**
# 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
# Emphasis Sites	5	5	5	5	5	5	5
Miles within Emphasis	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Total Number of Willow Flycatcher Sites Intersected by Decommissioned routes (positive impact)	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Total Miles	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**
# Occupied Sites	1	1	1	1	1	1	1
Miles within Occupied	0.3	0.3	0.3	0.3	0.3	0.3	0.3
# Emphasis Sites	2	2	2	2	2	2	2
Miles within Emphasis	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total Cumulative Effects							
Number of Times a Meadow is Intersected by Motorized Routes	**59**	**39**	**37**	**38**	**41**	**39**	**38**
Net Cumulative Impacts = Sum Total Miles of All Routes both positive and negative that Intersect Willow Flycatcher Sites	**12.1**	**8.4**	**8.2**	**8.2**	**8.5**	**8.4**	**8.3**

[1] Alternative 1 includes the existing routes unauthorized to motorized public use continued with cross country travel, while all action alternatives include proposed unauthorized routes.

Sensitive Species Determination

The Biological Evaluation for the Tahoe NF Motorized Travel Management Project (incorporated by reference) made a determination that the proposed 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 motorized trails un-authorized for motorized use . Furthermore, wet weather seasonal restrictions reduces 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 actions 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 routes and existing unauthorized routes unauthorized to public use are addressed in the RCO analysis and Appendix A (Road Cards).

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 routes motorized trails un-authorized for motorized use.

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 22 willow flycatcher meadows (Alt 5 reduces the least, Alt 3 reduces the most) from 3.6 miles to 3.8 miles of existing routes unauthorized to motorized public use. 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 meadows, and prohibits existing and future cross country travel. motorized trails un-authorized for motorized use.

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.

Analysis Measures

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 deer seasonal restrictions specified in the current Tahoe Forest Plan, wet weather seasonal restrictions would apply to certain alternatives. The benefits to great gray owl with these additional wet weather closures are analyzed for the alternatives.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for their effects to potential great gray owl breeding habitat.

Number of Great Gray Owl Meadows Intersected by Roads and Motorized Trails: 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 trail additions to the NFTS. The number of great gray owl meadows intersected by proposed motorized trail additions to the NFTS were assessed for the alternatives.

Direct and Indirect Effects

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 from wet season motorized use. Alternative 1 with the greatest miles through 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.

Prohibition of 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 motorized trails un-authorized for motorized use.

Number of Great Gray Owl Meadows Intersected by Roads , Trails, and Open Areas

Currently, great gray owls are not known to breed on the Tahoe NF. Although great gray owl sightings have been reported on the Forest, no confirmation of nesting has been identified at this time. Therefore, the project alternatives would have no direct impacts to breeding great gray owls, since great gray owls are not currently known to breed on the Tahoe NF.

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 motorized trails un-authorized for motorized use, where motorized use could continue associated with cross-country travel, totaling approximately 6 miles. 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 where the future to occupy these areas may be limited. Alternative 5 results in intersecting 5 (12%) great gray owl meadow sites, where the future establishment of great gray owls could be affected. The remaining action alternatives either do not impact potential great gray owl meadows (Alternative 3), or minimally impacts great gray owl meadows.

Table 3.03-91. Number of Great Gray Owl Meadows Intersected by Motorized Routes

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Meadows *with* Intersections	21	3	0	1	5	3	2
Motorized route miles	5.7	<0.1	0	<0.1	<0.1	<0.1	<0.1

* Alternative 1 includes the existing motorized trails un-authorized for motorized use associate with cross country travel, while all action alternatives include motorized trail additions to the NFTS.

Summary of Direct and Indirect Effects

Table 3.03-92 summarizes the overall net direct and indirect effect of the alternatives from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and changes in class of vehicles.

Table 3.03-92. 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
Motorized trail additions to the NFTS	Negative effects within 21 meadows intersected on 5.6 miles.	Negative effects within 3 meadows intersected on < 0.1 mile.	No effects - no meadows affected	Negative effects within 1 meadow intersected on <0.1 mile.	Negative effects within 5 meadows intersected on <0.1 mile.	Negative effects within 3 meadows intersected on <0.1 mile.	Negative effects within 2 meadows intersected on <0.1 mile.
Additions of Open Areas (Eureka Diggins, Greenhorn, and Reservoir Areas at Stampede, Boca, and Prosser)	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Cross Country Travel	Negative effect cross country travel not prohibited on 3,165 meadow acres, including within 21 meadows intersected on 5.6 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 21 meadow on 5.8 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 20 meadow on 5.7 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 17 meadow on 5.3 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 19 meadow on 5.7 miles.
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	No effect	No Effect	Localized negative effects	No Effect	Localized negative effects
Overall Net Effect of Proposed Actions	Negative effect where cross country travel not prohibited on 21 meadows 5.6 miles and within 3,165 acres of meadow habitat.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles.	Positive Effect – Cross country travel. Prohibited on 3,165 acres, including within 21 meadow on 5.8 miles.	Positive Effect – Cross country travel. Prohibited on 3,165 acres, including within 20 meadow on 5.7 miles.	Positive Effect – Cross country travel. Prohibited on 3,165 acres, including within 17 meadow on 5.3 miles.	Positive Effect – Cross country travel. Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles.	Positive Effect – Cross country travel. Prohibited on 3,165 acres, including within 19 meadow on 5.7 miles.

*Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel, while all the action alternatives include proposed route additions.

Cumulative Effects

The geographic boundary for analyzing great gray owl cumulative effects of proposed alternatives are the suitable great gray owl meadow habitat sites within the boundary of the Tahoe NF. Approximately 30 meadow sites have been identified as being suitable foraging habitat for the great gray owl that are adjacent to suitable great gray owl nesting habitat, which would provide a sufficient area to analyze impacts to great gray owls on the Tahoe NF. These meadows encompass a wide geographic distribution from eastside to westside and encompasses a variety of vegetation diversity. The adjacent forest types surrounding these great gray owl meadow areas range from eastside pine, eastside mixed conifer, true fir types, and, westside mixed conifer forests.

Although great gray owls currently are not known to breed on the Tahoe NF, a few recent sightings on the Forest and on adjacent private lands, indicate the potential for breeding great gray owls on the Tahoe NF is a reasonable expectation. All of the action alternatives do not currently pose adverse direct or indirect effects to known breeding great gray owls, and therefore, no cumulative impacts to breeding great gray owls would occur. However, the action alternatives are analyzed for cumulative effects of motorized and non-motorized routes to suitable great gray owl foraging habitat that may affect the ability for great gray owls to occupy these sites in the future. 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 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 15 miles. 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 on the Tahoe NF will continue to 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.

Alternative 5 also adds considerable cumulative impacts to suitable great gray owl meadow sites, where these sites would be intersected by motorized and non-motorized routes 37 times for a total of about 10 miles.

Alternatives 2, 6, and 7 add a small amount of cumulative impacts to great gray owl meadows where 2-3 meadows are impacted by proposed motorized routes for less than 0.1 mile. This amount of impact to great gray owl foraging habitat should not limit the distribution of great gray owls in the future. For all the action alternatives, cross-country motorized travel would be prohibited.

For all the action alternatives, cross country travel would be prohibited on 3,165 great gray owl meadows, including approximately 6 miles on motorized trails un-authorized for motorized use 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 is expected to recovery and diminish in the future.

Table 3.03-93. 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 Potential GGO Meadow Sites Intersected by motorized trails added to NFTS	21	3	0	1	5	3	2
Miles	5.7	<1	0	<1	<1	<1	<1
Motorized trails prohibited to motorized public use (positive impact)[2]							
Number of Potential GGO Meadow Sites Intersected by motorized trails	1	18	21	20	17	18	19
Miles	<1	5.7	5.8	5.7	5.3	5.7	5.7
Acres of Great Gray Owl Habitat Where Cross Country Travel is Prohibited	0	3,165	3,165	3,165	3,165	3,165	3,165
Acres of Great Gray Owl Habitat Where Cross Country Travel is not prohibited	3,165	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)							
Number of Potential GGO Meadow Sites Intersected by motorized routes	23	23	23	23	23	23	23
Miles	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Existing routes on private land - non-NFS lands (negative impact)							
Number of Potential GGO Meadow Sites Intersected by motorized routes	3	3	3	3	3	3	3
Miles	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Existing non-motorized routes (negative impact)							
Number of Potential GGO Meadow Sites Intersected by Routes	6	6	6	6	6	6	6
Miles	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Decommissioned routes (positive impact)							
Number of Potential GGO Meadow Sites Intersected by Routes	3	3	3	3	3	3	3
Miles	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Cumulative Effects							
Number of Times GGO Meadows Intersected by Motorized Routes	**53**	**35**	**32**	**33**	**37**	**35**	**34**
Total Miles	**15.2**	**9.6**	**9.5**	**9.5**	**10**	**9.6**	**9.5**

[1] Alternative 1 includes the existing routes unauthorized to motorized public use, 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 Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on the and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the great gray owl within the cumulative effects boundary.

Between 1994 and 2007, four wildfires (Cottonwood, Pendola, Star, and Bassetts) resulted in burning approximately 4,000 acres of older forest habitat. 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 2007, over 13,000 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 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 Q, Wildlife 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 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 habitat 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 a recent great gray owl detections are documented, is currently being planned for watershed restoration efforts to improve the hydrologic and vegetation conditions that would benefit great gray owl foraging conditions.

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 15 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.

Currently, great gray owls have not been known to breed on the Tahoe NF. Therefore, the addition of motorized trails to the National Forest Transportation System (NFTS) would not directly, indirectly or cumulative affect known breeding great gray owls. However, potential great gray owl nesting habitat does occur on the Forest and incidental great gray owls have been detected on the Sierraville Ranger District and incidental great gray owls have been documented on private land adjacent to National Forest system lands within the boundary of the Tahoe NF on the west side of the Forest. Alternative 6, the preferred alternative, results in less than 0.1 mile intersecting suitable great gray owl meadow sites within 7% (3 of 41) of the 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 actions and alternatives for the Tahoe NF Motorized Travel Management Project were analyzed for their potential effects to great gray owl meadows which addresses 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 routes and existing unauthorized routes unauthorized to public use are addressed in the RCO analysis and Appendix A (Road Cards).

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 motorized trails un-authorized for motorized use.

All of the action alternatives are consistent with the Standards and Guidelines since the reduce the potential effects to great gray owl meadows. All the action alternatives all prohibit cross country travel on 3,185 great gray owl meadow acres, and reduces the impacts of 17 to 21 great gray owl meadows (Alt 5 reduces the least, Alt 3 reduces the most) from 5.3 miles to 5.8 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 prohibits existing and future 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 (UDSA 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 occur 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

Analysis Measures

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.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for their effects to sandhill crane breeding habitat.

Sandhill Crane Breeding Sites Intersected by Motorized Trail Additions to the National Forest Transportation System (NFTS) and Designation of "Open Areas": Sandhill crane breeding sites were analyzed to determine the number of miles of motorized trail additions to the NFTS that intersects sandhill crane breeding sites.

Direct and Indirect Effects

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 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).

Prohibition of 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 Trail Additions to the National Forest Transportation System (NFTS) and Designation of "Open Areas"

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 trails added to the NFTS would not intersect known breeding sites at Kyburz Flat or Carman Valley on National Forest System lands, and therefore, no direct or indirect effects would occur from the addition of motorized trails to the NFTS.

Boca, Stampede, and Prosser Reservoir Open Areas: Alternative 2 proposes the allowance of 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.

Summary of Direct and Indirect Effects

Table 3.03-94 summarizes the overall net direct and indirect effect of the proposed actions from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-94. 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
Motorized trail additions to the NFTS	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.
Open Reservoir Areas at Stampede, Boca, and Prosser Reservoirs	Unmanaged motorized use continues, potential adverse effects to sandhill crane at Stampede Reservoir	Open motorized access to reservoirs on dry soil – potential adverse effects to sandhill crane at Stampede Reservoir	No effect	No effect	No effect	No effect	No effect
Cross Country Travel	Not prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.
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 Carmen Valley.	No effect	No Effect	Localized negative effects at Carmen Valley.	No Effect	Localized negative effects at Carmen Valley.
Overall Net Effect of Proposed Actions	Negative effect at Kyburz, Perazzo, and Carman Valley, and Stampede Reservoir where cross country travel continued.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited, but negative effects at Stampede Reservoir.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.

*Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of 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 project 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 Motorized Trail Additions to the National Forest Transportation System (NFTS), Designation 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 Q (Wildlife 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 is 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 actions 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 routes unauthorized to public use are addressed in the RCO analysis and Appendix A (Road Cards).
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 trail 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: Environmental Consequences

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.

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 trail additions to the National Forest Transportation System (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

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.

Prohibition of Cross Country Travel. Under Alternative 1, cross country travel would continue, affecting 3,525 acres of montane riparian habitat (10 acres directly affected by continued use on motorized trails un-authorized for motorized use), 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, 9 to 10 acres of yellow warbler habitat would directly benefit of the prohibition of cross country travel on motorized trails un-authorized for motorized use.

Motorized Trail additions to the National Forest Transportation System (NFTS). Table 3.03-95 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 motorized trails un-authorized for motorized use results in a loss or reduction in montane riparian habitat within 10 out of 5,131 acres or 0.2% of Tahoe NF montane riparian habitat. Alternatives 2, 5, & 6 are similar in their effects to montane riparian habitat, where motorized trail additions to the NFTS) results in between 0.4 and 0.6 acres out of 5,131 acres or 0.01% of Tahoe NF yellow warbler habitat. Alternatives 3, 4, and 7 result in minimal to no habitat affected by the motorized trail additions to the NFTS).

Table 3.03-95 Proportion of Yellow Warbler MIS habitat affected by of Motorized Trail Additions to the National Forest Transportation System (NFTS)

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		10	0.4	0	0.04	0.6	0.4	0.1
Proportion of Sierra Nevada Habitat	29,000	.03%	0%	0%	0%	0%	0%	0%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat	5,131	0.2%	0.01%	0%	0%	0.01%	0.01%	0%
Habitat Security Risk in Tahoe NF		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

*Alternative 1 includes existing motorized trails un-authorized for motorized use associated with cross country travel.

Summary of Direct and Indirect Effects

Table 3.03-96 summarizes the overall net effect to the yellow warbler habitat from the motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-96. Yellow Warbler - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Trail additions to the NFTS	0	0.4 acres montane riparian habitat affected.	0	0.04 acres montane riparian habitat affected.	0.6 acres montane riparian habitat affected.	0.4 acres montane riparian habitat affected.	0.1 acres montane riparian habitat affected.
Cross Country Travel	Not prohibited on 3,525 habitat acres (10 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within 9.6 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within approx. 10 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within approx. 10 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within 9.4 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within 9.6 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within 10 acres directly affected by motorized trails un-authorized for motorized use).
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	No effect	Minor negative effect	Localized negative effects	Localized negative effects	Minor negative effect
Overall Net Effect of Proposed Actions	Negative effect on 10 acres of yellow warbler habitat.	Positive effect on 9.6 acres of yellow warbler habitat.	Positive effect on 10 acres of yellow warbler habitat.	Positive effect on 10 acres of yellow warbler habitat.	Positive effect on 9.4 acres of yellow warbler habitat.	Positive effect on 9.6 acres of yellow warbler habitat.	Positive effect on approx.10 acres of yellow warbler habitat.

*Alternative 1 includes existing routes unauthorized to motorized public use 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

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System 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 affects 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 3.03-97 lists the reasonably foreseeable future projects and the associated direct, indirect, and cumulative impacts that are planned to occur on the Tahoe NF.

Table 3.03-97. Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Yellow Warbler Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in aspen and oak habitats.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	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 to montane riparian habitat.

Project type	Number of Projects	Yellow Warbler Direct and Indirect Impact	Overall Cumulative Impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve montane habitat quality and quantity used for foraging and nesting.	Beneficial cumulative impact by improving long-term habitat 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 where trail is in close proximity to yellow warbler habitat.	No cumulative impact to montane riparian habitat..
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, affects the greatest amount of yellow warbler habitat (10 acres out of 5,131 acres) on the Tahoe NF. Alternatives 2, 3, and 7 do not affect yellow warbler habitat (or affects only a nominal amount) from motorized trail additions to the National Forest Transportation System (NFTS). Alternatives 2, 5, and 6 alters less than 0.02% of yellow warbler habitat (0.4 acres to 0.6 acres out of 5,131 acres Tahoe NF habitat). 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 will 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 National Forest System 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 results in the greatest amount of montane riparian habitat 10 acres of 29,000 acres (0.03% of Sierra Nevada-wide habitat) affected by cross country travel, including use on existing motorized trails un-authorized for motorized use. The action alternatives result in none to very few (0 acres to less than 1 acre out of 29,000 acres) acres of yellow warbler habitat compared to Sierra Nevada-wide habitat available. Based on the small percentage of habitat affected, the Tahoe NF Motorized Travel Management Project will not alter the existing habitat trend, nor will 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 actions 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 trail additions to the NFTS and existing motorized trails un-authorized for motorized use are addressed in the RCO analysis and Appendix A (Road Cards).

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, continues cross country travel montane riparian habitats important to yellow warblers, including on 10 acres of montane riparian habitat resulting from travel on existing motorized trails un-authorized for motorized use.

All of the action alternatives are consistent with the above Standards and Guidelines. All the action alternatives reduces the impacts to these habitats by prohibiting cross country travel on within yellow warbler habitats, including on 9.6 of 10 acres of montane riparian habitat affected by existing motorized trails un-authorized for motorized use.

Aquatic Species and Habitat: Affected Environment

Introduction: The Tahoe NF aquatic species considered here in this analysis are fish and aquatic macroinvertebrates, special status species that are either on the federal threatened and endangered species list (Lahontan cutthroat trout and California red-legged frog) or on the Regional Forester's Sensitive Species list. Amphibian species and their habitats addressed in this section are foothill yellow-legged frog, mountain-yellow legged frog, and northern leopard frog. Fish species addressed include Lahontan cutthroat trout (LCT), hardhead, and Lahontan Lake tui chub. Great Basin ramshorn snail and the California floater are aquatic invertebrate species that are also included in the general discussion of potential impacts of road and trail associated factors.

Motorized road and trail associated factors will be discussed here for fisheries and macroinvertebrates across the Forest. Generally, site-specific studies on the species interaction with road and trail-associated factors is lacking in the literature. Site-specific information or literature on road and trail associated factors to aquatic species will be presented whenever available. Additional information is presented in Chapter 3.02, Soil and Watershed Resources.

Increases in stream sediments has been correlated with decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, and increased predation of fishes. The effects of roads and trails also include barriers to migration, changes in water temperature, and changes in streamflow regime. Culverts that are placed in improper locations at stream crossings can reduce or eliminate stream passage, and road crossings may be migration barriers to fish. Roads constructed adjacent to streams can also cause adverse effects to stream condition. Loss of riparian vegetation affects stream temperature and cover which can have both negative and positive impacts on fish. Irregularly or unpredictable streamflows has the potential to impact fish densities by affect reproductive success and over wintering survival. High streamflow events following spawning can dislodge egg masses or displace young fry, and therefore lead to increased mortality to fish populations.

Road construction and use also affects adjacent vegetation. Reductions in vegetation along roads resulting from hazard tree removal and road associated recreation use may create edge effects that alter community structure due to soil compaction and increased solar radiation and wind. Increases in soil compaction combined with increases in solar radiation have the potential to increase soil temperatures and decrease soil moisture, reducing habitat suitability for aquatic, aquatic-dependent, and riparian dependent species.

Summary of potential trail and road associated impacts to aquatic and riparian associated species:

- Mortality or injury resulting from a motorized vehicle running over or colliding with an animal
- Loss or degradation resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities (Includes changes in sediment delivery, changes in water temperature, changes in channel morphology, and changes in hydrologic and vegetative condition of aquatic and riparian habitats, including streams, ponds, lakes, meadows, springs, and fens, and the associated riparian vegetation).
- 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
- 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.

Fisheries and Aquatic Macroinvertebrates

Several studies have correlated road density or indices of roads to fish density or measures of fish diversity (Gucinski, et al. 2001). Impacts to fisheries include sedimentation of fines, changes in streamflow, changes in water temperature through loss of shade (changes in riparian vegetation) or changes in groundwater, migration barriers, introduction of exotic fishes, changes in channel geomorphology, and increased fishing pressure.

Effects of elevated sediment delivery to aquatic systems include adverse effects to water quality (e.g., increases in turbidity) and changes in substrate morphology that potentially could influence in-stream primary production and macroinvertebrate assemblages that provide forage for trout. Aquatic invertebrates species (macroinvertebrates) assemblages have been shown to be negatively impacted by stream crossings. One study found (Hawkins et al. *In*: Gucinski, et al. 2001) that aquatic insect larvae (mayflies, stoneflies, and caddisflies) assemblages were negatively related to the number of stream crossings above a site. Another study (Newbold et al. 1980 *In*: Gucinski, et al. 2001) found that macroinvertebrate assemblages differed significantly above and below stream crossings. Landscape analyses suggests that road and trail associated factors can affect the frequency, timing, and magnitude of disturbance, which may influence aquatic invertebrate community structure and species diversity.

Aquatic Species and Habitat: Environmental Consequences

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.

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails were analyzed for the project 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.

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)

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to aquatic habitat factors from motorized cross country travel.

Motorized Route and Area Additions: Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized trail additions to the NFTS, and the miles motorized trail additions within Riparian Conservation Areas (RCAs) for perennial and intermittent streams, and lakes, ponds, and reservoirs.

Direct and Indirect Effects to Fisheries (trout) and Macroinvertebrates

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.

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 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 route locations 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 stream, 941 miles of intermittent stream, 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 Water Resources). There are currently 2,099 native surfaced, stream crossings, and 1719 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 EPA's 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.

Wet Weather Seasonal Closures

Proposed wet weather seasonal restrictions on native surfaced roads and trails were analyzed for the project 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 trails, 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 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 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.

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). If the route changes from smoothed surfaced to native surfaced, the change in class of vehicle may result in increased sediment and erosion risk. The analysis of the change in class of vehicles indicates Alternatives 2, 5, and 6 will result in an increase in high risk routes (native surfaced) by a change of 0.2 miles per square mile of RCA (13.9 miles) and by 0.3 crossings per square mile (102 crossings) across the entire Tahoe NF, where increases in sedimentation to riverine and lacustrine habitats may occur over time (Table 3.03-98). No change in class of vehicles would occur in Alternatives 1 and 3, only minor changes (3.4 miles) would occur in Alternatives 4 and 7.

Table 3.03-98. 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	102	0	0	102	102	0
RCA Miles of Native Surfaced Routes	0	13.9	0	0	13.9	13.9	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will 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 will likely reduce the potential for sedimentation and alteration of water surface shade, and therefore benefit aquatic riverine and lacustrine habitat quality.

Motorized Route Additions

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 3.03-99). Alternative 1 poses the greatest risk of increased sedimentation where 785 stream crossings are affected by the continuance of cross country travel on motorized trails unauthorized to motorized public use. Of the action alternatives, Alternative 5 results in the greatest number of native surfaced, stream crossings (461 crossings) associated with proposed motorized trail additions to National Forest Transportation System (NFTS), followed by Alternatives 2, 6, 7, and 4, in descending order. Alternative 3 does not add motorized trails to the NFTS, and therefore macroinvertebrate habitat factors of sedimentation or water surface shade would not be affected.

Table 3.03-99. 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)	0	357	0	19	461	164	20
Stream Crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized public use (negative impact)	785	0	0	0	0	0	0
Crossings that would be unauthorized to motorized public use with the prohibition of cross country travel (positive impact)	0	428	785	766	324	621	765

Miles of Proposed Route Additions within RCAs. The miles of proposed motorized trail 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 3.03-100). Alternative 1 poses the greatest risk to increased sedimentation potential from 201.5 miles of motorized trails un-authorized for motorized use within RCAs that would remain due to not prohibiting cross country travel. Similar to stream crossing numbers, Alternative 5 also results in the greatest number of motorized route trails within RCAs that would be added to the NFTS, followed by Alternatives 2, 6, 7, and 4, in descending order. As stated above, Alternative 3 does not add motorized trails to the NFTS, and therefore changes to macroinvertebrate habitat factors of sedimentation or water surface shade would not occur.

Table 3.03-100. Miles of Proposed Route Additions within Riparian Conservation Areas (RCAs)

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized trail additions within RCAs (negative impact)	201.5	64.5	0	5.7	97.0	35.2	8.2
Miles of motorized routes within RCAs that would be prohibited to motorized public use with the prohibition of cross country travel (positive impact)	0	136.5	201.5	195.8	104.5	166.3	193.3

*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

Table 3.03-101 summarizes the direct and indirect effects of macroinvertebrate habitat factors for the alternatives from proposed motorized trail additions to the National Forest Transportation System and cross country travel, including motorized trails un-authorized for motorized use. 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 will 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 trail 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 density of native surface road and motorized trails within the Riparian Conservation Areas (RCAs) and the density of stream crossings within RCAs. RCAs are defined as the area within 100 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 will be reduced 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 will 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 (crossing density).

Table 3.03-101. Summary of Effects of Motorized Route Additions and Changes in Class of Vehicles 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 (201 RCA route miles, 785 crossings)	Decreases the most
Alt 2	Low	Increase (79 RCA route miles, 459 crossings)	Decrease
Alt 3	Low	No Change	No Change
Alt 4	Low	Increases the least (6 RCA miles, 19 crossings)	Decreases the least
Alt 5	Low	Increase (111 RCA miles, 563 crossings)	Decrease
Alt 6	Low	Increase (49 RCA miles, 266 crossings)	Decrease
Alt 7	Low	Increase (8 miles, 20 crossings)	Decrease

*Alternative 1 includes existing native surfaced, stream crossings and routes unauthorized to motorized use, while all the other Alternatives include motorized crossing and route additions.

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.

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 Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will 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.

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 aquatic macroinvertebrate habitats because humans are attracted to streams, lakes, ponds, and reservoirs. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased impacts to aquatic macroinvertebrate habitat would be expected, particularly during the summer months.

Cumulative Effects Conclusion

For the action alternatives, generally, changes in flow and water surface shade will 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 will continue on 149,277 acres within Riparian Conservation Areas where the highest potential to reduce habitat quality by increasing sediment delivery and alter water surface shade to aquatic macroinvertebrate habitats.

Changes in class of vehicles on native surfaced routes may potentially increase sedimentation to macroinvertebrate habitats under Alternatives 2, 5, and 6 by 13.9 RCA miles per square mile and by 102 crossings per mile across the Tahoe NF. Changes in class of vehicles on native surfaced routes will not measurably increase sedimentation to macroinvertebrate habitats under Alternatives 4 and 7.

Wet weather seasonal restrictions under Alternatives 4, 5, and 6 on all native surfaced roads and trails 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.

Sedimentation of macroinvertebrate habitats the greatest under Alternative 1, where 785 stream crossings and 201 RCA miles of motorized trails would continue to have un-authorized motorized use since cross country is not prohibited. For the action alternatives, Alternative 5 results in the greatest number of native surfaced, stream crossings, followed by Alternatives 2, 6, 7, and 4, in descending order from the addition of motorized trails to the National Forest Transportation System (NFTS). Alternative 3 does not add any stream crossings because no route additions are proposed to the NFTS.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Tables 3.03-102 and 3.03-103 summarizes the direct , indirect, and cumulative effects of existing native surfaced motorized routes, native surfaced, motorized route additions, and native surfaced 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 and Soil Resources for more detailed information and assumptions.

Table 3.03-102. Net Direct, Indirect, and Cumulative Effects to Number of Native Surfaced, Stream Crossings from Motorized Trail Crossing Additions, 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 NFTS Motorized Crossings	2,099	2,099	2,099	2,099	2,099	2,099	2,099
Motorized Crossing Additions	785	357	0	19	461	164	20
Prohibition of Cross Country Travel	0	428	785	766	324	621	765
Change in Class of Vehicles	0	102	0	0	102	102	0
Net Direct, Indirect, and Cumulative Effect = Total Motorized Crossings	**2,884**	**2,558**	**2099**	**2,118**	**2,662**	**2,365**	**2,119**

*Alternative 1 includes existing native surfaced, stream crossings unauthorized to motorized use, while all the other Alternatives include motorized crossing additions.

Table 3.03-103. Net Direct, Indirect, and Cumulative Effects to Native Surfaced, RCA Miles from Motorized Trail Additions, 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 NFTS Motorized	472.7	472.7	472.7	472.7	472.7	472.7	472.7
Miles of Native Surfaced Motorized RCA Trail Additions	201.5	64.5	0	5.7	97.0	35.2	8.2
Prohibition of Cross Country Travel	0	136.5	201.5	195.8	104.5	166.3	193.3
Change in Class of Vehicles	0	13.9	0	0	13.9	13.9	0
Net Direct, Indirect, and Cumulative Effect = Total Motorized RCA Miles	**674.2**	**551.1**	**472.7**	**478.4**	**583.6**	**521.8**	**480.9**

*Alternative 1 includes miles of existing native surfaced, routes unauthorized to motorized use, 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 will affect the greatest amount of macroinvertebrate habitat under Alternative 1, through increased sedimentation and decreased surface shade, where approximately 201 miles of motorized trails unauthorized to motorized public use would continue to occur under the continuance of cross country travel within RCAs. These motorized trails would effectively result in 785 native surfaced, stream crossings that could adversely affect the quality of macroinvertebrate habitats through increased sediment delivery and decreased surface water shade.

The analysis of the addition of motorized trails to the National Forest Transportation System (NFTS) for the action alternatives indicates Alternative 5 results in the greatest amount impact to macroinvertebrate habitat, though the potential increase in sedimentation and decrease in surface water shade from motorized stream crossings and RCA route miles (111 RCA miles, 563 crossings), followed by Alternatives 2, 6, 7, and 4, in descending order. Alternative 3 does not add any stream crossings or motorized trails within RCAs because no motorized trail additions to the NFTS are proposed under this alternative.

The action alternatives will not alter the existing trend in macroinvertebrate habitat, nor will 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, the prohibition of cross country travel on between 222 and 785 motorized RCA miles, and the prohibition of cross country travel on between 90 and 201 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 Forest Service 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 occupy four 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. These recreation related populations are not considered recovery populations by the USFWS and are not subject to protection under the Endangered Species Act (ESA). In 2006, Lahontan cutthroat trout were released into Sagehen Creek as part of research project. These LCT are also not subject to protection under the ESA.

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 alternatives are 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 that cross any stream occupied by Lahontan cutthroat trout.

    - The change in class of vehicles on the Pole Creek Road (Road #5708) proposed in alternatives 2, 5, and 6 crosses Pole Creek, which is occupied Lahontan cutthroat trout habitat.
- 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.
    - The change in class of vehicles on the Pole Creek Road has the potential to increase sediment delivery to Pole Creek which is occupied Lahontan cutthroat trout habitat. Mitigation measures would be required to maintain the Pole Creek Road that is within close proximity to the Pole Creek to a higher maintenance standard where sediment delivery to occupied habitat would be minimized to prevent adverse effects to LCT.
- **“Motorized 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 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 within watersheds or Riparian Conservation Areas that provide habitat for Lahontan cutthroat trout.
    - The change in class of vehicles on approximately 0.5 miles of the Pole Creek Road (Road #5708) is located within the Riparian Conservation Area of Pole Creek, which is occupied Lahontan cutthroat trout habitat, and therefore may have adverse effects from potential increased sedimentation from changed maintenance standards, where the route changes from smooth surfaced to native surfaced. Mitigation measures would be required to maintain the Pole Creek Road that is within the Pole Creek RCA to a higher maintenance standard where sediment delivery to occupied habitat would be minimized to prevent adverse effects to LCT.

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect LCT occupied habitats. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to occupied LCT streams.

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, Soil and Watershed Resources). 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.

Prohibition of 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.

Motorized Route and Area Additions (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 trail additions to the National Forest Transportation System, and the miles motorized trail additions 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 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 within the Riparian Conservation Areas (RCAs) of occupied LCT streams/lakes were also evaluated by 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 LCT. According to Chapter 3.02 (Soil and Watershed Resources), 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 routes unauthorized to motorized use). 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 project 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

Wet Weather Seasonal Closures

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where LCT 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, LCT 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.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-104 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 result in the changes to road maintenance standards resulting in changes from smooth surfaced roads to rough surfaced roads that are likely to occur (Table 3.03-104).

Under alternatives 2, 4, and 6, this change in road surface type has a higher potential to result in increased sedimentation within two HUC 7 watersheds with an occupied LCT stream. These are the East Fork Creek HUC7 watershed and the Middle Truckee River-Pole 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 could result in the change from smooth surfaced to native surfaced motorized crossing that may increase the risk of sedimentation. 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 results 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). This changed maintenance standard has the potential to increase the risk of sediment delivery to the occupied LCT stream at Pole Creek, and therefore may reduce habitat quality for LCT in Pole Creek. However, mitigation measures would be required to maintain the Pole Creek Road at a higher maintenance standard within approximately 0.5 miles adjacent to Pole Creek so that sediment delivery to Pole Creek is minimized.

Table 3.03-104. 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	0	1	0	0	1	1	0
Miles of route resulting from changes in maintenance from smooth surfaced to native surfaced route	0	0.5	0	0	0.5	0.5	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will continue on approximately 2,141 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 5.4 RCA miles and on 10 crossings for all the action alternatives, and continues under Alternative 1. Under the action alternatives, prohibitions on cross country travel on 2,141 acres within RCA's of occupied LCT streams (5.4 miles and 10 stream crossings) will likely reduce the potential for sedimentation and alteration of water surface shade, and therefore benefit LCT habitat quality.

Motorized Trail and Area Additions – Stream Crossings and Miles of Motorized Trail 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 10 stream crossings are affected by the continuance of cross country travel on motorized trails unauthorized to motorized public use., Alternatives 2, 5, and 6 result in the addition of 7 native surfaced, motorized trail crossings at the HUC7 scale. Alternatives 3, and 7 do not add motorized trails to the NFTS, and therefore sedimentation or water surface shade would not be affected within and LCT HUC7 watershed.

Table 3.03-105. LCT 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)	0	0	0	0	0	0	0
Miles of existing motorized routes unauthorized to motorized public use within RCAs that would remain due to not prohibiting cross country travel (negative impact)	10	0	0	0	0	0	0
Acres of cross country travel prohibitions	0	2,141	2,141	2,141	2,141	2,141	2,141

Miles of Proposed Route Additions within RCAs of LCT 7th Field Watersheds. The miles of proposed motorized trail 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 streams within LCT HUC 7 watersheds. Alternative 1 poses the greatest risk to increased sedimentation potential from 5.4 RCA miles of motorized trails un-authorized for motorized use that would remain due to not prohibiting cross country travel. Similar to stream crossing numbers, Alternatives 2, 5, and 6 proposes to add 1.9 RCA miles of motorized trails to the NFTS. As stated above, Alternatives 3, 4, and 7 do not add motorized trails to the NFTS, and therefore changes to sedimentation or water surface shade would not occur within any LCT HUC7 watershed.

Table 3.03-106. 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
Miles of proposed motorized trail additions within RCAs (negative impact)	0	0	0	0	0	0	0
Miles of existing motorized routes unauthorized to motorized public use within RCAs that would remain due to not prohibiting cross country travel (negative impact)	5.4	0	0	0	0	0	0

Addition of Areas. The addition of motorized areas will not affect any LCT watersheds, since none of the proposed motorized areas fall within any watersheds occupied by LCT, including the Greenhorn area, Eureka Diggings area, and the Reservoir areas (stampede, Boca, and Prosser).

Site-specific Physical Impacts and Disturbance to occupied Lahontan cutthroat trout streams

As mentioned above, the LCT occupies four 7th field watersheds (HUC7): Middle Truckee River-Pole Creek, Independence Lake, Middle Yuba River-Milton Reservoir, and East Fork on the Tahoe NF. Alternatives 1 and 5 pose the greatest risk to LCT where existing routes unauthorized to motorized public use have the potential to impact occupied LCT habitat. The remaining 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-Pole Creek 7th field watershed. Pole Creek is currently occupied by LCT and falls within the Middle Truckee River-Pole Creek watershed. No route additions are proposed under the action alternatives. Two existing routes unauthorized to motorized public travel would remain and under cross country travel in Alternative 1. However, these routes do not have the potential to deliver sediment to Pole Creek where LCT is 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, a route unauthorized to motorized public use (~¼ mile) does not cross, but parallels the headwaters of Macklin Creek, potentially delivering sediment into the stream. None of the project 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.

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 Roads and Trails

Route Density within Riparian Conservation Areas (RCAs). Chapter 3.02 (Soil and Watershed Resources), 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 (3.6 - 10.2 miles/square mile), moderately high (2.6 - 3.5 miles/square mile), moderately low (1.9 – 2.5 miles/square mile, and lowest (0.5 – 1.8 miles/square mile). Figure 3.03-3 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 the East Fork Creek HUC7 watershed has the highest motorized route densities (>3.6 miles/square mile) compared to all the action alternatives. Under Alternative 1, the three remaining LCT HUC7 watersheds each fall within route density categories of moderately high, moderately low, and lowest. Alternatives 2, 5, and 6 are similar in route densities where two HUC7 watersheds are within route density categories of moderately high, one within moderately low, and one within the lowest. Alternatives 3, 4, and 7 have the least potential for effects from motorized routes within HUC7 watersheds with occupied LCT streams where one watershed falls within the moderately high route density category, two within moderately low, and one within lowest.

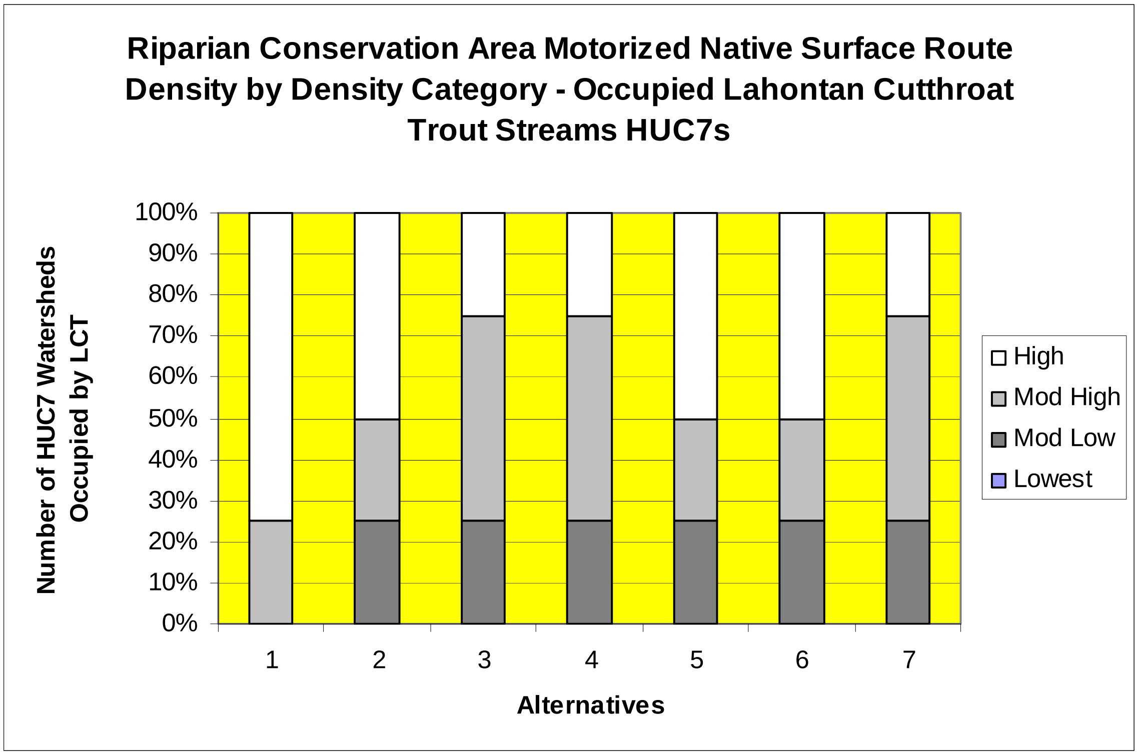

Figure 3.03-3. Number of HUC7 Watersheds with Occupied LCT streams by Route Density Categories of Lowest, Moderately Low, Highest, and Moderately High

Stream Crossing Density within RCAs

Chapter 3.02 (Soil and Watershed Resources), analyzed RCA stream crossing density for each 7th field watershed on the Tahoe NF, and categorized motorized RCA crossing density (native surfaced) by four route density categories. The route density categories were highest (29.9+crossings/sq. mile), moderately high (20.8-29.8 crossings/sq. mile), moderately low (13.9-20.7 crossings/sq. mi.), and lowest (0-13.8 crossing/sq. mi.). Figure 3.03-4 displays motorized crossing density within HUC7 watersheds with occupied LCT habitat for each of the project alternatives. Alternative 1 poses the greatest risk to LCT, since 3 of 4 HUC7 watersheds occupied by LCT falls within the highest and moderately high categories for route crossing density where potential sediment delivery to streams within HUC7 watersheds with occupied LCT streams. Alternative 5 poses the next greatest risk from stream crossings where stream crossing densities where the 4 LCT watersheds falls within highest (1), moderately high (1), and moderately low (2). Alternatives 2 and 6 are similar in their stream crossing densities where each LCT watersheds falls within stream crossing density categories of highest, moderately, high moderately low, and lowest. Alternatives 3, 4, and 7 poses the least risk to LCT watersheds where one LCT HUC7 watershed falls in the lowest route density crossing category, two in the moderately low category, and one within the highest route density crossing category, where the least amount of sediment delivery and stream habitat alteration would likely occur compared to all the other alternatives.

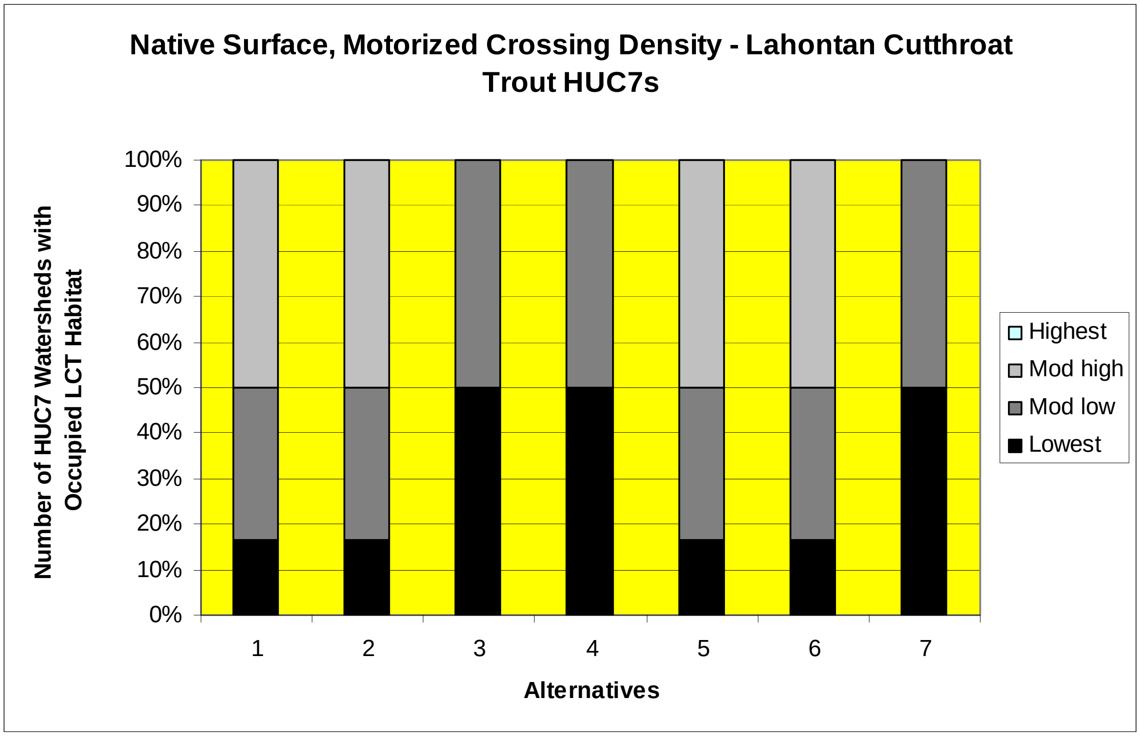

Figure 3.03-4. Number of HUC7 Watersheds with occupied LCT streams by Motorized Crossing Density Categories

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-107 summarizes the direct, indirect, and cumulative effects to native surfaced, motorized trail 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 (Soil and Watershed Resources) for more detailed information and assumptions.

Table 3.03-107. 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
Existing NFTS Native Surfaced, Stream Crossings	29	29	29	29	29	29	29
Native Surfaced, Motorized Trail Crossing Additions	0	0	0	0	0	0	0
Change in Class of Vehicles resulting in changed maintenance standards resulting in smooth surfaced to native surfaced	0	1	0	0	1	1	0
Cross Country Travel Continued on Stream Crossings Unauthorized to Motorized Use	10	0	0	0	0	0	0
Cross Country Travel Prohibited on Stream Crossings Unauthorized to Motorized Use	0	9	10	10	9	9	10
Net NFTS Native Surfaced, Stream Crossings	39	30	29	29	30	30	29
Acres of Cross Country Travel	Continues on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
NET Cumulative Effect	Cross country travel continues on 2,141 LCT RCA acres, including on 10 stream crossings unauthorized to motorized use. Motorized travel on 39 native surfaced, crossings No additional protection to occupied LCT streams from wet weather restrictions.	Cross country travel prohibited on 2,141 LCT RCA acres, including on 9 stream crossing unauthorized to motorized use. 30 NFTS native surfaced, crossings available for motorized use. No additional protection to occupied LCT streams from wet weather restrictions.	Cross country travel prohibited on 2,141 LCT RCA acres, including on 10 stream crossings unauthorized to motorized use. 29 NFTS native surfaced, crossings available for motorized use. No additional protection to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 10 stream crossing unauthorized to motorized use. 29 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 9 stream crossing unauthorized to motorized use. 30 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 9 stream crossing unauthorized to motorized use. 30 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 10 stream crossing unauthorized to motorized use. 29 NFTS native surfaced, crossings available for motorized use. No additional protection to occupied LCT streams from wet weather restrictions

Table 3.03-108. LCT 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized RCA Trail Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, RCA Miles	18.9	18.9	18.9	18.9	18.9	18.9	18.9
Native Surfaced, Motorized RCA trail mile Additions to NFTS	0	0	0	0	0	0	0
Change in Class of Vehicles resulting in changed maintenance standards resulting in smooth surfaced to native surfaced motorized RCA route miles	0	0.5 miles along Pole Creek would be mitigated to minimize sedimentation risk	0	0	0.5 miles along Pole Creek would be mitigated to minimize sedimentation risk	0.5 miles along Pole Creek would be mitigated to minimize sedimentation risk	0
Cross Country Travel Continued on RCA trails Unauthorized to Motorized Use	5.4	0	0	0	0	0	0
Cross Country Travel Prohibited on RCA trails Unauthorized to Motorized Use	0	5.4	5.4	5.4	5.4	5.4	5.4
Net NFTS Native Surfaced, RCA motorized route miles	24.3	21.3	18.9	18.9	21.3	21.3	18.9
Acres of Cross Country Travel	Continues on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
NET Cumulative Effect	Cross country travel continues on 2,141 LCT RCA acres, including on 5.4 miles. 24.3 RCA miles No additional protection from wet weather restrictions.	Cross country travel prohibited on 2,141 LCT RCA acres, including on 3 miles 21.3 NFTS RCA miles available. No additional protection from wet weather restrictions.	Cross country travel prohibited on 2,141 LCT RCA acres, including on 5.4 miles. 18.9 NFTS RCA miles available. No additional protection from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 5.4 miles. 18.9 NFTS RCA miles. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 3 miles. 21.3 NFTS RCA miles. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 3 miles. 21.3 NFTS RCA miles. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 5.4 miles. 18.9 NFTS RCA miles. Reduced sedimentation risk to occupied LCT streams 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 & 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 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 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.

Analysis Measures

Prosser Creek Reservoir HUC7, Stampede Reservoir HUC7, and Boca Reservoir HUC7

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect Lahontan Lake tui chub habitat. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to suitable Lahontan Lake tui chub habitat.

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). 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.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to three tui chub 7th field watersheds from motorized cross country travel.

Motorized Route and Area Additions (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 trail additions to the National Forest Transportation System, and the miles of motorized trail 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.

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 (Soil and Watershed Resources), 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 project 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

Wet Weather Seasonal Closures. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where Lahontan Lake tui chub potential habitat 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, the Lahontan Lake tui chub would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of native surfaced, motorized stream crossings and highest RCA motorized route densities that could potentially delivery sediment to tui chub habitat from motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-109 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 Prosser, Stampede, and Boca Reservoir HUC7 watersheds. Alternatives 2, 5, and 6 result in the downgrade of 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 tui chub habitat affected by 8 crossings and 0.4 miles of motorized roads.

Table 3.03-109. 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	3	0
Native surfaced RCA Miles as a result of changed maintenance standards from smooth surfaced to native surfaced	0	0.4	0	0	0.4	0.4	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will 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 approximately 14 RCA miles and between 37 to 42 crossings (Alt 3- the most, Alt 5 – the least) for the action alternatives. The prohibition of motorized cross country travel will likely reduce the risk of sedimentation and alteration of streamside vegetation, and therefore benefit potential tui chub habitat.

Motorized Trail and Area Additions – Stream Crossings and Miles of Motorized Trail Additions

Number of Native Surfaced, Stream Crossing Additions within Three Tui Chub7th Field Watersheds. Within the Prosser, Stampede, and Boca Reservoir watersheds, 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 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 trails unauthorized to motorized public use (Table 3.03-110). Alternative 5 results in the addition of 5 native surfaced crossings, while alternatives 2, 4, 6, & 7 result in the addition of 3 motorized native surfaced crossings. Alternative 3 does not add motorized trails to the NFTS, and therefore sedimentation or water surface shade would not be affected within the three tui chub HUC7 watersheds.

Table 3.03-110. 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)	42	3	0	3	5	3	3
Cross country travel	Continues on 9,689 acres	Prohibited on 9,689 acres	Prohibited on 9,689 acres	Prohibited on 9,689 acres	Prohibited on 9,689 acres	Prohibited on 9,689 acres	Prohibited on 9,689 acres

*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 trail 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 within tui chub HUC 7 watersheds. Alternative 1 poses the greatest risk to increased sedimentation potential from approximately 14 RCA miles of motorized trails un-authorized for motorized use that would remain due to the continuance of cross country travel (Table 3.03-111). Similar to stream crossing numbers, Alternatives 2, 5, and 7 propose to add between 0.5 to 0.6 RCA miles of motorized trails to the NFTS. Alternatives 3, 4, and 6 do not add motorized trails to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within the three Lahontan Lake tui chub HUC7 watersheds under these alternatives.

Table 3.03-111. 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
Miles of proposed motorized trail additions within RCAs (negative impact)	14.4	0.5	0	0	0.6	0	0.5

*Alternative 1 includes existing native surfaced, routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

Motorized Areas Additions

Stampede, Boca and Prosser Reservoirs. Under Alternative 2, Boca, Prosser and Stampede reservoirs would be managed to allow motorized access to the shoreline below the high water line by motor vehicles when the soils are dry. Shoreline access at these reservoirs by motorized vehicles is prohibited for all the other project alternatives including the no action alternative. Alternative 2 has the potential to increase soil erosion and sediment delivery to the reservoirs which may affect water quality for the Lahontan Lake tui chub. Therefore, except for Alternative 2, all the remaining project alternatives will not affect Lahontan Lake tui chub habitat within Boca, Stampede, and Prosser Reservoirs.

Greenhorn and Eureka Diggings Areas. Proposed motorized use at Greenhorn and Eureka Diggings areas, under Alternative 2, would not affect Lahontan Lake tui chub, since suitable habitat for the species does not occur within these proposed areas. Therefore, no direct or indirect effects to the species would result from the addition of the Greenhorn or Eureka Diggings areas.

Twelve HUC7 Tui Chub 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): Chapter 3.02 (Soil and Watershed Resources), analyzed Riparian Conservation Area (RCA) route density for twelve 7th field watershed on the Tahoe NF, and categorized motorized RCA route density (native surfaced) 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 3.03-112 and Figure 3.03-5 displays the number and percent of 7th field watersheds (HUC7s) with suitable tui chub habitat by RCA route density category of highest (3.6-8.2 miles/square mile), moderately high (2.6-3.5 miles/square mile), moderately low (1.9-2.5 miles/square mile), and lowest (0-1.8 miles/square mile). Alternative 1 poses the greatest direct and indirect effects to suitable tui chub habitat where 75% (9 of 12 tui chub HUC7 watersheds have route densities within the highest, 17% (2 of 12) within moderately high, 8% (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. Alternative 5 only slightly improves route densities compared to Alternative 1, where one HUC7 watershed moves from the moderately low to the lowest route density category. Alternatives 3, 4, and 5 have the lowest route densities of all the action alternatives. Alternatives 2 and 6 have similar route densities.

Table 3.03-112. Number and percent of HUC7 Watersheds with Suitable Lahontan Lake Tui Chub Habitat by RCA Route Density Category

Alternatives	**Highest** (3.6 to 8.2 mi/mi^2)	**Moderately High** (2.6 to 3.5 mi/mi^2)	**Moderately Low** (1.9 to 2.5 mi/mi^2)	**Lowest** (0 to 1.8 mi/mi^2)
Alt 1	10 (83%)	1 (8%)	1 (8%)	0
Alt 2	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 3	6 (50%)	3 (25%)	1 (8%)	2 (17%)
Alt 4	6 (50%)	3 (25%)	1 (8%)	2 (17%)
Alt 5	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 6	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 7	6 (50%)	3 (25%)	1 (8%)	2(17%)

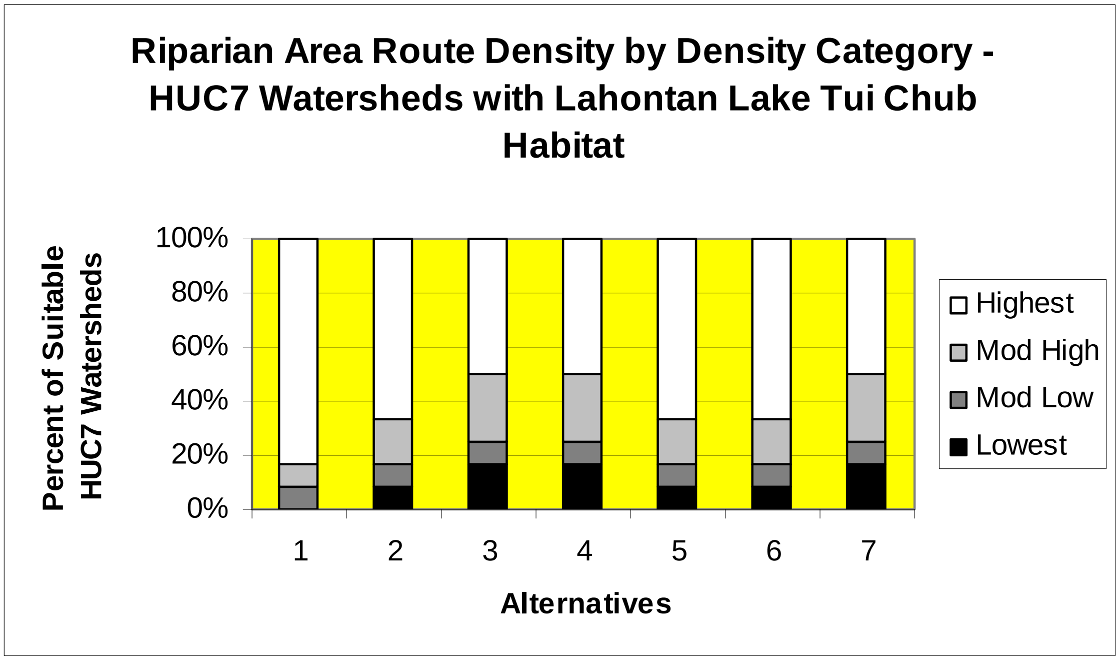

Figure 3.03-5. Proportion of HUC7 Watersheds with Suitable Lahontan Lake Tui Chub Habitat by Motorized RCA Route Density Categories

Stream Crossing Density: Twelve 7th field watersheds (HUC7s) identified as potentially affecting 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 (29.9+crossings/sq. mile), moderately high (20.8-29.8 crossings/sq. mile), moderately low (13.9-20.7 crossings/sq. mi.), and lowest (0-13.8 crossing/sq. mi.) (Table 3.03-113 and Figure 3.03-6). Alternative 1 poses the greatest risk of indirect effects to Lahontan Lake tui chub habitat through potential sediment delivery from native surfaced, motorized routes. Under Alternative 1, 91% HUC7 watersheds potentially affecting tui chub habitat would have stream crossing densities within the highest and the moderately high route density categories combined. Although Alternative 5 has a higher proportion of tui chub HUC7 watersheds in the highest stream crossing density category, under Alternative 5, stream crossing densities would be lower overall where a greater number of HUC7 watersheds are within the moderately low and the lowest crossing density categories.

The remaining alternatives further reduce the number of stream crossings within the highest crossing density category. 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. Alternatives 2 and 6 have the same proportion of HUC7 watersheds within stream crossing density categories.

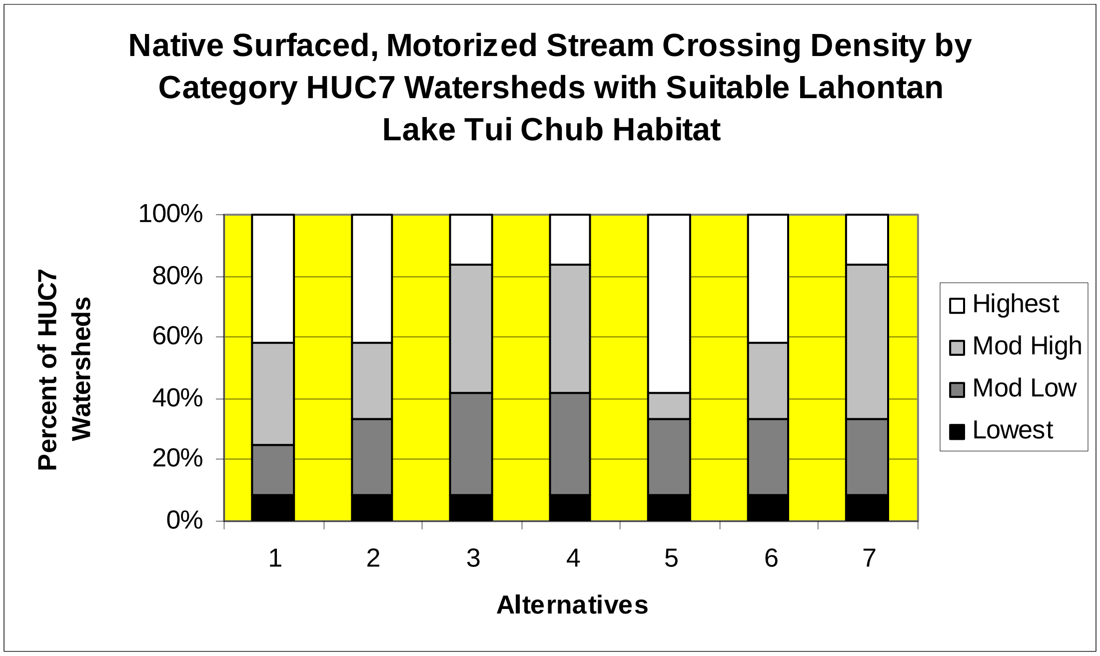

Figure 3.03-6. Number of HUC7 Watersheds with suitable Lahontan Lake Tui Chub Habitat by Motorized Stream Crossing Density Categories

Table 3.03-113. Number and percent of HUC7 Watersheds with Suitable Lahontan Lake Tui Chub Habitat by Native Surfaced, Motorized Stream Crossing Density Category

Alternatives	Highest (>29.9 crossings/mi^2)	Moderately High (20.8 to 29.8 crossings/mi^2)	Moderately Low (13.9 to 20.7 crossings/mi^2)	Lowest (0 to13.8 crossing/mi^2)
Alt 1	5 (42%)	4 (33%)	2 (17%)	1 (8%)
Alt 2	5 (42%)	3 (25%)	3 (25%)	1 (8%)
Alt 3	2 (17%)	5 (42%)	4 (33%)	1 (8%)
Alt 4	2 (17%)	5 (42%)	4 (33%)	1 (8%)
Alt 5	7 (58%)	1 (8%)	3 (25%)	1 (8%)
Alt 6	5 (42%)	3 (25%)	3 (25%)	1 (8%)
Alt 7	2 (17%)	6 (50%)	3 (25%)	1 (8%)

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 twelve 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 25 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 42 native surfaced crossings and approximately 14 miles of routes unauthorized to motorized use 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 routes unauthorized to motorized use in Alternative 1 would add measurable cumulative impacts to suitable Lake Lahontan tui chub habitat where 92% of HUC7 watersheds route densities are within the highest and moderately high route density categories combined. Native surfaced, motorized stream crossing densities would be greatest under Alternative 1 where 91% 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 3, 4, 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 ½ mile of trail unauthorized to motorized use and on 34 to 42 native surfaced, stream crossings (Alt 5 prohibits the least, Alt 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 3.03-114 summarizes the direct, indirect, and cumulative effects to native surfaced, motorized trail crossings within Lahontan Lake tui chub 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 (Soil and Watershed Resources) for more detailed information and assumptions.

Table 3.03-114. Lahontan Lake Tui Chub 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Stream Crossing Numbers

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Motorized Stream Crossings	75	75	75	75	75	75	75
Native Surfaced, Motorized Trail Crossing Additions	42	3	0	3	5	3	3
Change in Class of Vehicles Resulting in Changed Maintenance Standards Resulting in Smooth Surfaced to Native Surfaced Crossings	0	3	0	0	3	3	0
Cross Country Travel Prohibited on Motorized Crossings Unauthorized to Motorized Use	0	36	42	39	34	36	39

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Native Surfaced, Motorized Stream Crossings	117	81	75	78	83	81	78
Prosser, Stampede, and Boca Reservoir Open Areas	No Effect	Approximately 2,000 acres surrounding three reservoirs with potential to increase sediment risk to tui chub habitat	No Effect	No Effect	No Effect	No Effect	No Effect
Acres of RCA Cross Country Travel	Continues on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
NET Cumulative Effect	Cross country travel continues on 9,689 tui chub RCA acres, including on 42 native surfaced, crossings unauthorized to motorized use. 117 native surfaced, stream crossings (75 NFTS, 42 unauthorized) No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on 36 native surfaced crossings unauthorized to motorized use. 81 NFTS stream crossings available to motorized use. Motorized impacts from Open Reservoir Areas potentially increase sedimentation risk to tui chub habitat within Prosser, Stampede, and Boca reservoirs. No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on 42 native surfaced crossings unauthorized to motorized use. 75 NFTS stream crossings available to motorized use. No additional protection to tui chub habitat from wet weather restrictions	Cross country travel prohibited on 9,689 tui chub, RCA acres including on 39 native surfaced crossings unauthorized to motorized use. 78 NFTS stream crossings available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions	Cross country travel prohibited on 9,689 tui chub, including on 34 native surfaced crossings unauthorized to motorized use. 83 NFTS stream crossings available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions	Cross country travel prohibited on 9,689 tui chub, including on 36 native surfaced crossings unauthorized to motorized use. 81 NFTS stream crossings available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions	Cross country travel prohibited on 9,689 tui chub, including on 39 native surfaced crossings unauthorized to motorized use. 78 NFTS stream crossings available to motorized use. 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.

Table 3.03-115 summarizes the direct, indirect, and cumulative effects to native surfaced, motorized RCA route miles within Lahontan Lake tui chub HUC 7 watersheds, from existing motorized routes, motorized route and area 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 and Soil Resources for more detailed information and assumptions.

Table 3.03-115. Lahontan Lake Tui Chub 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of Existing NFTS Native Surfaced, Motorized Roads and Trails	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Miles of Native Surfaced, Motorized RCA Trail Additions*	14.4	0.5	0	0	0.6	0	0.5
Change in Class of Vehicle Where Changed Maintenance Standards Result in Smooth Surfaced to Native Surfaced RCA Route Miles	0	0.4	0	0	0.4	0.4	0
Miles of Cross Country Travel Prohibited on Motorized Routes Unauthorized to Motorized Use	0	13.5	14.4	14.4	13.4	14	13.9
Net RCA Miles of Native Surfaced, Motorized Routes	30.4	16.9	16	16	17	16.4	16.5
Acres of Open Areas at Stampede, Prosser, and Boca Reservoirs	0	2,000 acres	0	0	0	0	0
Acres of RCA Cross Country Travel	Continues on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
NET Cumulative Effect	Cross country travel continues on 9,689 tui chub RCA acres, including on approx. 14 miles native surfaced, RCA miles unauthorized to motorized use. Approx. 30 native surfaced, RCA miles (16 mi NFTS, 14.4 mi. unauthorized) No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 17 NFTS RCA miles available to motorized use. Increased sediment risk to tui chub habitat from 2,000 acres of Reservoir Open Areas No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 16 NFTS RCA miles available to motorized use. No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, RCA acres including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 16 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on approx. 13 native surfaced RCA miles unauthorized to motorized use. Approx. 17 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 16 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on approx. 14native surfaced RCA miles unauthorized to motorized use. Approx. 17 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.

*Alternative 1 includes existing native surfaced, routes unauthorized to motorized use, while all the action alternatives include motorized route 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 contribute (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 (Doughtery and Smith 2006) or displace frog life stages, or they may be accumulated in plants as toxins which, in turn, can depress larval amphibian growth. 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 sublethal 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 & 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 wound 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 National Forest Travel System (NFTS):

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.

- 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.
- 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).
- 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.
- Routes or areas are located outside of Critical Aquatic Refuges, Riparian Conservation Areas, meadows, and wetlands within California red-legged frog habitat.
- 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. Alternative 5 proposes to add two motorized routes, H3004-8 and H3004-10, to the NFTS that are within close proximity to the Michigan Bluff site. Neither proposed route addition would directly or indirectly affect this red-legged frog site. Each Project Design Standard is addressed below:
- 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.
- Routes H3004-8 and H3004-10 are located down slope of the occupied California red-legged frog site, and therefore do not have the potential to capture surface run-off and deliver sediment to the site.

- 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.
  Routes H3004-8 and H3004-10 are located outside of Riparian Conservation Areas.
- 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).
  Routes H3004-8 and H3004-10 are located at least 580 feet away from the edge of the occupied California red-legged frog ponds. Two ponds are greater than 850 feet from the proposed route additions.
- 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.
  As indicated above, routes H3004-8 and H3004-10 are down slope of the occupied red-legged pond sites and do not have to potential to capture sediment into the ponds.
- Routes or areas are located outside of Riparian Conservation Areas, meadows, and wetlands within California red-legged frog habitat.
  As indicated above, proposed Alternative 5 routes H3004-8 and H3004-10 are located outside of the Riparian Conservation Areas for the ponds. The Riparian Conservation Area for perennial ponds is 300 feet from the edge of the pond. The distance of the proposed route additions exceed 500 feet from the edge of the nearest occupied pond.
- 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 25 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 project 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 National Forest System 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 3 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.), 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 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 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, 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

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect FYLF habitat. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to suitable FYLF habitat.

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). 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 maintenance downgrades is evaluated for their potential to affect selected 7^{th} field watersheds that may have suitable habitat for the FYLF.

Prohibition of 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 7^{th} field watersheds from motorized cross country travel.

Motorized Route and Area Additions (FYLF 7^{th} 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 trail additions to the National Forest Transportation System, and the miles of motorized trail additions within Riparian Conservation Areas (RCAs) for FYLF 7^{th} field watersheds

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.

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 routes unauthorized to motorized use) for the alternatives within each 7^{th} field watershed occupied by foothill yellow-legged frog (FYLF). According to Chapter 3.02 (Soil and Watershed Resources), 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 7^{th} 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 project 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

Wet Weather Seasonal Closures. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where FYLF potential habitat 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, the FYLF would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of native surfaced, motorized stream crossings and highest RCA motorized route densities that could potentially delivery sediment to FYLF habitat from motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-115 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 FYLF HUC7 watersheds. Alternatives 2, 5, and 6 result in the downgrade of 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 crossing and 0.1 miles of motorized roads.

Table 3.03-116. 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 of maintenance downgrades	0	1	0	0	1	1	0
RCA Miles of road downgrades from smooth surfaced to rough or native surfaced	0	0.1	0	0	0.1	0.1	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will 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. Under the action alternatives, the prohibition of cross country travel results in prohibiting motorized use on 34,092 RCA acres, including 39 to 68 RCA miles and from 97 to 228 motorized crossings (Alt 5 prohibits the least, Alt 3 prohibits the most). Cross country travel prohibitions will likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit FYLF habitat.

Motorized Trail and Area Additions –
Motorized Stream Crossings and Miles of Motorized Trail Additions

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 motorized trails unauthorized to motorized use (Table 3.03-117**)**. In decreasing order, Alternatives 5, 2, 6, 4, and 7 result in the addition of 131 to 3 native surfaced, motorized trail crossings. Alternative 3does not add motorized trail crossings to the NFTS, and therefore sedimentation or streamside vegetation would not be affected within any FYLF HUC7 watersheds

Table 3.03-117. 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	88	0	7	131	33	3
Cross country travel	Continues on 34,092 RCA acres	Prohibited on 34,092 RCA acres	Prohibited on 34,092 RCA acres	Prohibited on 34,092 RCA acres	Prohibited on 34,092 RCA acres	Prohibited on 34,092 RCA acres	Prohibited on 34,092 RCA acres

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

RCA Miles of Proposed Motorized Trail Additions of FYLF 7th Field Watersheds. The miles of proposed motorized trail 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 FYLF habitats at the HUC7 level. Alternative 1 poses the greatest risk to increased sedimentation potential from 68.4 RCA miles of motorized trails un-authorized for motorized use that would remain due to not prohibiting cross country travel (Table 3.03-118**)**. Similar to stream crossing numbers, Alternatives 2, 4, 5, 6, and 7 propose to add between 1.3 and 29.4 RCA miles (Alt 5 adds the most , Alt 7 adds the least) of motorized trails to the NFTS. Alternative 3 does not add motorized trails to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any FYLF HUC7 watershed.

Table 3.03-118. 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 trail additions within RCAs* (negative impact)	68.4	16.3	0	2.2	29.4	10.1	1.3
Miles of motorized routes within RCAs that would be prohibited to motorized public use with the prohibition of cross country travel (positive impact)	0	52.1	68.4	66.2	39.0	58.3	67.1

*Alternative 1 includes existing routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

Site-specific Physical Impacts and Disturbance to known foothill yellow-legged frog locations. On the Tahoe NF, FYLF locations occur within forty 7th field watersheds. Table 3.03-119 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 3.03-119. 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	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts of motorized additions	Prohibition of Cross Country Travel
Bullards Bar Reservoir-Bridger Creek	No proposal	None	Proposed action alternatives prohibits cross country travel on 2 (Alts 2, 5, 6) to 3 (Alts 3,7) of 8 intermittent/perennial NFS crossings.
Cherokee Creek	YRN-008, (Alt 2, 5, 6); 0025-009, 0491-003,25-9-3_p, 35-4-1_p, 35-4_p, 491-3-1_p, 491-3-2_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, N39-12-1, N39-4, N39-5. N35-5-1, N35-5-2, N39-6, N39-7, N39-8-1, N491-1, N491-3-1; (Alt 5) – 23.8 mi. (Alt 6) – 8.0 mi	YRN-008 near the FYLF site and may impact. FYLF. Alt 5 may have a cumulative effect to FYLF due to the addition of 23.8 miles of routes unauthorized to motorized use. Several Alt 5 proposed routes are above FYLF site and may impact the site. Alt 6 proposes to add motorized aroute just below the MYLF site and may have an impact to FYLF.	Proposed action alternatives prohibits cross country travel on 2 (Alt 5), 12 (Alt 6), 16 (Alt 2), to 19 (Alts 3,4,7) of 25 intermittent/perennial NFS crossings.
Fall Creek	Alt 5 proposed additions - H18-12, H18-12-2	H18-12, H18-12-2 – Alt 5 route additions may impact FYLF sites in South Yuba River below confluence of Trapp Creek and Fall Creek.	Proposed action alternatives prohibits cross country travel on 4 (Alts 3,7) or add 9 (Alts 2,5,6) to12 existing intermittent/perennial NFS crossings.
Fiddle Creek	Alt 5 proposed routes (0025-009, 25-9_p, H25-11-3, H27-19, N25-3, N25-14, N25-2, N25-2-1, N25-2-3, N25-4-10, 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, N25-10, N25-8-2, N25-8-3, N25-8-4, N25-8-6. N25-8-8, N27, N27-1, N27-10M B27-2. N27-3, N27-4, N35-1, N55-1) – 24.8 mi Alt 6 – proposed routes - 0.8 mi	FYLF site in lower HUC7, Alt 5 proposed routes in upper HUC7. Routes in southern part of HUC7 have a small potential to indirectly and cumulatively impact FYLF site from the addition of 24.8 miles.	Proposed action alternatives prohibits cross country travel on 14 (Alts 2) to 21 (Alts 3,4,6,7) or add 9 (Alts 2,5,6) to 36 existing intermittent/perennial NFS crossings.
Fulda Creek	H19-22-14 (Alt 5), – 1.3 mi	One FYLF site. Alt 5 only - H19-22-14 is on the mainstem of Fulda Creek upstream of FYLF site and could therefore potentially impact the FYLF. The direct RCA effects are on the private land. NFS portion of route is outside of the RCA	Proposed action alternatives prohibits cross country travel on 2 (All Action Alts) of 8 existing intermittent/perennial NFS crossings.
Goodyears Creek	Alt 5 proposals H25-18, H25-18-4, H27-16, H27-17	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 prohibits cross country travel on 8 (Alts 3,4,6,7) or add 4 (Alt 2) to 7 (Alts 5) to 20 existing intermittent/perennial NFS crossings.
Greenhorn Creek-South Fork Greenhorn Creek	Greenhorn Area (Alt1, 2, 5)	Greenhorn Area could impact FYLF site.	Proposed action alternatives prohibits cross country travel on 17 (All Action Alts) of 21 existing intermittent/perennial NFS crossings.
Grizzly Creek	Alt 5 proposed addition (H613-8)	Multiple FYLF could be affected by Alt 5 route addition.	Proposed action alternatives prohibits cross country travel on 3 of 11 existing intermittent/perennial NFS crossings.

Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts of motorized additions	Prohibition of Cross Country Travel
Headwaters Oregon Creek	No proposals	None	Proposed action alternatives prohibits cross country travel on 8 (All Action Alts) of 10 existing intermittent/perennial NFS crossings.
Humbug Canyon	ARM-7, ARM-5 (Alt 2, 4, 5, 6, 7),	ARM-5 & ARM-7 in upper HUC7 not likely to impact FYLF in lower portion of HUC7, ARM-5 up on ridge w/ no connection to frog site.	Proposed action alternatives prohibits cross country travel on 0 (All Action Alts) of 13 existing intermittent/perennial NFS crossings.
Indian Creek	No proposals	None	None
Lower Downie River	YRN-509 (Alt 2,5,6)	YRN-509 is not likely to impact FYLF.	Proposed action alternatives prohibits cross country travel 1 (All Action Alts) of 19 existing intermittent/perennial NFS crossings.
Lower Kanaka Creek	No proposals	None	Proposed action alternatives prohibits cross country travel on 9 (All Action Alts) of 24 existing intermittent/perennial NFS crossings.
Lower Middle Yuba River	Alt 5 proposed historic routes – 2.6 mi	One FYLF site.	Proposed action alternatives prohibits cross country travel on 2 (All Action Alts) of 6 existing intermittent/perennial NFS crossings.
Lower North Shirttail Canyon	ARM-3 (Alt 2, 5) , ARM-3A (Alt 4, 6, 7) Alt 5 historic proposed routes - 0.4 mi	89% FS; RCA ws-1 mi 7.3 (6.7 FS); ARM-3 & ARM-3a are above FYLF sites are not likely impact FYLF; Alt 5 historic route proposals are above sites not likely to impact; all action alternatives prohibits cross country travel on trails nearest to FYLF streams.	Proposed action alternatives prohibits cross country travel on 12 (Alts 2,4,5,6,7) to 13 (Alt 3) of 26 existing intermittent/perennial NFS crossings.
Lower Oregon Creek	Alt 5 proposed historic routes - 0.3 mi	Multiple FYLF sites. Most Proposed routes do not impact FYLF site.	Proposed action alternatives prohibits cross country travel on 1 (All Action Alts) of 15 existing intermittent/perennial NFS crossings.
Lower Poorman Creek	No proposals	None	Proposed action alternatives prohibits cross country travel on 4 of 34 existing intermittent/perennial NFS crossings.
Middle Yuba River-Indian Creek	No proposals	None	Proposed action alternatives prohibits cross country travel on 4 of 26 existing intermittent/perennial NFS crossings.
Middle Yuba River-Moores Flat Creek	YRM-M4 (Alt 2,5,6,7) Alt 5 proposed route (H833-10 - 0.6 mi)	Multiple FYLF sites. YRM-M4 is isolated and not likely to impact FYLF. Alt 5 route H833-10 - 0.6 in upper watershed could impact one of the upper FYLF sites.	Proposed action alternatives prohibits cross country travel on 8 (All Action Alts) of 26 existing intermittent/perennial NFS crossings.
Middle Yuba River-National Gulch	No proposals	None	Proposed action alternatives prohibits cross country travel on 7 of 24 existing intermittent/perennial NFS crossings.

Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts of motorized additions	Prohibition of Cross Country Travel
Middle Yuba River-Studhorse Canyon	Alt 5 proposed route- H613-8- 0.1 mi	Multiple FYLF sites. Proposed route H613-8 would not impact FYLF.	Proposed action alternatives prohibits cross country travel on 3 of 7 existing intermittent/perennial NFS crossings.
North Fork American River-Giant Gap Gulch	Alt 5 proposed routes –H26-6-10 & H26-6-12 (0 .3 mi)	Alt 5 proposed routes not connected to FYLF sites, no impacts likely.	Proposed action alternatives prohibits cross country travel on 0 (All Action Alts) of 13 existing intermittent/perennial NFS crossings.
North Fork Middle Fork American River -El Dorado Canyon	Alt 5 proposed routes H3004-10, & H3004-8 ((2.1 mi)	Multiple FYLF sites. Addition of the H3004-10 &H3004-8 could potentially impact the FYLF.	Proposed action alternatives prohibits cross country travel on 2 (Alt 5) to 3 (Alts 2,3,4,6,7) of 9 existing intermittnet/perennial NFS crossings.
North Yuba River-Humbug Creek	Alt 5 proposed route H293-19(1.6 mi)	Multiple FYLF sites. Proposed Alt 5 route H293-19 in upper parts of watershed above FYLF site, very slight potential of impact FYLF.	Proposed action alternatives prohibits cross country travel on 3 (Alts 4,6) to 4 (Alts 3,7) or add 10 (Alts 2,5) to 15 existing intermittent/perennial NFS crossings.
North Yuba River-Indian Creek	YRN-M3 (Alt 2, 5,6) Alt 5 proposed routes H293-19, H34-4,H34-8-3, N-39-5, N39-5-3, N39-5-4 (2.1 mi)	Multiple FYLF sites. YRN-M3 and several Alt 5 proposed route additions have a low potential to deliver sediment to FYLF sites.	Proposed action alternatives prohibits 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	No proposals	None	Proposed action alternatives prohibits cross country travel on 5 of 20 existing intermittent/perennial NFS crossings.
North Yuba River-Slug Canyon	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	Proposed action alternatives prohibits cross country travel on 5 (All Action Alts) of 12 existing intermittent/perennial NFS crossings.
Oregon Creek-Marion Creek	Alt 5 proposed route H293-4-4 (1.8 mi)	Multiple FYLF sites. Alt 5 proposed route H293-4-4 in northeastern part of HUC has potential to deliver sediment to FYLF sites.	Proposed action alternatives prohibits cross country travel on 3 (Alt 5) to 5 (Alts 2,3,4,6,7) of 13 existing intermittent/perennial NFS crossings.
Oregon Creek-Miller Creek	Alt 5 proposed historic routes - .4 mi	Proposed historic route not connected, not likely to impact FYLF.	Proposed action alternatives prohibits 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	No proposals	None	Proposed action alternatives prohibits cross country travel on 7 (All Action Alts) of 11 existing intermittent/perennial NFS crossings.
South Yuba River-Diamond Creek	YRS-SF4 (Alt 2, 5, 6), Alt 5 proposed routes H20-16, H20-16-2-7, H29-11 s (1.5 mi)	Alt 5 proposed route additions and YRS-SF4 may affect FYLF downstream near Diamond Ck. may be affected by sediment into spring near the north end of route YRS-SF4.	Proposed action alternatives prohibits cross country travel on 0 (Alt 6) to 2 (Alts 3,4,7) or add 2 (Alt 2) to 3 Alt 5) to 15 existing intermittent/perennial NFS crossings.

Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts of motorized additions	Prohibition of Cross Country Travel
South Yuba River-Jefferson Creek	Alt 5 proposed route–H20-8-5 (0.6 mi)	Two FYLF sites. Alt 5 proposed route ties into NFTS road, and FYLF site south of proposal is not connected	Proposed action alternatives prohibits cross country travel on 3 (All Action Alts) of 13 existing intermittent/perennial NFS crossings.
South Yuba River-Logan Canyon	No proposals	No effect to multiple FYLF sites.	Proposed action alternatives prohibits cross country travel on 4 (All Action Alts) of 13 existing intermittent/perennial NFS crossings.
South Yuba River-New York Canyon	No proposals	None	Proposed action alternatives prohibits cross country travel on 0 of 4 existing intermittent/perennial NFS crossings.
South Yuba River-Scotchman Creek	YRS-066 (Alt 2, 6), YRS-SF6 (Alt 2, 4, 5, 6, 7)	Multiple FYLF sites. YRS-066, YRS-SF6 not likely to affect FYLF sites, not connected.	Proposed action alternatives prohibits cross country travel on 0 (Alts 2,5) to 5 Alt 6) to 6 (Alts 3,7) 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) Alt 5 proposed route H26-6-10 & H26-6-12 (0.3 mi)	Multiple FYLF sites. ARM-2 may impact FYLF site, ARM-5 on ridge - no connection and no impact to FYLF site, Alt 5 proposed additions H26-6-10 & H26-6-12 are short ridgetop roads and not connected to FYLF sites. ARM-5 will not impact FYLF.	Proposed action alternatives prohibits cross country travel on 9 (All Action Alts) of 30 existing intermittent/perennial NFS crossings.
Upper Poorman Creek	H21-5-3 (1.3 mi)	Multiple FYLF sites. Alt 5 proposal only (H21-5-3), separated from FYLF site, not likely to directly impact FYLF.	Proposed action alternatives prohibits cross country travel on 0 (Alt 5) to 2 (Alts 2, 6) to 4 (Alts 3,4,7) of 29 existing intermittent/perennial NFS crossings.
Upper Shirttail Canyon	ARM-3r	Multiple FYLF sites. ARM-3r is not proximal to sites and will not impact FYLF. All action alts prohibits cross country travel on trails nearest to FYLF sites	Proposed action alternatives prohibits motorized cross country travel on 2 (All Action Alts) of 25 intermittent/perennial NFS crossings.
Upper Steephollow Creek	YRS-SF5, YRS-S6 (Alt 2,4,5,6,7,) YRS-B10 (Alt 2,5)	Most of YRS-S5 and 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.	Proposed action alternatives prohibits motorized cross country travel on 1 (Alts 2,5,6) to 2 (Alts 4,7) to 4 (Alt 3) of 16 existing intermittent/perennial NFS crossings.
Willow Creek	Alt 5 proposed route H293 (0 .9 mi)	Alt 5 proposed route H293 in southwestern portion of watershed may affect one of the FYLF sites.	Proposed action alternatives prohibits motorized cross country travel on 9 (Alts 2,5) to 13 (Alts 4,6) to 15 (Alts 3,7) of 28 existing intermittent/perennial NFS crossings.
Wolf Creek	No proposals	None	Proposed action alternatives prohibits motorized cross country travel on 6 of 26 existing intermittent/perennial NFS crossings.

Alternative 1 poses the greatest risk to FYLF habitat on the Tahoe NF from cross country travel, including on numerous existing routes unauthorized to motorized public use, where 100% of FYLF HUC7 watersheds are potentially affected. Table 3.03-120 identifies all FYLF HUC7 watersheds indicating which alternatives have the potential to impact FYLF sites either directly or indirectly. Alternative 5 poses the next greatest risk to FYLF compared to Alternative 1. Alternative 5 affects known FYLF sites within 15 HUC7 watersheds or 37% of all HUC7 watersheds (n=41) with known FYLF observations. Alternatives 2 and 6 similarly affect FYLF sites within 5 (12%) and 4 (10%) FYLF HUC7 watersheds, respectively. Alternatives 3, 4 and 7 affect the least number of FYLF sites within 0(0%), 1(2%) and 2 (5%) FYLF HUC7 watersheds respectively, where FYLF would most benefit from the prohibition of cross country travel, including on existing routes unauthorized to motorized use.

Table 3.03-120. Comparison of Alternatives for proposed route additions that have potential to adversely impact FYLF sites (X in Box = route proposed and likely to adversely impact FYLF directly or indirectly)

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Bullards Bar Reservoir-Bridger Creek	Cross country travel, including on routes unauthorized to motorized use (Alt 1 only)	X						
	Miles of Motorized Trail Additions	0.9 mi						
Cherokee Creek	YRN-008 (Alt 2, 5, 6); 0025-009, 0491-003,25-9-3_p, 35-4-1_p, 35-4_p, 491-3-1_p, 491-3-2_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, N39-12-1, N39-4, N39-5. N35-5-1, N35-5-2, N39-6, N39-7, N39-8-1, N491-1, N491-3-1; Cross country travel, including on routes unauthorized to motorized use (Alt 1 only)	X	X		X	X	X	
	Miles of Motorized Trail Additions	8.3 mi	0.4 mi		0.2 mi	6.3 mi	2.8 mi	
Fall Creek	H18-12, H18-12-2; Cross country travel, including on routes unauthorized to motorized public use (Alt 1 only)	X	X			X	X	
	Miles of Motorized Trail Additions and/or Changes in Class of Vehicles	2.3 mi	3.1			3.3	3.1	
Fiddle Creek	0025-009, 25-9_p, H25-11-3, H27-19, N25-3, N25-14, N25-2, N25-2-1, N25-2-3, N25-4-10, 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, N25-10, N25-8-2, N25-8-3, N25-8-4, N25-8-6. N25-8-8, N27, N27-1, N27-10M B27-2. N27-3, N27-4, N35-1, N55-1 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
	Miles of Motorized Trail Additions	4.9 mi				6.5 mi		
Fulda Creek	H19-22-14 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
	RCA Miles of Motorized Trail Additions	1.2 mi				0 mi NFS (1.3 mi pvt)		
Goodyears Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only); H25-18, H25-18-4, H27-16, H27-17, N25-14, N25-18-1, N25-19-1 (Alt 5)	X				X		
	RCA Miles of Motorized Trail Additions	2.5				2.3		
Greenhorn Creek-South Fork Greenhorn Creek	Greenhorn Area (Alt 1, 2) Cross country travel, including on existing routes unauthorized to motorized public use (Alt 1 only)	X	X					
	RCA Miles of Motorized Trail Additions	2.6 mi	60 acres					
Grizzly Creek	Cross country travel, including on existing routes unauthorized to motorized public use (Alt 1 only), H613-8 (Alt5)	X				X		
	RCA Miles of Motorized Trail Additions	0.8 mi				0.04 mi		
Headwaters Oregon Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	2.8 mi						
Humbug Canyon	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Motorized Trail Additions	0.7 mi						
Indian Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.1 mi						
Lower Downie River*	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.3 mi						
Lower Kanaka Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Motorized Trail Additions	1.7 mi						
Lower Middle Yuba River	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1.4 mi						
Lower North Shirttail Canyon	Cross country travel, including on routes existing unauthorized to motorized use (Alt 1 only)	X				X		
	RCA Miles of Motorized Trail Additions	2.8 mi				0.3 mi		
Lower Oregon Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.8 mi						
Lower Poorman	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use and/or change in class of vehicles	0.7 mi						
Middle Yuba River-Indian Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1.1 mi						
Middle Yuba River-Moores Flat Creek	H833-10 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only),	X				X		
	RCA Miles of Motorized Trail Additions	1.9 mi				0.22mi		
Middle Yuba River-National Gulch	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1.8 mi						
Middle Yuba River-Studhorse Canyon	H613-8 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
	RCA Miles of Motorized Trail Additions	1.3 mi				0 mi		

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
North Fork American River-El Dorado Canyon	H3004-10, H3004-8 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
	RCA Miles of Motorized Trail Additions	0.5 mi				0.3 mi		
North Fork American River-Giant Gap Gulch	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	Miles of Existing Routes Unauthorized to Motorized Use	0.5 mi						
North Yuba River-Humbug Creek	H293-19 (Alt 5); Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X	X		X	X	X	
	Miles of Motorized Trail Additions and/or Changes in Class of Vehicles	0.7 mi	1.5		0.1	1.6 mi	0.1	
North Yuba River-Indian Creek	YRM-M3 (Alts 2, 5, 6) H293-19, H34-4,H34-8-3, N-39-5, N39-5-3, N39-5-4; Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X	X			X	X	
	RCA Miles of Motorized Trail Additions	1.4 mi	1.5 mi			1.5 mi	0.03 mi	
North Yuba River-New York Ravine	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	2.2 mi						
North Yuba River-Slug Canyon	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1.7 mi						
Oregon Creek-Marion Creek	H293-4-4 (Alt 5); Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
	Miles of Existing Routes Unauthorized to Motorized Use	0.9 mi				0.2 mi		
Oregon Creek-Miller Creek	Cross country travel, including on existing routes unauthorized to motorized use Alt 1 only)	X	X		X	X	X	
	RCA Miles of Existing Routes Unauthorized to Motorized Use and/or Changes in Class of Vehicles	1.4 mi	0.1		0.1	0.1	0.1	
Rock Creek-North Yuba River	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
	Miles of Existing Routes Unauthorized to Motorized Use	2.6 mi						
South Yuba River-Diamond Creek*	YRS-SF4 (Alts 2, 5, 6), H20-16, H20-16-2-7, H29-11 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X	X			X	X	
	RCA Miles of Motorized Trail Additions	1 mi	1.9 mi			1.9 mi	1.6 mi	
South Yuba River-Jefferson Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Motorized Trail Additions	0.6 mi						
South Yuba River-Logan Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.9 mi						
South Yuba River-New York Canyon	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.1mi.						
South Yuba River-Scotchman Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1.9 mi						
Upper North Shirttail Canyon*	ARM-2 (Alts 2, 5, 6, 7); Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X	X			X	X	X
	RCA Miles of Motorized Trail Additions	3.9	0.1			0.1	0.1	0.1
Upper Poorman Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.9						
Upper Shirttail Canyon	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Motorized Route Additions	1.3						

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Upper Steephollow Creek	YRS-B10 (Alt 2 & 5); YRS-SF6 (Alts 2, 4, 5, 6, & 7); Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only	X	X		X	X	X	X
	RCA Miles of Motorized Route Additions	1.7	1 mi		0.9	1 mi	1 mi	0.9 mi
Willow Creek	H293 (Alt 5 only), Cross country travel, including on routes unauthorized to motorized use (Alt 1 only)	X				X		
	RCA Miles of Motorized Route Additions	2.2 mi				1 mi		
Wolf Creek	Cross country travel, including on routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1 mi						
Total Number of FYLF HUC7 watersheds with potential negative impacts to FYLF sites		**41**	**9**	**0**	**4**	**18**	**8**	**2**
Percent of All FYLF HUC7 watersheds receiving negative impacts (n=41)		**100%**	**22%**	**0%**	**10%**	**44%**	**20%**	**5%**

*HUC7 watersheds with multiple routes with potential impacts to FYLF sites

*Alternative 1 includes motorized routes unauthorized to motorized use, while all the action alternatives include motorized trail additions.

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 3.03-121, Figure 3.03-7). Under Alternative 1, 39% of the HUC7 watersheds with FYLF detections falls under the highest (17%) and moderately high (22%) categories for motorized route density (native surfaced routes); followed by Alternative 5. Alternative 5 poses the next highest risk of motorized RCA route density where 24% of the HUC7 watersheds with FYLF observations falls with the highest (12%) and moderately high (12%) route density categories. The remaining alternatives have slightly less RCA route densities compared to Alternative 5. Alternatives 2 and 6 are similar in RCA route densities where 19-20% of the FYLF HUC7s falls within the highest (7-10%) and moderately high (10-12%) categories. Alternatives 3, 4 and 7 each contribute 17% of FYLF HUC7 watersheds with highest and moderately high route densities.

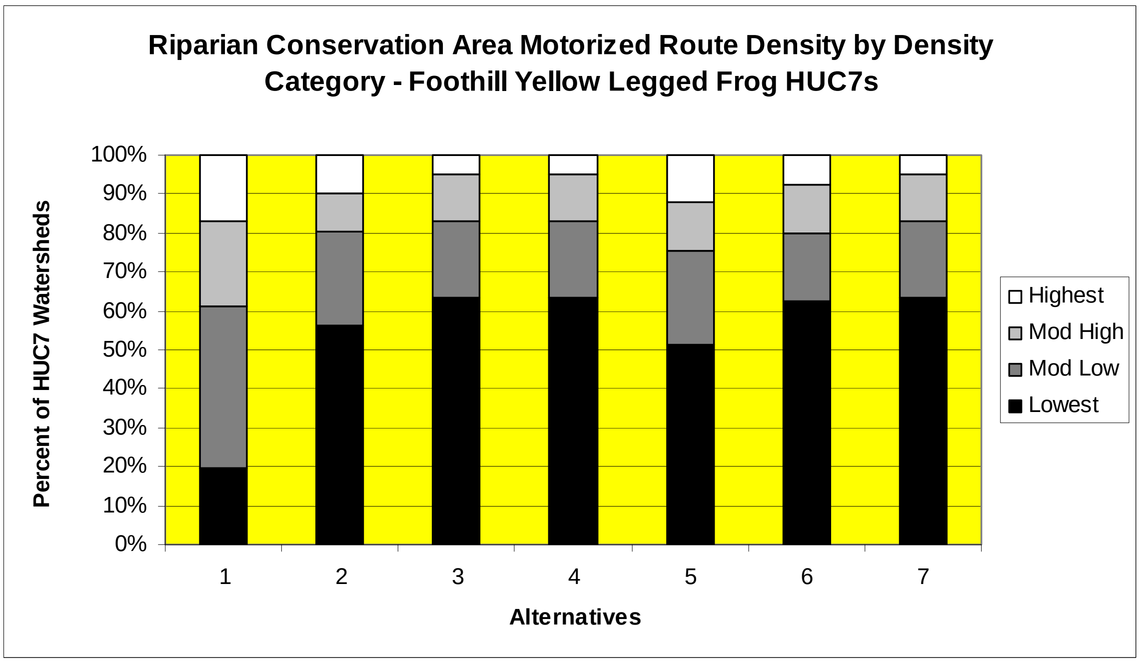

Figure 3.03-7. Number of HUC7 Watersheds with Foothill Yellow-legged Frogs by Route Density Category for Motorized Route Density (Native Surfaced) with Riparian Conservation Areas

Table 3.03-121. The Proportion of Foothill Yellow-legged Frog 7th Field Watersheds within Route Density Categories of Highest, Moderately High, Moderately Low, and Lowest or Forty one 7th Field Watersheds (HUC7s) with Foothill Yellow-legged Frog Observations

Alternatives	Highest (%)	Moderately High (%)	Moderately Low (%)	Lowest (%)
Alt 1	7 (17%)	9 (22%)	17 (41%)	8 (20%)
Alt 2	4 (10%)	4 (10%)	10 (24%)	23 (56%)
Alt 3	2 (5%)	5 (12%)	8 (20%)	26 (63%)
Alt 4	2 (5%)	5 (12%)	8 (20%)	26 (63%)
Alt 5	5 (12%)	5 (12%)	10 (24%)	21 (51%)
Alt 6	3 (7%)	5 (12%)	7 (17%)	25 51%)
Alt 7	2 (5%)	5 (12%)	8 (20%)	26 (63%)

Stream Crossing Density within Riparian Conservation Areas (RCAs): RCA stream crossing density was assessed by route density categories of highest (29.9+crossings/sq. mile), moderately high (20.8-29.8 crossings/sq. mile), moderately low (13.9-20.7 crossings/sq. mi.), and lowest (0-13.8 crossing/sq. mi.) within 7**th** field watersheds (HUC7s) with known foothill yellow-legged frog observations (Table 3.03-122, Figure 3.03-8). 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, 61% of HUC7 watersheds with known FYLF detections are within the highest (28%) and moderately high (33%) route crossing density. Alternatives 2 and 5 pose the next greatest risk to FYLF from stream crossings where 46% of FYLF HUC7 watersheds are within the highest and moderately high motorized crossing density categories, followed by Alternative 6 (40%). The remaining alternatives similarly reduces the potential direct and effects of cross country travel, including on routes unauthorized to motorized public use, where 35% of HUC7 watersheds with route crossing densities within the highest and moderately high categories.

Table 3.03-122. The 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 (%)	Moderately High (%)	Moderately Low (%)	Lowest (%)
Alt 1	11 (28%)	13 (33%)	10 (25%)	6 (15%)
Alt 2	5 (13%)	13 (33%)	10 (25%)	12 (30%)
Alt 3	3 (7%)	11 (28%)	11 (28%)	15 (37%)
Alt 4	3 (7%)	11 (28%)	11 (28%)	15 (37%)
Alt 5	7 (17%)	12 (29%)	9 (23%)	12 (29%)
Alt 6	3 (7%)	13 (33%)	10 (25%)	14 (35%)
Alt 7	3 (7%)	7 (28%)	11 (28%)	15 (37%)

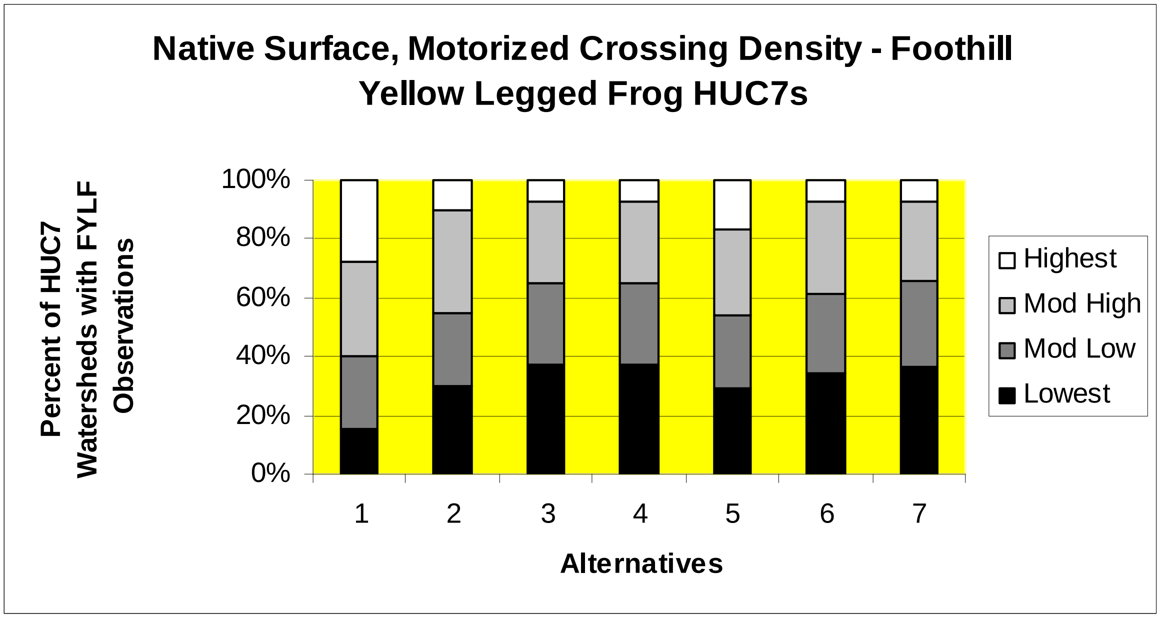

Figure 3.03-8. Number of HUC7 Watersheds with Foothill Yellow-legged Frogs by Route Density Category for Motorized Stream Crossing Density (Native Surfaced) with Riparian Conservation Areas

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 affects 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 affects, 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% (Alt 3) to 5% (Alt 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 routes unauthorized to motorized use. For all the action alternatives, future unmanaged cross country motorized travel would be prohibited, including on the majority of routes unauthorized to motorized use, 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 3.03-123 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail 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 and Soil Resources for more detailed information and assumptions.

Table 3.03-123. 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
Existing NFTS Native Surfaced, Motorized Stream Crossings	411	411	411	411	411	411	411
Native Surfaced, Motorized Trail Crossing Additions	228	88	0	7	131	33	3
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	1	0	0	1	1	0
Motorized Stream Crossings unauthorized to motorized use Cross Country Travel is Prohibited	0	139	228	221	96	194	225
Net Native Surfaced, Motorized Crossings	**639**	**500**	**411**	**418**	**543**	**445**	**414**
Acres of RCA Cross Country Travel	**Continues on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**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	Motorized cross country travel continues on 34,092 RCA acres, including on 228 native surfaced, stream crossings unauthorized for motorized use. Continued use on 639 motorized crossings (411 NFTS, 228 unauthorized). No additional protection to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 139 native surfaced, stream crossings. 500 NFTS native surfaced, crossings available for motorized use. No additional protection to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 228 native surfaced, stream crossings 411 NFTS native surfaced, crossings available for motorized use. No additional protection to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 221 native surfaced, stream crossings 418 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 96 native surfaced, stream crossings 543 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 194 native surfaced, stream crossings 445 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 225 native surfaced, stream crossings 414 NFTS motorized 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 3.03-124 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail miles 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 and Soil Resources for more detailed information and assumptions.

Table 3.03-124. Foothill Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	122.3	122.3	122.3	122.3	122.3	122.3	122.3
RCA Miles of Native Surfaced, Motorized Trail Additions*	68.4	16.3	0	2.2	29.4	10.1	1.3
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	52.1	68.4	66.2	39.0	58.0	67.1
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	0.1	0	0	0.1	0.1	0
Net NFTS Native Surfaced, Motorized RCA Miles	**190.7**	**138.7**	**122.3**	**124.5**	**151.8**	**132.5**	**123.6**
Acres of RCA Cross Country Travel	**Continues on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 34,092 RCA acres, including on 68.4 RCA miles of routes unauthorized to motorized use. Motorized use continues on 190.7 RCA miles (122 miles NFTS, 68 miles unauthorized).	Motorized cross country travel prohibited on 34,092 RCA acres, including on 52.1 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 138.7 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 68.4 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 122.3 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 66.2 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 124.5 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 39.0 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 151.8 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 58.0 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 132.5 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 67.1 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 123.6 RCA miles.

*Alternative 1 includes existing native surfaced, routes unauthorized to motorized use, 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

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect MYLF habitat. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to suitable MYLF habitat.

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). 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.

Prohibition of 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.

Motorized Route and Area Additions (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 trail additions to the National Forest Transportation System, and the miles of motorized trail additions within Riparian Conservation Areas (RCAs) for MYLF 7th field watersheds

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 delivery sediment to known MYLF locations were also evaluated by 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 (Soil and Watershed Resources), 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 project 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

Wet Weather Seasonal Closures. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where MYLF potential habitat 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, the MYLF would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of native surfaced, motorized stream crossings and highest RCA motorized route densities that could potentially delivery sediment to MYLF habitat from motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-125 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 MYLF HUC7 watersheds. Alternatives 2, 5, and 6 result in the downgrade of 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 MYLF habitat affected by 17 native surfaced, crossings and 2.3 miles of motorized routes.

Table 3.03-125. 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	17	0	0	17	17	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

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will 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 29 to 45 RCA miles and from 41 to 84 motorized crossings (Alt 5 prohibits the least, Alt 3 prohibits the most). Cross country travel prohibitions will likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit MYLF habitat.

Motorized Trail and Area Additions –
Motorized Stream Crossings and Miles of Motorized Trail Additions

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 84 motorized stream crossings are associated with the continuance of cross country travel on existing motorized trails unauthorized to motorized use. In decreasing order, Alternatives 5, 2, 6, 4, and 7 result in the addition of 43 to 1 native surfaced, motorized trail crossings. Alternative 3does not add motorized trail crossings to the NFTS, and therefore sedimentation or streamside vegetation would not be affected within any MYLF HUC7 watershed.

Table 3.03-126. Mountain 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 to NFTS* (negative impact)	84	42	0	1	43	15	1
Motorized Stream Crossings that would be unauthorized to motorized use with the prohibition of cross country travel (positive impact)	0	42	84	83	41	69	83
Cross country travel	Continues on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

RCA Miles of Proposed Motorized Trail Additions within MYLF 7th Field Watersheds. The miles of proposed motorized trail 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 MYLF habitats at the HUC7 level. Alternative 1 poses the greatest risk to increased sedimentation potential from 68.4 RCA miles of motorized trails un-authorized for motorized use 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 16.4 RCA miles (Alts 4&7-adds the least, Alt 5-adds the most) of motorized trails to the NFTS. Alternative 3 does not add motorized trails to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any MYLF HUC7 watershed.

Table 3.03-127. Miles of Proposed Route Additions within MYLF HUC7 Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized trail additions within RCAs* (negative impact)	45.2	13.3	0	0.6	16.4	8.0	0.6
Miles of motorized routes within RCAs that would be prohibited to motorized public use with the prohibition of cross country travel (positive impact)	0	29.7	45.2	44.6	28.8	37.2	44.6

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

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 3.03-128 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 3.03-128. 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	Direct and Indirect Impacts	Beneficial Impacts
Alder Creek	No proposals	One MYFL site.	Proposed action alternatives prohibits cross country travel on 5 (All Action Alts) of 9 existing intermittent/perennial NFS crossings
Boca Reservoir	TKN-M1,TKN-J2, TKN-J3 (Alt 2,4,5,6,7) TKN-Q1, TKN-3n (Alt 2,5,6); H889-10, H889-30-10, H889-3-30-5, 0072-002, H894-5-1, N890-14-5 (Alt 5 2.7 mi)	MYLF sighting east of Boca ; TKN-M1 & TKN-Q1 in western part of HUC7; TKN-J2, TKN-J3, TKN-J3n east of Boca, but north and east of trib with sighting; TKN-M1, TKN-Q1, TKN-J2, TKN-J3, & TKN-J3n not likely to affect MYLF. Alt 5 routes proposed north of MYLF not likely to affect MYLF habitat	Proposed action alternatives prohibits cross country travel on 4 (Alts 2,5,6) to 7 (Alts 3,4,7) of 36 existing intermittent/perennial NFS crossings.
Canyon Creek-Sawmill Lake	YRS-003b (Alt 2,5,6)	MYLF site at bottom of HUC7, YRS-003b at top end of watershed , no connection and no impacts to frogs	Proposed action alternatives prohibits cross country travel on (Alt 4), to 1 (Alts 3,7) or add 1 (Alt 2,5,6) to 4 existing intermittent/perennial NFS crossings.
Fordyce Lake	SV-004 (Alt 2,5,6) YRS-AF (Alt 2,4,5,6,7)	Multiple MFYL sites. SV-004 not connected to sites, will not impact MYFL. YRS-AF is adjacent of MYFL site and has potential to impact MYFL.	Proposed action alternatives prohibits cross country travel on 2 (Alts 2,5) to 3 (Alts 3,4,6,7) of 25 existing intermittent/perennial NFS crossings
Headwaters North Fork American River	No proposals	None	Proposed action alternatives prohibits cross country travel on 0 of 13 existing intermittent/perennial NFS crossings.
Headwaters North Yuba River	No proposals	None	Closes 6 of 26 existing intermittent/perennial NFS crossings.
Headwaters South Yuba River	TKN-J4, TKN-J5	TKN-J4 & 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. Proposed routes are not connected.	Proposed action alternatives prohibits cross country travel on 1 (Alts 2,5,6,7) to 2 (Alts 3,4) of 22 existing intermittent/perennial NFS crossings.
Independence Creek	SV-P11	Two MFYL sites. SV-P11 in same H2shed, 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, Affects to MYLF habitat not expected.	Proposed action alternatives prohibits cross country travel on 3 (All Action Alts) of 19 existing intermittent/perennial NFS crossings.
Little Truckee River-Saddle Meadow	SV-P8 (Alt 2,5,6,7)	One MFYL site. SV-P8 is not connected to MYLF sites.	Proposed action alternatives prohibits cross country travel on 2 (Alts 3,4,7) or adds 1 (Alts 2,5,6) existing intermittent/perennial NFS crossings.
Lower Fordyce Creek	No proposals	One MYFL site. No effect	Proposed action alternatives prohibits cross country travel on 2 (Alts2,5) to 3 (Alts 3,4,6,7) of 25 existing intermittent/perennial NFS crossings.

7th Field Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts	Beneficial Impacts
Lower Sagehen Creek	No proposals	One MYLF site.	Proposed action alternatives close 1 (Alts 3,4,7) or add 2 (Alts 2,5,6) to 14 existing intermittent/perennial NFS crossings.
Lower Salmon Creek	YRN-004 (Alt 2,5,6)	MYLF site near lakes, YRN-004, not connected to MYLF site & therefore no impacts to MYLF	Proposed action alternatives prohibits cross country travel on 1 (All Action Alts) of 3 existing intermittent/perennial NFS crossings.
Middle Martis Creek	No proposals	No effect	Proposed action alternatives prohibits cross country travel on 0 of 35 existing intermittent/perennial NFS crossings.
Middle Truckee River-Lower Prosser Creek	TKN-M1	TKN-M1 not connected to MYLF site, not likely to affect MYLF.	Proposed action alternatives prohibits cross country travel on 3 (All Action Alts) of 9 existing intermittent/perennial NFS crossings.
North Creek	No proposals	2 MYLF sites not affected.	Proposed action alternatives prohibits cross country travel on 6 (All Action Alts) of 9 existing intermittent/perennial NFS crossings.
North Yuba River-Haskell Creek	No proposals.	Two MFYL sites not affected.	Proposed action alternatives prohibits cross country travel on 3 (Alt 6), to 7 (Alts 3,4,7) or add 7(Alts 2,5) to 17 existing intermittent/perennial NFS crossings.
North Yuba River-Howard Creek	H823-1-1, H54-9 (Alt 5 - 1.5 mi)	Two MFYL sites in upper watershed. H823-1-1 is the below MYFL sites, but may impact the MYLF as they move downstream. H54-9 in the sout part of the watershed is not connected to the sites and is not likely to impact MYFL..	Proposed action alternatives prohibits cross country travel on 7 (Alt 6), to 8 (Alts 3,4,7) or add 3 (Alt 2) to 4 (Alt 5) to 17 existing intermittent/perennial NFS crossings.
Perazzo Canyon	SV-005 (Alt 2, 5)	MYLF site downstream near tributary to Little Truckee Rv. MYLF not affected by SV-005 which connects to 2 NFTS roads.	Proposed action alternatives prohibits cross country travel on 0 (All Action Alts) of 14 existing intermittent/perennial NFS crossings.
Prosser Creek	N886-1-5 (Alt 5)	One MYLF site on Prosser Creek. N886-1-5 in Alt 5 is on the opposite side of Hwy 89 on private land not connected to Prosser Creek, and likely not affect MYLF site.	Proposed action alternatives prohibits cross country travel on 1 (Alts 2,5,6) to 2 (Alts 4,7) to 4 (Alt 3) of 16 existing intermittent/perennial NFS crossings.
Rattlesnake Creek	No proposals	Multiple MYLF sites not affected.	Proposed action alternatives prohibits cross country travel on 0 (Alts 2,5) to 2 (Alt 6) to 4 (Alts 3,4,7) of 9 existing intermittent/perennial NFS crossings.
South Yuba River-Lower Castle Creek	TKN-J4	TKN-J4 on watershed boundary south of MYLF site with no connection and no impacts. Route is ~1 mile from MYLF site.	Proposed action alternatives prohibits cross country travel on 3 (All Action Alts) of 8 existing intermittent/perennial NFS crossings.
Squaw Creek	No proposals	No effects	Proposed action alternatives prohibits cross country travel on 0 of 20 existing intermittent/perennial NFS crossings.

7th Field Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts	Beneficial Impacts
Upper Cold Stream	SVP-7e (alt 2,4,5,6,7)	SVP-7e in headwaters no connection with MYLF along main channel and highway, no impacts expected.	Proposed action alternatives prohibits cross country travel on 8 (Alts 3,4,7) or add 2 (Alts 2,5,6) of 8 existing intermittent/perennial NFS crossings.
Upper Five Lakes	No proposals	No effects	Proposed action alternatives prohibits cross country travel on 1 of 10 existing intermittent/perennial NFS crossings.
Upper Sagehen Creek	TKN-001 (Alt 2,5)	Multiple MFYL sites. TKN-001 (decommissioned rd) on trib east of MYLF site, no connection & no potential effects from TKN-001.	Proposed action alternatives prohibits cross country travel on 0 (Alts 2,5,6) to 3 (Alts 3,4,7) of 8 existing intermittent/perennial NFS crossings.

Alternative 1 poses the greatest risk to MYLF habitat on the Tahoe NF from continued cross country travel, including on numerous routes unauthorized to motorized public use, within 24 of 25 (96%) MYLF HUC7 watersheds. Table 3.03-129 identifies specific MYLF HUC7 watersheds and indicates which of the alternatives have the potential to adversely impact MYLF sites either directly or indirectly. Alternative 5 poses the next greatest risk to MYLF compared to Alternative 1. Alternative 5 affects known MYLF sites within 5 of 25 (20%) HUC7 watersheds with documented MYLF observations. Alternatives 2, 4, 6, and 7 affects MYLF habitat within 1 of 25 (8%) HUC7 watersheds from a short route (0.3 mi). The potential for off-site sedimentation from this short route segment is expected to be relatively low. Beneficial effects to MYLF from the prohibition of cross country travel is displayed in Table 3.03-101 and also in the motorized route density and crossing density sections which follow.

Table 3.03-129. Mountain Yellow-legged Frog 7th Field Watersheds where Motorized Routes Additions May Impact MYLF (X denotes potential impact from proposed route) for each of the Alternatives (Total MYLF HUC7s = 25)

Watershed Name	Route ID/Description for Action Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Alder Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only – 2.6 miles)	X						
Boca Reservoir	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Canyon Creek-Sawmill Lake	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Fordyce Lake	YRS-AF (Alt 2, 4, 5, 6, 7), Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X	X		X	X	X	X
Headwaters North Fork American River	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Headwaters North Yuba River	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Headwaters South Yuba River	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Independence Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Little Truckee River-Saddle Meadow	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Lower Fordyce Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Lower Sagehen Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Lower Salmon Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Middle Martis Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Middle Truckee River-Lower Prosser Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
North Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
Perazzo Canyon	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Prosser Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		

Watershed Name	Route ID/Description for Action Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
North Yuba River-Haskell Creek	H823-1-1 (Alt 5); Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
North Yuba River-Howard Creek	H823-1-1 (Alt 5); Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
Rattlesnake Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Squaw Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
South Yuba River-Lower Castle Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Upper Cold Stream	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Upper Five Lakes	No proposals and no routes within RCAs							
Upper Sagehen Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Total Number HUC7s with Potential Adverse Impacts to MYLF (Percent) (n=25)		**24**	**1**	**0**	**1**	**5**	**1**	**1**
Percent of HUC7s		**96%**	**4%**	**0%**	**4%**	**20%**	**4%**	**4%**

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 3.03-130, Figure 3.03-9). 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 3.03-130. 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%)

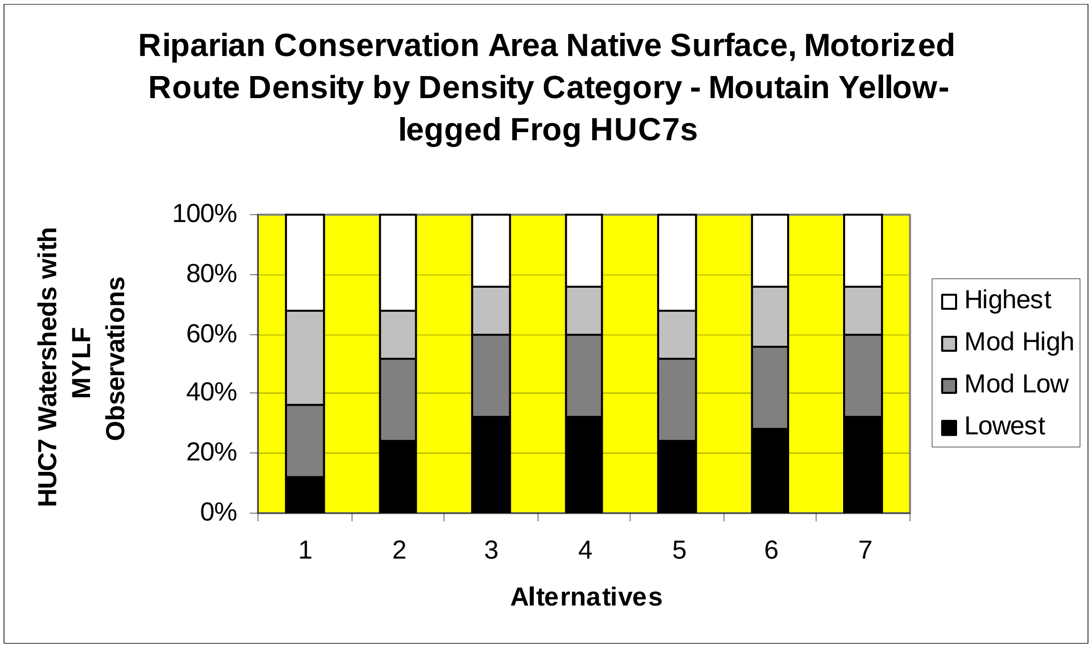

Figure 3.03-9. Number of 7th Field Watersheds within RCA Route Density Categories with Known Mountain Yellow-legged Frogs Locations

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 3.03-131 and Figure 3.03-10). 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 3.03-131. 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%)

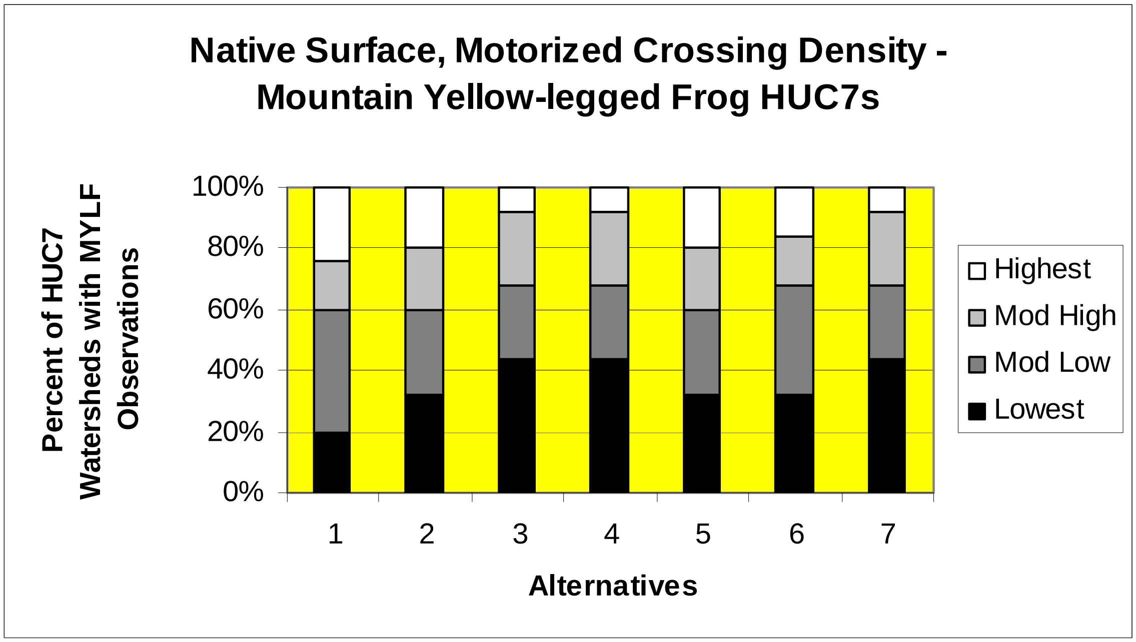

Figure 3.03-10. Number of 7th Field Watersheds by Native Surfaced, Motorized Crossing Density Category for Known Mountain Yellow-legged Frog Locations

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; 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 affects, especially if projects occurred adjacent to MYLF aquatic habitats. Ground disturbing activities including timber harvest and fuels treatment projects (burning and mastication projects) potentially caused direct mortality to this species which may have affected the abundance of the species on the 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 add 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 adds 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 historic 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% (Alts 2 and 5- most) and 36% (Alt 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 3.03-132 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail 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 and Soil Resources for more detailed information and assumptions.

Table 3.03-132. 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
Existing NFTS Native Surfaced, Motorized Stream Crossings	299	299	299	299	299	299	299
Native Surfaced, Motorized Trail Crossing Additions*	84	42	0	1	43	15	1
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	17	0	0	17	17	0
Cross Country Travel Prohibited on Motorized Stream Crossings unauthorized to motorized use	0	42	84	83	41	69	83
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
Net Native Surfaced, Motorized Crossings	383	358	299	300	359	331	300
Acres of RCA Cross Country Travel	Continues on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 22,717 RCA acres, including on 84 native surfaced, stream crossings. Motorized use continues on 383 native surfaced, crossings (299 NFTS and 84 unauthorized) No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 42 native surfaced, stream crossings. 358 NFTS crossings available for motorized use. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 84 native surfaced, stream crossings. 299 NFTS crossings available for motorized use. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 83 native surfaced, stream crossings. 300 NFTS crossings available for motorized use. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 41 native surfaced, stream crossings. 359 NFTS crossings available for motorized use. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 69 native surfaced, stream crossings. 331 NFTS crossings available for motorized use. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 10 native surfaced, stream crossings. 300 NFTS crossings available for motorized use. 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 3.03-133 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail 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 and Soil Resources for more detailed information and assumptions.

Table 3.03-133. Mountain Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	146.2	146.2	146.2	146.2	146.2	146.2	146.2
RCA Miles of Native Surfaced, Motorized Trail Additions*	45.2	13.3	0	0.6	14.1	5.7	0.6
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	2.3	0	0	2.3	2.3	0

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	29.6	45.2	44.6	28.7	37.2	44.6
Net NFTS Native Surfaced, Motorized RCA Miles	191.4	161.8	146.2	146.9	162.7	154.2	146.8
Acres of RCA Cross Country Travel	Continues on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 22,717 RCA acres, including on 45.2 RCA miles of routes unauthorized to motorized use. Motorized use continues on 191.4 RCA miles (146 .2 mi. NFTS and 45.2 mi. unauthorized). No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 29.6 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 161.8 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 45.2 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 146.2 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 44.6 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 146.9 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 28.7 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 162.7 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 37.2 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 154.2 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 44.6 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 146.8 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

Northern Leopard Frog: Affected Environment

The northern leopard frog (*Rana pipiens*) (NLF) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). The NLF is widely distributed across North America from the Atlantic coast to the western edge of the Great Basin (Stebbins 1985). This species is uncommon and localized in California and many populations appear to be introduced (Morey 1988). Elevational range extends from sea level to 11,000 feet (Stebbins 1985). On the Tahoe National Forest the only drainage to potentially support endemic populations of this species is the Truckee River drainage. The Tahoe National Forest considers any northern leopard frogs to be found outside of the Truckee River drainage to be introduced and not to be included as a Region 5 Forest Service Sensitive Species unless designated through a conservation strategy.

No current records of northern leopard frogs exist from the Tahoe National Forest (Jennings and Hayes 1994, Panik and Barrett 1994, Jennings and Fuller 2004; Tahoe National Forest amphibian surveys 1993 to date). One historical record exists for northern leopard frogs in the proximity of the Tahoe National Forest in the areas of Antelope Valley near the town of Sierraville. Jennings and Fuller (2004) reported the collection of one adult frog (SSU 356) 1.6 km (1 mile) northeast of Sierraville by Robert Livezey and his herpetology class on 3 July 1958. Jennings and Fuller (2004) considered this single record as an introduction. The historic Antelope Valley location on private lands has not been resurveyed to date.

Risk factors to northern leopard frog from roads and trails are similar to other frog species described above.

Northern Leopard Frog: Environmental Consequences

No direct, indirect, or cumulative effects to the NLF would occur from the project alternatives, since no known populations of the northern leopard frog are currently known to occur on the Tahoe NF.

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 National Forest system land and the remaining are on private land or on Bureau of Land Management administered lands. All the Tahoe NF reported sightings are from the Yuba River drainage 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

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect NWPT habitat. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to suitable NWPT habitat.

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). 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.

Prohibition of 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.

Motorized Route and Area 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 trail additions to the National Forest Transportation System, and the miles of motorized trail 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.

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 (Soil and Watershed Resources), 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 project 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

Wet Weather Seasonal Closures. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where NWPT potential habitat 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, the NWPT would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of native surfaced, motorized stream crossings and highest RCA motorized route densities that could potentially delivery sediment to NWPT habitat from motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-134 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 NWPT HUC7 watersheds. Alternatives 2, 5, and 6 result in changed road maintenance 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 NWPT habitat 0.1 mile of motorized routes.

Table 3.03-134. Northwestern Pond Turtle – 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	0	0	0	0	0	0
RCA Motorized Route Miles where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	0.1	0	0	0.1	0.1	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will 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 3.03-135). Under the action alternatives, the prohibition of cross country travel results in prohibiting motorized use on 7,986 RCA acres, including 8.7 to 16.3 RCA miles and from 20 to 44 native surfaced, motorized crossings (Alt 5 prohibits the least, Alt 3 prohibits the most). Cross country travel prohibitions will likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit NWPT habitat.

Table 3.03-135. Cross Country Travel within NWPT 7th Field Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Native Surfaced Crossings	44 Cross Country Travel Continued	34 Cross Country Travel Prohibited	44 Cross Country Travel Prohibited	42 Cross Country Travel Prohibited	20 Cross Country Travel Prohibited	34 Cross Country Travel Prohibited	44 Cross Country Travel Prohibited
Native Surfaced RCA Miles	16.3 Cross Country Travel Continued	14.6 Cross Country Travel Prohibited	16.3 Cross Country Travel Prohibited	15.9 Cross Country Travel Prohibited	8.7 Cross Country Travel Prohibited	13.0 Cross Country Travel Prohibited	16.0 Cross Country Travel Prohibited
RCA Acres	Continues on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres

Motorized Trail and Area Additions – Motorized Stream Crossings and Miles of Motorized Trail Additions

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 44 native surfaced, stream crossings are associated with the continuance of cross country travel on existing trails unauthorized to motorized use (Table 3.03-136). In increasing order, Alternatives 4, 6, 2, and 5 result in the addition of 2 to 24 native surfaced, motorized trail crossings.

Alternatives 3 and 7do 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 3.03-136. 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)	44	10	0	2	24	10	0

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

RCA Miles of Proposed Motorized Trail Additions within NWPT 7th Field Watersheds. The miles of proposed motorized trail 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 16.3 RCA miles of motorized trails un-authorized for motorized use that would remain due to not prohibiting cross country travel (Table 3.03-137). Similar to stream crossing numbers, Alternatives 2, 4, 5, 6, and 7 propose to add between 0.3 and 7.5 RCA miles (Alts 4&7-adds the least, Alt 5-adds the most) of motorized trails to the NFTS. Alternative 3 does not add motorized trails to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any NWPT HUC7 watershed.

Table 3.03-137. 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 trail additions within RCAs* (negative impact)	16.3	1.6	0	0.4	7.5	3.2	0.3
Cross country travel	Continues on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, 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. Table 3.03-138 describes the relationship between project alternative route proposals and pond turtle locations.

Table 3.03-138. 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	Direct and Indirect Impacts
Bullards Bar Reservoir-Bridger Creek	None	None
Cherokee Creek	YRN-008 (Alt 2, 5, 6) Cal Ida Network – Alt 5 & 6 (0025-009, 0491-003, 25-9-3_p, 25-9_p, 35-3_p, 35-4-1_p, 39-9_p) H39-12 (Alt 5)	YRN-008 and Cal Ida Network not likely to impact turtle site, not connected
Lower Oregon Creek	**H49-16 (Alt 5)**	**Turtle site is proximal to route H49-16 and may be impacted**
Lower Middle Yuba River	H18N49Y (Alt 5)	H18N49Y does not affect turtle sites
Middle Yuba River-Indian Creek	None	None
South Yuba River-Pierce Meadow	YRS-F1 short segments (Alts 2, 4, 5, 6, & 7) H652-5-5 (Alt 5) Alt 1 short segments (2) unauthorized routes.	YRS-F1 – short route segments do not affect turtle habitat, not connected. **H652-5-5 connects to routes within North Fork of North Fork American River-Blue Canyon watershed, and may contribute impacts to turtles.** Alt 1 short segments not connected to turtle site.
Headwaters North Fork American River	**Alt 1 existing routes unauthorized to motorized use** **H652-5-5 (Alt 5)**	**Alt 1 routes unauthorized to motorized use may impact turtles at one part of watershed,** **Alt 5 route (H652-5-5) may potentially impact turtle site.**
North Fork of North Fork American River-Blue Canyon	Alt 1 existing routes unauthorized to motorized use	Existing routes unauthorized to motorized use may impact pond turtle site
Willow Creek	H293 (Alt 5)	Alt 5 routes are located below pond turtle site, won’t be impacted by Alt 5.

Northwestern pond turtles occurring within three 7**th** field watersheds have the potential to be impacted by Alternative 5 proposed motorized route additions within Lower Oregon Creek, South Yuba River-Pierce Meadow, and Headwaters North Fork American River (Table 3.03-138). Existing routes unauthorized to motorized use under Alternative 1 affect the pond turtles within the Headwaters North Fork American River and North Fork of North Fork American River-Blue Canyon watersheds. The remaining action alternatives either do not propose motorized route additions or proposes routes that would not affect the pond turtle. Numerous private land motorized routes may contribute to direct and indirect impacts to the pond turtle.

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 3.03-139 and

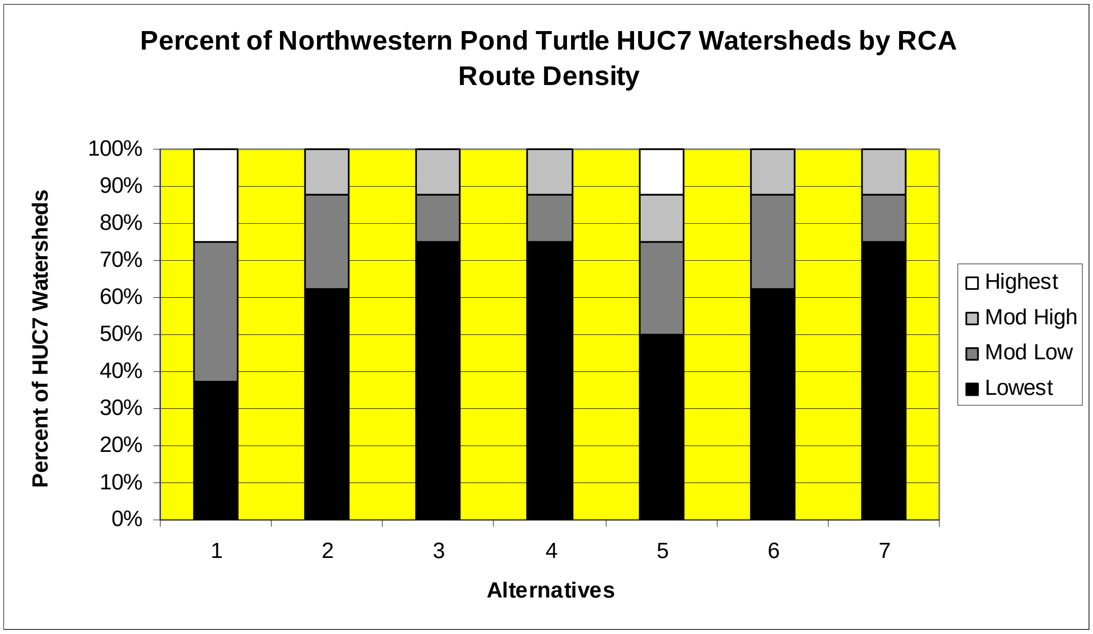

Figure 3.03-11. Number of Northwestern Pond Turtle 7th Field Watersheds by Motorized Native Surface RCA Route Density Category

Figure 3.03-11 displays the number and percent of 7th field watersheds (HUC7s) with known locations of NWPT locations by RCA route density category of highest (4.2-5.3.miles/square mile), moderately high (3.1-4.1 miles/square mile), moderately low (1.7-2.1 miles/square mile), and lowest (0-1.6 miles/square mile). Alternative 1 poses the greatest direct and indirect effects to the NWPT where 2 of 8 (25%) pond turtle HUC7 watersheds have route densities within the highest (2 of 8 HUC 7 or 25%) and moderately high (0 of 8 HUC7 or 0%) route density categories; and 76% of the pond turtle HUC7 watersheds fall within the moderately low (3 of 8 HUC7s or 38%) and lowest (3 0f 8 HUC7s or 38%). All the action alternatives reduce RCA route densities compared to Alternative 1. Under Alternative 5, 25% pond turtle HUC7 watersheds remains in the highest and moderately high route density categories, 25% (2 of 8) HUC7s within the moderately low, and 50% (4 of 8) HUC7s within the lowest RCA route density category. The remaining alternatives improves RCA route densities similarly where between 1 (13%) and 2 (25%) pond turtle HUC7 watersheds fall in the moderately low route density category, and 5-6 HUC7s (63-75%) fall within the lowest category.

Table 3.03-139. Number and Percent of 7th Field Watersheds (HUC7s) with Occupied Northwestern Pond Turtle Locations by Route Density Category

Alternatives	Highest (4.2 to 5.3 mi/mi^2)	Moderately High (3.1 to 4.1 mi/mi^2)	Moderately Low (1.7 to 2.1 mi/mi^2)	Lowest (0 to 1.6 mi/mi^2)
Alt 1	2 (25%)	0 (0%)	3 (38%)	3 (38%)
Alt 2	0 (0%)	1 (13%)	2 (25%)	5 (63%)
Alt 3	0 (0%)	1 (13%)	1 (13%)	6 (75%)
Alt 4	0 (0%)	1 (13%)	1 (13%)	6 (75%)
Alt 5	1 (13%)	1 (13%)	2 (25%)	4 (50%)
Alt 6	0 (0%)	1 (13%)	2 (25%)	5 (63%)
Alt 7	0 (0%)	1 (13%)	1 (13%)	6 (75%)

Motorized Route (native surface) Crossing Density within Northwestern Pond Turtle 7th Field Watersheds: For each of the project alternatives, RCA stream crossing density was assessed by crossing density categories of highest (12.8-15.0 crossings/sq. mile), moderately high (7.7-12.7 crossings/sq. mile), moderately low (4.4-7.6 crossings/sq. mi.), and lowest (0-4.3 crossing/sq. mi.) within 7th field watersheds (HUC7s) with known northwestern pond turtles occurrences. Table 3.03-140 and Figure 3.03-12 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, 25% (2 of 8) HUC7 watersheds with known pond turtle occurrences are within the highest, 13% (1 of 8) in moderately high route crossing densities, and 25% (2 of 8) within moderately low, and 38% (3 of 8) 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 reduces crossing densities the least where 2 of 8 (25%) HUC7 remains in the highest stream crossing density category, 1 of none (0%) is within the moderately high category, 2 of 8 (25%) is within moderately low, and 4 of 8 (50%) HUC7s are within the lowest category. Compared to Alternative 5, Alternative 6 moves 1 HUC7 from the highest stream crossing density category from the highest to the moderately high.

The remaining alternatives similarly reduce the potential direct and indirect effects by prohibiting cross country travel, including on routes unauthorized to motorized public use, where HUC7 crossing density categories are as follows: 13% HUC7s in the highest, no HUC7s in moderately high, 25-38% in moderately low, and 50-63% 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 3.03-140. Number of 7th Field Watersheds (HUC7s) with Occupied Northwestern Pond Turtle Locations by Stream Crossing Density Category of Native Surfaced Routes

Alternatives	Highest (12.8 to 15.0 crossings/mi^2)	Moderately High (7.7 to 12.7 crossings/mi^2)	Moderately Low (4.4 to 7.6 crossings/mi^2)	Lowest (0 to 4.3 crossings/mi^2)
Alt 1	2 (25%)	1 (13%)	2 (25%)	3 (38%)
Alt 2	1 (13%)	0 (0%)	3 (38%)	4 (50%)
Alt 3	1 (13%)	0 (0%)	2 (25%)	5 (63%)
Alt 4	1 (13%)	0 (0%)	2 (25%)	5 (63%)
Alt 5	2 (25%)	0 (0%)	2 (25%)	4 (50%)
Alt 6	1 (13%)	1 (13%)	2 (25%)	4 (50%)
Alt 7	1 (13%)	0 (0%)	2 (25%)	5 (63%)

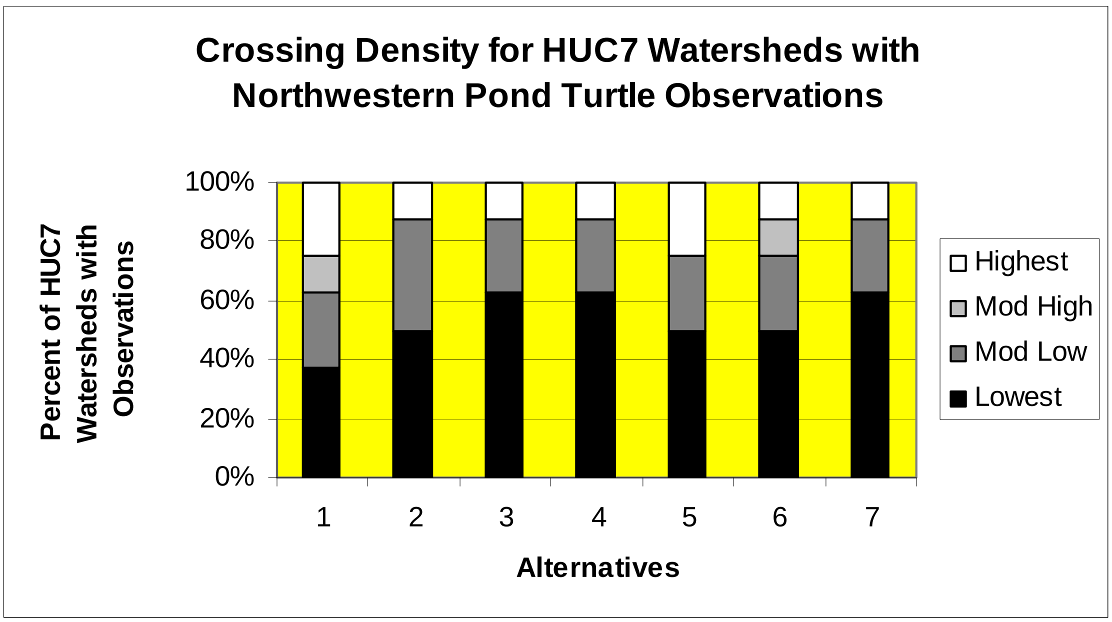

Figure 3.03-12. Northwestern Pond Turtle 7th Field Watersheds by Motorized Crossing

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 adds the greatest cumulative impacts to current existing cumulative impacts where HUC7 watersheds where pond turtles are located have the greatest route densities and stream crossing densities compared to all the action alternatives. Beneficial impacts to pond turtle habitat would occur least within Alternative 5 and greatest within all the remaining action alternatives similarly from the reduction in RCA route density and stream crossing density. Alternative 5 potentially adds cumulative impacts site-specifically within three7^{th} field watersheds (Lower Oregon Creek, South Yuba River-Pierce Meadow, and Headwaters North Fork American River) where proposed route additions are within close proximity and may directly or indirectly affect pond turtle habitat.

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 3.03-141 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail 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 and Soil Resources for more detailed information and assumptions.

Table 3.03-141. 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
Existing NFTS Native Surfaced, Motorized Stream Crossings	77	77	77	77	77	77	77
Native Surfaced, Motorized Trail Crossing Additions	44	10	0	2	24	10	0
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	0	0	0	0	0	0
Cross Country Travel Prohibited on Motorized Stream Crossings unauthorized to motorized use	0	34	44	42	20	34	44
Net Native Surfaced, Motorized Crossings	121	87	77	79	101	87	77
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented.	Wet Weather Restrictions would be implemented.	Wet Weather Restrictions would be implemented.	None

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres of RCA Cross Country Travel	Continues on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 7,986 RCA acres, including on 44 native surfaced, stream crossings. Motorized use continues on 121 native surfaced, crossings (77 NFTS and 44 unauthorized) No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 34 native surfaced, stream crossings. 87 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 44 native surfaced, stream crossings 77 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 42 native surfaced, stream crossings 79 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 20 native surfaced, stream crossings 101 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 34 native surfaced, stream crossings 87 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 44 native surfaced, stream crossings 77 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.

Table 3.03-142 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail 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 and Soil Resources for more detailed information and assumptions.

Table 3.03-142. Northwestern Pond Turtle 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	22.3	22.3	22.3	22.3	22.3	22.3	22.3
RCA Miles of Native Surfaced, Motorized Trail Additions*	16.3	1.6	0	0.4	7.5	3.2	0.3

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	0.1	0	0	0.1	0.1	0
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	14.6	16.3	15.9	8.7	13.0	16.0
Net NFTS Native Surfaced, Motorized RCA Miles	38.6	24.0	22.3	22.7	29.9	25.6	22.6
Acres of RCA Cross Country Travel	Continues on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 7,986 RCA acres, including on 16.3 RCA miles of routes unauthorized to motorized use. Motorized use continues on 38.6 RCA miles (22.3 mi. NFTS and 16.3 mi. unauthorized). No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 14.6 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 24 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 16.3 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 22.3 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 15.9 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 22.7 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 8.7 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 29.9 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 13 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 25.6 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 16 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 22.6 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, routes unauthorized to motorized use, 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

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect GBRS habitat. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to suitable GBRS habitat.

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, Soil and Watershed Resources). 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.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to GBRS 7th field watersheds from motorized cross country travel.

Motorized Route and Area 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 trail additions to the National Forest Transportation System, and the miles of motorized trail additions within Riparian Conservation Areas (RCAs) for GBRS 7th field 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 and routes unauthorized to motorized public use) for the alternatives within each 7th field watershed that may impact potential habitat for GBRS. According to Chapter 3.02 (Soil and Watershed Resources), high clearance vehicle 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 potential habitat of the GBRS 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 with potential ramshorn snail 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 project alternatives. Route crossing density provides a way to measure the potential indirect effects to sensitive aquatic invertebrate species habitat. Indirect effects to GBRS habitat 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

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 project 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).

Wet Weather Seasonal Closures. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where GBRS potential habitat 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, the GBRS would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of native surfaced, motorized stream crossings and highest RCA motorized route densities that could potentially delivery sediment to GBRS habitat from motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-143 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 11 stream crossings and 1.3 miles of native surfaced, motorized routes.

Table 3.03-143. 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	11	0	0	11	11	0
RCA Motorized Route Miles where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	1.3	0	0	1.3	1.3	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will continue on 12,359 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. Under the action alternatives, the prohibition of cross country travel results in prohibiting motorized use on 12,359 RCA acres, including 42.5 to 51.1 RCA miles and from 40 to 74 native surfaced, motorized crossings (Alt 5 prohibits the least, Alt 3 prohibits the most). Cross country travel prohibitions will likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit GBRS habitat.

Table 3.03-144. Cross Country Travel within Twelve GBRS 7th Field Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Native Surfaced Crossings	74 Cross Country Travel Continued	44 Cross Country Travel Prohibited	74 Cross Country Travel Prohibited	69 Cross Country Travel Prohibited	40 Cross Country Travel Prohibited	45 Cross Country Travel Prohibited	67 Cross Country Travel Prohibited
Native Surfaced RCA Miles	51.1 Cross Country Travel Continued	42.5 Cross Country Travel Prohibited	51.1 Cross Country Travel Prohibited	48.8 Cross Country Travel Prohibited	37.5 Cross Country Travel Prohibited	44.4 Cross Country Travel Prohibited	47.9 Cross Country Travel Prohibited
RCA Acres	Continues on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres

Motorized Trail and Area Additions – Motorized Stream Crossings and Miles of Motorized Trail Additions

Number of Native Surfaced, Motorized Stream Crossing Additions within 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 74 native surfaced, stream crossings are associated with the continuance of cross country travel on existing trails unauthorized to motorized use (Table 3.03-145). In increasing order, Alternatives 4, 7, 6, 2, and 5 result in the addition of 5 to 26 native surfaced, motorized trail 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 3.03-145. 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)	74	22	0	5	26	21	7

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

RCA Miles of Proposed Motorized Trail Additions within GBRS 7th Field Watersheds. The miles of proposed motorized trail 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 GBRS habitats at the HUC7 level. Alternative 1 poses the greatest risk to increased sedimentation potential from 51.1 RCA miles of motorized trails un-authorized for motorized use that would remain due to not prohibiting cross country travel (Table 3.03-146). Similar to stream crossing numbers, Alternatives 2, 4, 5, 6, and 7 propose to add between 2.3 and 12.8 RCA miles (Alts 4 adds the least, Alt 5 adds the most) of motorized trails to the NFTS. Alternative 3 does not add motorized trails to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any GBRS HUC7 watershed.

Table 3.03-146. 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 trail additions within RCAs (negative impact)	51.1	7.9	0	2.3	12.8	7.0	3.1

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

Riparian Conservation Area Route Density: Potential habitat for the Great Basin ramshorn snail was identified to occur within twelve 7th field watersheds on the Tahoe National Forest on the east slope of the Sierran Nevada crest. For each of the alternatives, Table 3.03-147 and Figure 3.03-13 displays the number and percent of 7th field watersheds (HUC7s) with potential GBRS habitat by RCA route density

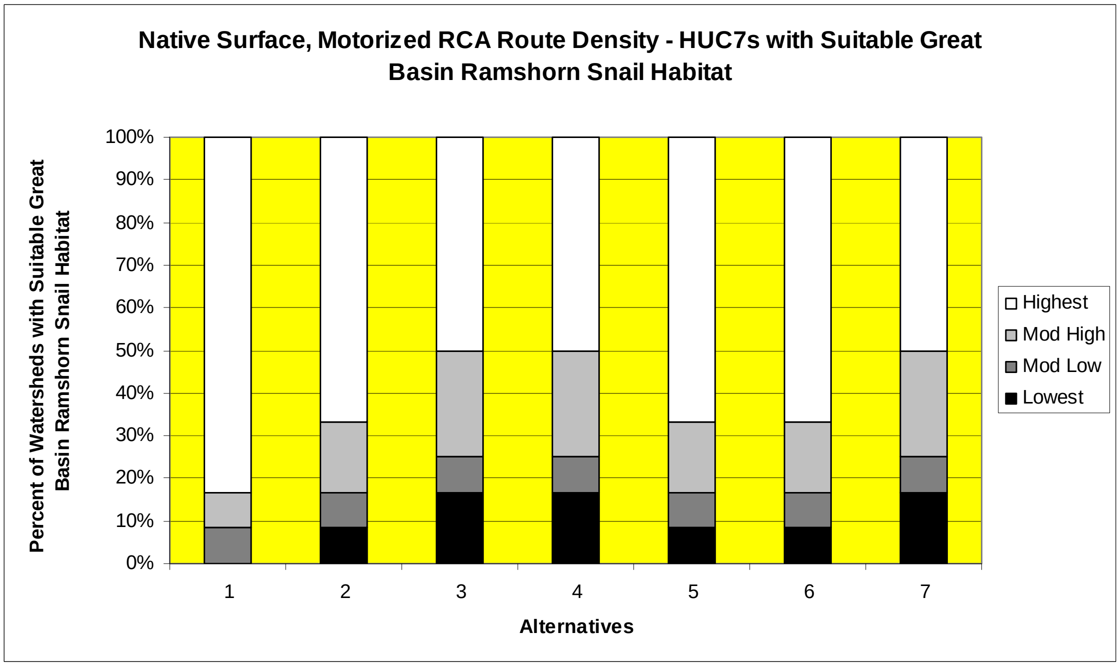

Figure 3.03-13. 7th Field Watersheds with Suitable Great Basin Ramshorn Snail Habitat by Native Surfaced, RCA Motorized Density

category of highest (3.6-8.6 miles/square mile), moderately high (2.6-3.5 miles/square mile), moderately low (1.8-2.7 miles/square mile), and lowest (0-1.8 miles/square mile). Alternative 1 poses the greatest potential for indirect effects of sediment delivery to potential GRBS habitat where 83% (10 of 12) HUC7 watersheds with suitable ramshorn snail habitat have route densities within the highest, 8% (1 of 12) are in the moderately high, 8% (1 0f 12) are in the moderately low, and 0% (0 of 15) are in the lowest route density category. All the action alternatives reduce RCA route densities within potential GBRS HUC7 watersheds compared to Alternative 1. Under alternatives 2, 5, and 6, 67% (8 of 12) of HUC 7 watersheds are in the highest, 17% (2 of 12) are in the moderately high, 8% (1 of 12) are in the moderately low, and 8% (1 of 12) are in the lowest route density category. Alternatives 3, 4, and 7 result in the lowest route densities within suitable GBRS HUC7s and reduce route densities within the highest route density category by 11-16% when compared to all the other alternatives. Alternatives 3, 4, and 7 are similar in their potential for indirect effects to ramshorn snail habitat and have the lowest route densities overall.

Table 3.03-147. Number and Percent of 7th Field Watersheds with Suitable Great Basin Ramshorn Snail Habitat by Route Density Category (n=15)

Alternatives	Highest (3.6 to 8.6 mi/mi²)	Moderately High (2.6 to 3.5 mi/mi²)	Moderately Low (1.8-2.7 mi/mi²)	Lowest (0 to 1.8 7 mi/mi²)
Alt 1	10 (83%)	1 (8%)	1 (8%)	0 (0%)
Alt 2	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 3	6 (50%)	3 (25%)	1 (8%)	2 (17%)
Alt 4	6 (50%)	3 (25%)	1 (8%)	2 (17%)
Alt 5	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 6	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 7	6 (50%)	3 (25%)	1 (8%)	2 (17%)

Stream Crossing Density: Twelve 7th field watersheds (HUC7s) identified as having suitable habitat for the Great Basin ramshorn snail were evaluated by alternative for the number and percentage of HUC7s that are within stream crossing density categories of highest (10.4-20.6 crossings/sq. mile), moderately high (7.4-10.3 crossings/sq. mile), moderately low (4.2-7.3 crossings/sq. mi.), and lowest (0-4.1 crossing/sq. mi.) (Table 3.03-148, Figure 3.03-14). Alternative 1 poses the greatest risk of indirect effects to Great Basin ramshorn snail habitat through potential sediment delivery from native surfaced, motorized routes. Under Alternative 1, 42% (5 of 12) HUC7 watersheds with suitable ramshorn snail habitat would have stream crossing densities within the highest route density category, 33% (4 of 12) within the moderately high category, 17% (2 of 12) in the moderately low category, and none within the lowest category. Alternative 5 has the most HUC7 watersheds within the highest stream crossing density category (7 of 12), but Alternative 1 has the most HUC7 watersheds when the highest and moderately high crossing density categories are combined.

The remaining alternatives further reduce the number of stream crossings within the highest route crossing density category. Alternatives 2 and 6 have the same number of HUC7 watersheds across all stream crossing density categories. Alternatives 3, 4, and 7 are similar in stream crossing densities within the highest and moderately high crossing density categories, and therefore have the most HUC7 watersheds within the moderately low and lowest crossing densities.

Table 3.03-148. Number and Percent of 7th Field Watersheds with Suitable Great Basin Ramshorn Snail Habitat by Stream Crossing Density Category (n=15)

Alternatives	Highest (10.4 to 20.6 crossings/mi²)	Moderately High (7.4 to 10.3 crossings/mi²)	Moderately Low (4.2-7.3 crossings/mi²)	Lowest (0 to 4.1 crossings/mi²)
Alt 1	5 (42%)	4 (33%)	2 (17%)	1 (8%)
Alt 2	5 (42%)	3 (25%)	3 (25%)	1 (8%)
Alt 3	2 (17%)	5 (42%)	4 (33%)	1 (8%)
Alt 4	2 (17%)	5 (42%)	4 (33%)	1 (8%)
Alt 5	7 (58%)	1 (8%)	3 (25%)	1 (8%)
Alt 6	5 (42%)	3 (25%)	3 (25%)	1 (8%)
Alt 7	2 (17%)	6 (50%)	3 (25%)	1 (8%)

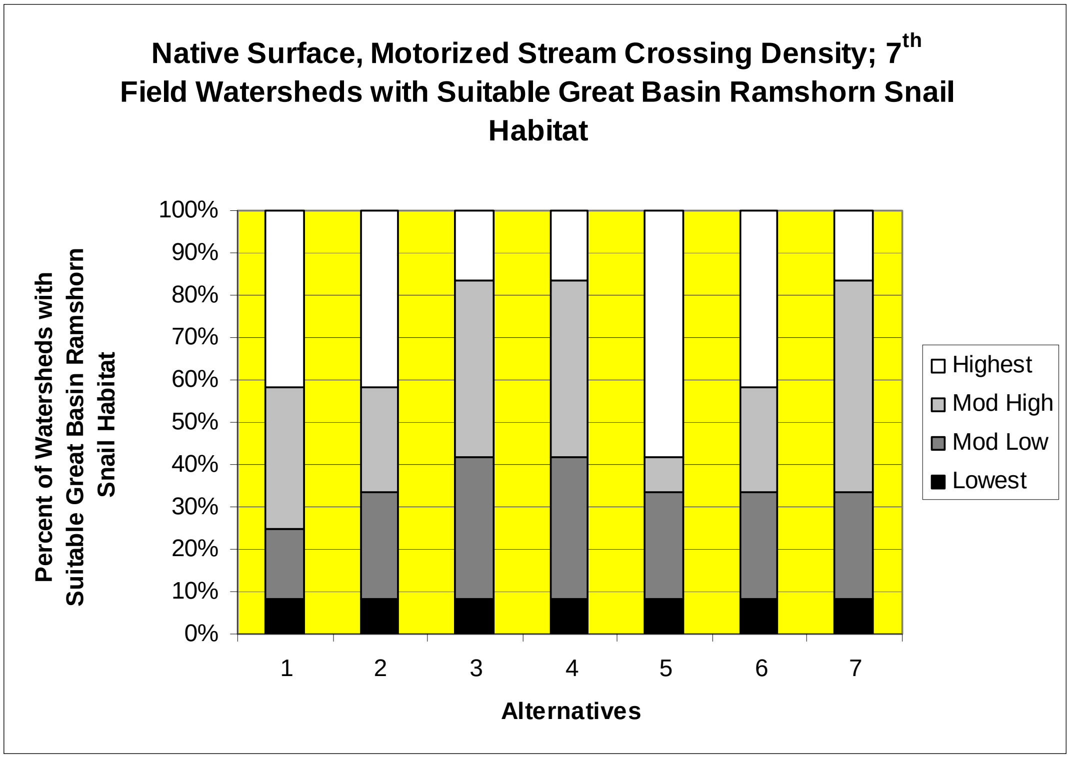

Figure 3.03-14. Native Surface, Motorized Stream Crossing Density 7th Field Watersheds with Suitable Great Basin Ramshorn Snail Habitat

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 fifteen 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 routes unauthorized to motorized public travel 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 exiting 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 3.03-149 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail 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 and Soil Resources for more detailed information and assumptions.

Table 3.03-149. 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
Existing NFTS Native Surfaced, Motorized Stream Crossings	207	207	207	207	207	207	207
Native Surfaced, Motorized Trail Crossing Additions*	74	22	0	5	26	21	7
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	8	0	0	8	8	0
Cross Country Travel Prohibited on Motorized Stream Crossings unauthorized to motorized use	0	44	74	69	40	45	67
Net Native Surfaced, Motorized Crossings	281	237	207	212	241	236	214
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
Acres of RCA Cross Country Travel	Continues on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 12,359 RCA acres, including on 74 native surfaced, stream crossings. Motorized use continues on 281 native surfaced, crossings (207 NFTS and 74 unauthorized) No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 44 native surfaced, stream crossings. 237 NFTS crossings available for motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 74 native surfaced, stream crossings. 207 NFTS crossings available for motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 69 native surfaced, stream crossings. 212 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 40 native surfaced, stream crossings. 241 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 45 native surfaced, stream crossings. 236 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 67 native surfaced, stream crossings. 214 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 3.03-150 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail 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 and Soil Resources for more detailed information and assumptions.

Table 3.03-150. Great Basin Ramshorn Snail 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	85.5	85.5	85.5	85.5	85.5	85.5	85.5
RCA Miles of Native Surfaced, Motorized Trail Additions*	51.1	7.9	0	2.3	12.8	7.0	3.1

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	0.7	0	0	0.7	0.7	0
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	42.5	51.1	48.8	37.5	44.4	47.9
Net NFTS Native Surfaced, Motorized RCA Miles	136.6	94.1	85.5	87.8	99.1	92.2	88.7
Acres of RCA Cross Country Travel	Continues on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 12,359 RCA acres, including on 51.1 RCA miles of routes unauthorized to motorized use. Motorized use continues on 136.6 RCA miles (85.5 mi. NFTS and 51.1 mi. unauthorized). No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 42.5 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 94.1 RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 51.1 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 85.5RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 48.8 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 87.8RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 37.5 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 99.1RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 44.4 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 92.2RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 47.9 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 88.7 RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

California Floater: Affected Environment

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 National Forest system 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 project 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 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 Tahoe NF Travel Management Project for aquatic species and were considered for the analysis of the alternatives.

- *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.

- *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 trail 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 (Road Cards), Soil and Watershed Section Chapter 3.03-2, and Appendix R (Riparian Conservation Objectives).

- *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, Road Cards).

- *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 and trail additions to the NFTS were inventoried and assessed for their condition. Conditions were described and mitigations measures were developed as appropriate.

- *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.

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.

Affected Environment

Fire Management

Understanding past and present roles of fire in shaping Tahoe National Forest ecosystems is critical for managing fire. Fire, once a pervasive force in structuring and rejuvenating Tahoe National Forest 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 fires 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 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 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 thinning that has occurred has been due to competition (primarily water and light), diseases, and insects. The result has been a large increase in 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 Tahoe National Forest has recorded wildfires since establishment of the forest reserves in the early 1900s. The Tahoe National Forest 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 Tahoe National Forest 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 Tahoe National Forest 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 Tahoe National Forest 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. Tahoe National Forest Acres burned in by size of fire

Years	1977-1991	1992-2006
Total Fires	2,263	1,050
Total Acres Burned	19,828	85,667
Fires greater than 50 acres	12	14
Fires Greater than 100 acres	11	12
Fires Greater than 1,000 acres	5	8
Fires greater than 5,000 acres	1	4

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. Lightning fires have generally been linked to fire occurrence episodes.

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). 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. The WUI is comprised of two zones: the defense zone and the threat zone.

Defense Zone

The WUI 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; however, actual defense zone boundaries are determined at the project level following national, regional and forest policy. In particular, the Healthy Forest Restoration Act of 2003 identifies areas to be included in the WUI. Local fire management specialists determine the extent, treatment orientation, and prescriptions for the WUI based on historical fire spread and intensity, historical weather patterns, topography, access. Defense zones are of sufficient extent that fuel treatments within them will reduce wildland fire spread and intensity sufficiently for suppression forces to succeed in protecting human life and property.

The WUI threat zone typically buffers the defense zone; however, a threat zone may be delineated in the absence of a defense zone under certain conditions, including situations where the structure density and location do not provide a reasonable opportunity for direct suppression on public land, but suppression on the private land would be enhanced by fire behavior modification on the adjacent public land.

Threat Zone

Threat zone boundaries are determined at the project level following national, regional and forest policy. 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. Fuels treatments in these zones are designed to reduce wildfire spread and intensity. Strategic landscape features, such as roads, changes in fuels types, and topography may be used in delineating the physical boundary of the threat zone.

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)	<1%	<1%	<1%	<1%	<1%	<1%	<1%
	Lower Risk (0-2 Miles/Square Mile)	17%	25%	27%	25%	25%	25%	25%
	Moderate Risk (2-4 Miles/Square Mile)	44%	56%	56%	56%	53%	56%	56%
	Higher Risk (4-6 Miles/Square Mile)	32%	15%	13%	14%	18%	15%	15%
	Highest Risk (>6 Miles/Square Mile)	7%	4%	4%	4%	5%	4%	4%

Figure 3.04-1. Human caused wildfires, such as the Gap Fire, can damage forest resources

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)**	1,714	1,026	1,026	1,026	1,026	1,026	1,026
	Forest Total	**3,918**	**3,529**	**3,529**	**3,529**	**3,529**	**3,529**	**3,529**

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.

Figure 3.04-2. Roads, such as the Bowman Road shown here, provide important access for fire suppression equipment

3.05. Heritage 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 they can not be repaired or replaced.

Section 106 of the NHPA compels Federal agencies to take into account the effect of its undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (36 CFR 60) (**Historic Properties**). The Travel Management rule requires that the effects on cultural resources be considered, with the objective of minimizing damage, when designating roads, trails, and areas for motor vehicle use on National Forest lands (36 CFR 212.55(a), 212.55(b)(1)).

Regulatory Environment for Heritage Resources

The Forest Service is directed to identify, evaluate, treat, protect, and manage historic properties by several laws. However, the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.) (NHPA) provides comprehensive direction to federal agencies about their historic preservation responsibilities. Executive Order 11593, entitled *Protection and Enhancement of the Cultural Environment*, also includes direction about the identification and consideration of historic properties in Federal land management decisions.

The **National Historic Preservation Act of 1966** extends the policy 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 and State Historic Preservation Officers. NHPA Section 106 directs all Federal agencies to take into account effects of their undertakings (actions, financial support, and authorizations) on properties included in or eligible for the National Register. The Advisory Council on Historic Preservation's 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 Advisory Council on Historic Preservation. It outlines minimal requirements for considering possible effects to historic properties that may be associated with designating routes and areas as part of a National Forest's transportation system. This policy statement recognizes the use of programmatic agreements for compliance with Section 106 of the NHPA.

Section 106 of the NHPA and the Advisory Council on Historic Preservation's (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 PA**). This agreement defines the Area of Potential Effects (**APE**) (36 CFR 800.4(a)(1)) and includes a strategy outlining the requirements for cultural resource inventory, evaluation of historic properties, and effect determinations; it also includes protection and resource management measures that may be used where effects may occur.

Executive Order 11593 - *Protection and Enhancement of the Cultural Environment*, issued May 13, 1971, directs Federal agencies to inventory cultural resources under their jurisdiction, to nominate 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 specific standard and guidelines are described in Chapter 2 of the EIS.

Affected Environment

Heritage resources are archaeological, cultural, and historical legacies from our past and are more than 50 years old. Heritage 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.

Heritage Resources in the Tahoe National Forest

With 3,228 recorded sites, the Tahoe National Forest contains numerous prehistoric and historic archaeological sites, buildings, features and objects. Research of cultural resources discovered within the Tahoe National Forest indicate that people have been using the Forest for over 8,000 years, with the heaviest use 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 managed land.

Table 3.05-1. Heritage Resources within the Tahoe National Forest

Type of Site	# Sites
Total Documented Sites	3,228
National Register Listed Properties	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 Tahoe National Forest. Numerous trails and routes crossed the Forest including various branches associated with the Overland Emigrant Trail, the Placer County Emigrant Trail, and the Henness Pass Road. These early roads were established to access 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 established this route as one of the major transportation corridors into California. Four of California's original 64 State Highways, both the Victory and Lincoln Highways, are within the Tahoe National Forest (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 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 river bottoms of the Yuba, Bear, and American Rivers or along the ridge tops. 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 early on 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 dominate industry in the Tahoe National Forest.

Historic heritage resources reflect particularly the cultural and economic products of the rapid pace of technological achievement in the last two centuries superimposed over the varied terrain of the Sierra Nevada. These more recent resources often reflect environmental changes made possible by industrial and technological advances in resource extraction, landscape use and management.

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 admits, 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 Tahoe National Forest date from ca. 1846 to the present. Historic sites provide many opportunities for interpretation and public appreciation.

Relationship between Heritage Resources and Motorized Vehicle Use on the Tahoe National Forest

The archaeological inventory was completed under provisions of the Motorized PA. The inventory consisted of a combination of existing record reviews, on-the-ground survey, and monitoring. One hundred forty-six (146) archaeological sites were documented as associated with proposed additions to the National Forest Transportation System. These sites represent archaeological remains from primarily historic mining and logging activities along with evidence of Native American occupation. One National Register listed historic property, the Stampede Archaeological District, is located at Stampede Reservoir. Table 3.05-2 displays the sites in the Area of Potential Effect (APE) by route.

Table 3.05-2. Summary of Heritage Resources Identified by Route

Note: Under resource 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.

Route ID	Resource ID	Resource Type
25-9_p	05175300469	Prehistoric
39-5_p	05175300217	Historic
39-5_p	05175300342	Prehistoric
491-3_1	05175300337	Multicomponent
491-3_2	05175300216	Historic
ARM-5	05175400124	Prehistoric
ARN-001	05175500317	Prehistoric
Boca Reservoir Open Area	05175700241	Historic
Boca Reservoir Open Area	05175700303	Prehistoric
Boca Reservoir Open Area	05175700305	Prehistoric
Boca Reservoir Open Area	05175700307	Prehistoric
Boca Reservoir Open Area	05175700175/CA-NEV-82	Multicomponent
Boca Reservoir Open Area	05175700240/CA-NEV-81	Prehistoric
Boca Reservoir Open Area	CA-NEV-26	Multicomponent
Eureka Diggings	05175300004	Historic
Eureka Diggings	05175300023	Prehistoric
Eureka Diggings	05175300230	Historic
H11E10	05175300696	Historic
H1-2	05175700297	Prehistoric

Route ID	Resource ID	Resource Type
H25-11-3	05175300031	Historic
H261-8	05175700558	Prehistoric
H261-8	05175700563	Prehistoric
H27-19	05175300032	Historic
H293-4-4	05175300385	Prehistoric
H293-4-4	05175300637	Historic
H301-6	05175300176	Historic
H301-6	05175300188	Multicomponent
H3-4-4	05175700148	Prehistoric
H50-12-3-1	05175500035	Historic
H54-9	05175600283	Historic
H54-9	05175600341	Multicomponent
H54-9	05175600317	Prehistoric
H652-5-5	05175500481	Prehistoric
H833-10	05175500458	Historic
H833-10	05175500459	Multicomponent
H88-44	05175400215	Prehistoric
H889-28	05175700088	Prehistoric
H889-3-18-5	05175700563	Prehistoric
H889-3-30-10	05175700304	Prehistoric
H889-3-30-10	05175700307	Prehistoric
H889-3-30-5	05175700303	Prehistoric
H889-8	05175700395	Multicomponent
H889-8	05175700401	Prehistoric
H894-5-1	05175700240	Prehistoric
N25-1-1	05175300347	Prehistoric
N25-1-1	05175300348	Prehistoric
N25-2 and N25-2-3	05175300454	Prehistoric
N25-6-1	05175300356	Prehistoric
N25-7	05175300034	Prehistoric
N261-8-15-2	05175700563	Prehistoric
N27-3	05175300514	Historic
N27-5	05175300446	Prehistoric
N39-5	05175300217	Historic
N43-6-2	05175400368	Historic
N860-20-1	05175600426	Prehistoric
N860-20-1	05175700540	Prehistoric
N886-14-10	05175700577	Historic
N886-1-5	05175700009	Multicomponent
N886-1-5	05175700409	Multicomponent
N886-18-10	05175700447	Prehistoric
N886-18-10	05175700529	Prehistoric
N889-3-30-10	05175700304	Prehistoric

Route ID	Resource ID	Resource Type
N890-14-5	05175700511	Prehistoric
N96-34-2-6	05175400325	Prehistoric
Prosser Reservoir Open Area	05175700460	Prehistoric
Prosser Reservoir Open Area	05175700609	Multicomponent
Prosser Reservoir Open Area	05175700608/CA-NEV-64	Prehistoric basalt quarry,
Prosser Reservoir Open Area	CA-NEV-23	Prehistoric
Prosser Reservoir Open Area	CA-NEV-24	Prehistoric
Prosser Reservoir Open Area	NEV-10	Prehistoric
Prosser Reservoir Open Area	NEV-11	Prehistoric
Prosser Reservoir Open Area	NEV-22	Prehistoric
Prosser Reservoir Open Area	NEV-56	Prehistoric
Prosser Reservoir Open Area	NEV-57	Prehistoric
Prosser Reservoir Open Area	NEV-58	Prehistoric
Prosser Reservoir Open Area	NEV-59	Prehistoric
Prosser Reservoir Open Area	NEV-60	Prehistoric
Prosser Reservoir Open Area	NEV-61	Prehistoric
Prosser Reservoir Open Area	NEV-62	Prehistoric
Prosser Reservoir Open Area	NEV-63	Prehistoric
Prosser Reservoir Open Area	NEV-65	Prehistoric
Prosser Reservoir Open Area	NEV-65	Prehistoric
Prosser Reservoir Open Area	NEV-66	Prehistoric
Prosser Reservoir Open Area	NEV-67	Prehistoric
Prosser Reservoir Open Area	NEV-68	Prehistoric
Prosser Reservoir Open Area	NEV-69	Prehistoric
Prosser Reservoir Open Area	NEV-70	Prehistoric
Prosser Reservoir Open Area	NEV-71	Prehistoric
Stampede Reservoir Open Area	05175700535	Prehistoric
Stampede Reservoir Open Area	05175700540	Prehistoric
Stampede Reservoir Open Area	05175700004/SIE-S44	Prehistoric site listed on the National Register of Historic Places
Stampede Reservoir Open Area	DWR-S-1	Prehistoric
Stampede Reservoir Open Area	SIE-11	Prehistoric
Stampede Reservoir Open Area	SIE-12	Prehistoric
Stampede Reservoir Open Area	SIE-13	Prehistoric
Stampede Reservoir Open Area	SIE-14	Prehistoric
Stampede Reservoir Open Area	SIE-15	Prehistoric
Stampede Reservoir Open Area	SIE-16	Prehistoric
Stampede Reservoir Open Area	SIE-17	Prehistoric
Stampede Reservoir Open Area	SIE-28	Prehistoric antelope corral
SV-P14	05175600571	Prehistoric
SV-P5	05175600574	Historic
TKN-002	05175700332	Historic
TKN-003	05175700564	Multicomponent
TKN-003	05175700563	Prehistoric

Route ID	Resource ID	Resource Type
TKN-J1	05175700206	Historic
TKN-J11	05175700096	Historic
TKN-J11	05175700097	Prehistoric
TKN-J11	05175700354	Prehistoric
TKN-J13	05175700286	Multicomponent
TKN-J13	05175700287	Prehistoric
TKN-J6	05175700374	Prehistoric
TKN-J9	05175700508	Historic
TKN-M2	05175700401	Prehistoric
TKN-M2	05175700734	Prehistoric
TKN-Q1	5175700087	Prehistoric
TKN-Q1	05175700554	Prehistoric
TKS-11	05175700735	Prehistoric
TKS-11	05175700736	Prehistoric
TKS-M9	05175700450	Historic
YRN-002	05175300887	Prehistoric
YRN-004	05175300676	Historic
YRN-007	05175300426	Prehistoric
YRN-008	05175300369	Historic
YRN-1	05175300881	Historic
YRN-2	05175300499	Historic
YRN-2	05175300545	Historic
YRN-2	05175300546	Historic
YRN-4	05175300386	Historic
YRN-509	05175300198	Historic
YRN-509	05175300205	Historic
YRN-7	05175300674	Historic
YRN-M1	05175300389	Prehistoric
YRN-M1	05175300390	Prehistoric
YRN-M1	05175300392	Prehistoric
YRN-M1	05175300394	Multicomponent
YRN-M1	05175300882	Prehistoric
YRN-M1	05175300885	Prehistoric
YRN-M2	05175300671	Historic
YRN-M2	05175300675	Historic
YRN-M2	05175300890	Historic
YRN-M3A	05175300669	Historic
YRS-F1	05175300888	Historic
YRS-SF5	0175500272	Historic

Environmental Consequences

Effects Analysis Methodology

Assumptions specific to cultural resources

Roads, trails, and open areas un-authorized for motorized use have already affected historic properties within route/area prisms. Under the action alternatives, use will continue at current levels or increase over time on the designated system with the prohibition of cross-country travel. The effects analysis focused on the potential for any effect associated with current or increased use levels.

Site specific observations (monitoring) were completed as required under the *Motorized PA*. Each site was monitored for current conditions and to document any existing impacts and potential effects from motorized and non-motorized recreation.

Measurement Indicator and Rationale

All cultural resources are considered *historic properties* unless they already have been determined *not eligible* in consultation with the State Historic Preservation Officer (SHPO). When assessing direct, indirect, and cumulative effects on historic properties, assessments were made based on the National Register of Historic Places. The National Register of Historic Places contains four criteria and seven levels of integrity for this assessment. The four criteria are:

1. Is the property **associated with events** that have made a significant contribution to the broad patterns of our history; or
2. Is the property **associated with the lives of persons** significant in our past; or
3. Does the property embody **the distinctive characteristics** of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
4. Will the property **yielded, or likely yield, information** important in prehistory or history.

Of these four criteria, only 3 and 4 are applicable to this project.

The seven levels of integrity are:

1. Location
2. Design
3. Setting
4. Materials
5. Workmanship
6. Feeling
7. Association

The **Motorized PA** allows for the addition of roads and motorized trails to the National Forest Transportation System within historic properties, if there is no additional impact to the property expected through continued motorized use of the route. Information about existing effects was used in determining whether continued use by motor vehicles would cause any additional effects. In addition, sites may have ongoing effects not related to motorized use.

When assessing effects under Section 106 of the NHPA, an undertaking can have:

- No effect
- No adverse effect
- An adverse effect

An adverse effect on a historic property can occur when an undertaking **a) directly** or **b) indirectly** alters its important values and is measured by the degree to which it diminishes its integrity.

Direct effects are/will be caused by motorized vehicle uses/or the consequences of such use, including physical damage resulting in or from erosion, down-cutting, rutting, or displacement or damage to cultural features.

Indirect effects are associated with motorized vehicle uses but occur outside designated routes and areas, such as adjacent dispersed camping areas or areas where travel off of designated routes or areas may occur. The proximity of sensitive cultural resources (i.e., rock art) to designated routes is important when determining where resources could be susceptible to greater threats or risks. Indirect effects could include those listed for direct effects, but also include destructive actions like vandalism and looting.

The integrity measures were used to characterize the nature of any potential effects, whether they are direct, indirect or cumulative; and their severity, whether they are negligible, minor, moderate, or major. The degree to which historic property values are diminished will be used to measure the direct, indirect and cumulative effects of motorized use on the NFTS.

There can be a direct or indirect effect on historic properties if use by motorized vehicles diminishes the values of a historic property. If there are effects, mitigation measures can be used to maintain and protect the site values. The mitigation measures are specified in Appendix A (Road Cards). Use of these mitigation measures should result in a no adverse effect to historic properties. Where there are ambiguous effects, a provision for monitoring is also specified in Appendix A to identify if future management actions would be needed to reduce or eliminate effects.

Effects of the Alternatives on Heritage Resources

The roads, trails and areas being considered for addition the National Forest Transportation System in the alternatives already exist on-the-ground. Although they are currently being used by motorized vehicles, such use is not authorized. Since the routes already exist, some degree of impact has already occurred to the historic properties in the Area of Potential Effect. During the field work in support of this proposed undertaking, past effects from motorized vehicles and other activities (non-motorized effects) were observed and described. The inventory and monitoring observations are summarized in Heritage Resource Report TNF02151/R2007051700062.

Based on the inventory and monitoring, effects were determined for each route and associated site. Depending on the number of new routes added to the NFTS under each alternative, the total number of sites affected varies. The results are shown in Table. 3.05-3. Under all of the action alternatives, the reduced motor vehicle access will lessen the effects associated with motorized vehicle use on roads and trails.

Table 3.05-3. Site Specific Motorized Effects on Heritage Resources by Alternative

Route ID	Site Number	Effect	Type/Severity	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
25-9_p	05175300469	Trail	Direct/Minor	X				X	X	
39-5_p	05175300217	Roads	Direct/Moderate	X						
39-5_p	05175300342	None	None	X						
491-3_1	05175300337	None	None	X				X	X	
491-3_2	05175300216	Road	Direct/Minor	X				X	X	
ARM-5	05175400124	None	None	X	X		X	X	X	X
ARN-001	05175500317	Road	Direct/Minor	X						
Eureka Diggings	05175300004	Open area in tailings	Direct/Major	X	X					
Eureka Diggings	05175300023	None	None	X	X					
Eureka Diggings	05175300230	None	None	X	X					
H11E10	05175300696	Road	Direct/Minor	X				X		
H1-2	05175700297	Road	Direct/Minor	X				X		
H25-11-3	05175300031	Road	Direct/Minor	X				X		
H261-8	05175700558	Road	Direct/Minor	X				X		
H261-8	05175700563	Road	Direct/Minor	X				X		
H27-19	05175300032	Road	Direct/Minor	X				X		
H293-4-4	05175300385	Road	Direct/Minor	X				X		
H293-4-4	05175300637	Road	Direct/Minor	X				X		
H301-6	05175300176	Road	Direct/Minor	X				X		
H301-6	05175300188	Road	Direct/Minor	X				X		
H3-4-4	05175700148	Road	Direct/Minor	X				X		
H50-12-3-1	05175500035	Road	Direct/Minor	X				X		
H54-9	05175600283	Road	Direct/Minor	X				X		
H54-9	05175600317	Road	Direct/Minor	X				X		
H54-9	05175600341	Road	Direct/Minor	X				X		
H652-5-5	05175500481	Road	Direct/Minor	X				X		
H833-10	05175500458	Road	Direct/Minor	X				X		
H833-10	05175500459	Road	Direct/Minor	X				X		
H88-44	05175400215	Road	Direct/Minor	X				X		
H889-28	05175700088	Road	Direct/Minor	X				X		
H889-3-18-5	05175700563	Road	Direct/Minor	X				X		

Route ID	Site Number	Effect	Type/Severity	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
H889-3-30-10	05175700304	Road	Direct/Minor	X				X		
H889-3-30-10	05175700307	Road	Direct/Minor	X				X		
H889-3-30-5	05175700303	Road	Direct/Minor	X				X		
H889-8	05175700395	Road	Direct/Minor	X				X		
H889-8	05175700401	Road	Direct/Minor	X				X		
H894-5-1	05175700240	Road	Direct/Minor	X				X		
N25-1-1	05175300347	Road	Direct/Minor	X				X		
N25-1-1	05175300348	Road	Direct/Minor	X				X		
N25-2 and N25-2-3	0175300454	Road	Direct/Minor	X				X		
N25-6-1	05175300356	Road	Direct/Minor	X				X		
N25-7	05175300034	Road	Direct/Minor	X				X		
N261-8-15-2	05175700563	Road	Direct/Minor	X				X		
N27-3	05175300514	Road	Direct/Minor	X				X		
N27-5	05175300446	Road	Direct/Minor	X				X		
N39-5	05175300217	Road	Direct/Minor	X				X		
N43-6-2	05175400368	Road	Direct/Minor	X				X		
N860-20-1	05175600426	Road	Direct/Minor	X				X		
N860-20-1	05175700540	Road	Direct/Minor	X				X		
N886-14-10	05175700577	Road	Direct/Minor	X				X		
N886-1-5	05175700009	Road	Direct/Minor	X				X		
N886-1-5	05175700409	Road	Direct/Minor	X				X		
N886-18-10	05175700447	Road	Direct/Minor	X				X		
N886-18-10	05175700529	Road	Direct/Minor	X				X		
N889-3-30-10	05175700304	Road	Direct/Minor	X				X		
N890-14-5	05175700511	Road	Direct/Minor	X				X		
N96-34-2-6	05175400325	Road	Direct/Minor	X				X		
open area Boca Reservoir	05175700241	None	None	X	X					
open area Boca Reservoir	05175700303	Road	Direct/Minor	X	X					
open area Boca Reservoir	05175700305	Road	Direct/Minor	X	X					
open area Boca Reservoir	05175700307	Road	Direct/Minor	X	X					
open area Boca Reservoir	05175700175/CA-NEV-82	Roads	Direct/Moderate	X	X					
open area Boca Reservoir	05175700240/CA-NEV-81	Roads	Direct/Moderate	X	X					

Route ID	Site Number	Effect	Type/Severity	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
open area Boca Reservoir	CA-NEV-26	None	None	X	X					
open area Prosser Reservoir	05175700460	None	None	X	X					
open area Prosser Reservoir	05175700609	Road	Direct/Minor	X	X					
open area Prosser Reservoir	05175700608/CA-NEV-64	Road	Direct/Minor	X	X					
open area Prosser Reservoir	CA-NEV-23	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	CA-NEV-24	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-10	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-11	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-22	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-56	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-57	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-58	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-59	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-60	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-61	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-62	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-63	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-65	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-66	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-67	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-68	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-69	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-70	Vehicular tracks	Direct/Minor	X	X					
open area Prosser Reservoir	NEV-71	Vehicular tracks	Direct/Minor	X	X					
open area Stampede Reservoir	05175700535	Vehicular tracks	Direct/Minor	X	X					
open area Stampede Reservoir	05175700540	Vehicular tracks	Direct/Minor	X	X					
open area Stampede Reservoir	05175700004/SIE-S44	Vehicular tracks	Direct/Minor	X	X					
open area Stampede Reservoir	DWR-S-1	Vehicular tracks	Direct/Minor	X	X					
open area Stampede Reservoir	SIE-11	Vehicular tracks	Direct/Minor	X	X					
open area Stampede Reservoir	SIE-12	Vehicular tracks	Direct/Minor	X	X					
open area Stampede Reservoir	SIE-13	Vehicular tracks	Direct/Minor	X	X					
open area Stampede Reservoir	SIE-14	Vehicular tracks	Direct/Minor	X	X					

Route ID	Site Number	Effect	Type/Severity	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
open area Stampede Reservoir	SIE-15	Vehicular tracks	Direct/Minor	X	X					
open area Stampede Reservoir	SIE-16	Vehicular tracks	Direct/Minor	X	X					
open area Stampede Reservoir	SIE-17	Vehicular tracks	Direct/Minor	X	X					
open area Stampede Reservoir	SIE-28	Vehicular tracks	Direct/Minor	X	X					
SV-P14	05175600571	Road	Direct/Minor	X	X		X	X	X	X
SV-P5	05175600574	Road	Direct/Minor	X	X			X	X	X
TKN-002	05175700332	Road	Direct/Minor	X						
TKN-003	05175700563	Road	Direct/Minor	X	X			X	X	
TKN-003	05175700564	Road	Direct/Minor	X	X			X	X	
TKN-J1	05175700206	Road	Direct/Minor	X						
TKN-J11	05175700096	None	None	X	X			X	X	
TKN-J11	05175700097	Road	None	X	X			X	X	
TKN-J11	05175700354	None	None	X	X			X	X	
TKN-J13	05175700286	Road	Direct/Moderate	X	X		X	X	X	X
TKN-J13	05175700287	Road	Direct/Moderate	X	X		X	X	X	X
TKN-J6	05175700374	Road	Direct/Minor	X	X		X	X	X	X
TKN-J9	05175700508	None	None	X	X		X	X	X	X
TKN-M2	05175700401	Trail	Direct/Moderate	X	X			X	X	
TKN-M2	05175700734	Trail	Direct/Moderate	X	X			X	X	
TKN-Q1	05175700087	Road	Direct/Minor	X	X			X	X	
TKN-Q1	05175700554	None	None	X	X			X	X	
TKS-11	05175700735	None	None	X	X			X	X	X
TKS-11	05175700736	None	None	X	X			X	X	X
TKS-M9	05175700450	None	None	X	X		X	X	X	X
YRN-002	05175300887	Road erosion	Direct/Minor	X						
YRN-004	05175300676	Road erosion	Direct/Minor	X	X			X		
YRN-007	05175300426	None	None	X	X			X	X	
YRN-008	05175300369	OHV tracks, rutting	Direct/Moderate	X	X			X	X	
YRN-1	05175300881	Road erosion	Direct/Minor	X	X			X	X	X
YRN-2	05175300499	Road erosion	Direct/Minor	X	X			X	X	X
YRN-2	05175300545	Road	Direct/Minor	X	X			X	X	X
YRN-2	05175300546	None	None	X	X			X	X	X

Route ID	Site Number	Effect	Type/Severity	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
YRN-4	05175300386	Road erosion	Direct/Minor	X	X			X	X	X
YRN-509	05175300198	Spur road	Direct/Minor	X	X			X	X	
YRN-509	05175300205	Spur road	Direct/Minor	X	X			X	X	
YRN-7	05175300674	Road erosion	Direct/Minor	X	X			X	X	X
YRN-M1	05175300389	None	None	X						
YRN-M1	05175300390	Trail	Direct/Minor	X						
YRN-M1	05175300392	Trail	None	X						
YRN-M1	05175300394	None	None	X						
YRN-M1	05175300882	Trail	Direct/Minor	X						
YRN-M1	05175300885	Trail	Direct/Minor	X						
YRN-M2	05175300671	Trail-erosion from FS System Road 25-23-1-2	Direct/Moderate	X	X			X		
YRN-M2	05175300675	Trail	Direct/Minor	X	X			X		
YRN-M2	05175300890	None	None	X	X			X		
YRN-M3A	05175300669	Trail erosion, damage to features	Direct/Moderate	X						
YRS-F1	05175300888	Multiple roads	Direct/Major	X	X			X	X	X
YRS-SF5	05175500272	None	None	X	X		X	X	X	X
Unauthorized routes not included in any alternative	175 additional sites									

Table 3.05-4. Summary Comparison of Effect, Type, and Severity on Heritage Resources

Effect	Type/Severity	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Open Area/Multiple Roads	Direct/Major	2	2	0	0	1	1	1
Roads/Trails/Erosion	Direct/Moderate	10	8	0	2	6	5	2
Road/Trail/Tracks	Direct/Minor	112	56	0	2	66	17	10
None	None	22	17	0	4	14	13	7
	Total	**146**	**83**	**0**	**8**	**87**	**36**	**20**
Cross Country Travel		Continues	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited

Cross Country Travel: Alternative 1, the no action alternative, has the greatest direct and indirect effects on cultural resources since it continues the pattern of unrestricted cross country travel, resulting in random and unmanageable impacts to cultural resources, resulting in the loss of integrity and NRHP values.

All of the action alternatives prohibit cross country travel on 800,000 acres. This prohibition will reduce the potential for adverse impacts to heritage resources from motorized vehicles by reducing the number of miles available for motorized use. The prohibition of cross country travel would have a beneficial effect on cultural resources throughout the Forest. In the short and long term; it would curtail on-going effects and reduce the risk and threat to cultural resource values. All future permitted or other authorized vehicle travel off designated roads, trails and areas will be subject to NHPA Section 106 compliance and potential effects to cultural and historic properties would be identified at that time.

Additions to the National Forest Transportation System: Table 3.05-4 summarizes the effects on heritage resources by alternative. Under Alternatives 2, 4, 5, 6, and 7, all routes being added to the National Forest Transportation System that are having direct major or moderate effects to sites have mitigation measures outlined in Appendix A (Road Cards). These protection measures are listed as Standard Resource Protection Measures in the Motorized PA. They are designed to maintain the values at each site. Alternatives which add routes to the National Forest Transportation system still have the potential to impact sites as a result of motorized use. Therefore, those alternatives which recommend the most number of routes and miles have the greatest potential impact to sites. All of the action alternatives reduce the potential for adverse impacts to heritage resources from motorized vehicles by reducing the number of miles available for motorized use.

Under Alternative 2, there are 2 sites with direct major effects. Effects at one site (0517530004) are from the tailings area being used as an open area and the other is a site (05175300888) located along the Fordyce Jeep Trail where there are multiple short motorized trail spurs which come off the existing National Forest System motorized trail to access dispersed camping sites. These short spurs receive heavy use during a brief time of the year. Both sites are currently being evaluated for inclusion in the National Register of Historic Places. There are 8 sites having direct moderate effects. At these sites, there are moderate levels of erosion within the existing road or trail prisms. Implementing road maintenance and erosion control measures will halt these effects. Additionally, barricades and signage will be implemented at these sites to prohibit motorized vehicles into the sites. Specific recommendations are listed in Appendix A (Road Cards). Alternative 2 also maintains motorized use below the high water line at Boca, Prosser, and Stampede Reservoirs. Motorized access to shoreline below the high water line at these reservoirs has direct but minor impacts to the heritage sites (one of which is a National Register listed site). The more severe effects to these sites are not associated with motorized vehicles (non-motorized impacts); they are associated with wave action, deflation, and boating access. These factors are having moderate to major effects on these sites as compared to the minor effect resulting from motorized use. All of the other action alternatives close these reservoirs to motorized vehicles, but the effects resulting from wave action, wind action and boating access will continue. Fifty-six (56) sites in this alternative were noted has having direct minor effects. Monitoring is recommended to determine if mitigation measures will be needed in the future.

There are no historic properties associated with Alternative 3.

Alternative 4 has the least effects to heritage resources as only 4 sites have direct moderate or minor effects.

Aside from Alternative 1 (no action alternative), Alternative 5 has the most sites associated with the proposed additions to the National Forest Transportation System. One site (05175300888), also included in Alternative 2, 6, and 7, has direct major effects. Again, this site is currently being evaluated for inclusion in the National Register of Historic Places. Six (6) sites have direct moderate effects and 66 were classified as having direct minor effects.

Alternatives 6 and 7 reduce the number of sites associated with proposed additions to the National Forest Transportation System. There are 36 sites in Alternative 6 and 20 in Alternative 7. As noted in the above, one site has direct major effects. However, like Alternative 5, there are few sites (5 for Alternative 6 and 2 for Alternative 7) with direct moderate effects. The most significant difference is with sites having direct minor effects (17 under Alternative 6 and 10 for Alternative 7).

Changes to Class of Vehicle and/or Season of Use: Neither action is 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 NFS roads. Allowing or prohibiting non-highway legal vehicle use will have no direct, indirect, or cumulative effect on cultural resources.

Cumulative Effects: The impacts of the alternatives when combined with the following past, present, and foreseeable future actions and events constitute the cumulative effects. However, each alternative, when added to past, present, and reasonably foreseeable future actions is not expected to cumulatively lead to increased impacts to cultural resources/historic properties. Under the no action alternative, adverse impacts are expected to be higher than under the action alternatives. All of the action alternatives will reduce the potential effects to cultural resources due to the prohibition of cross country travel and the reduction in motorized roads and trails available for public use.. Unregulated cross country travel has the greatest potential for creating adverse impacts to cultural resources.

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

Additionally, the majority of cultural resources have been protected using "flag and avoid" measures during all project activities subsequent to the 1974 RPA, including projects such as timber and fire salvage sales. 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 National Register of Historic Places resulting in the Forest managing hundreds of sites that may be not eligible for inclusion in the NRHP. All projects listed in Table 3.00-1 *Reasonably Foreseeable Future Actions Considered in Cumulative Effects Analysis* have been or will be subject to NHPA Section 106 compliance and potential effects to cultural and historic properties would be identified at that time following stipulations in the *Programmatic Agreement among the U.S.D.A. Forest Service, Pacific Southwest Region, the California State Historic Preservation Officer, and the Advisory Council for Historic Preservation, Regarding Process for Compliance with Section 106 of the National Historic Preservation Act for undertakings on the National Forests of the Pacific Southwest Region* (Regional PA).

3.06. Plant Communities

Regulatory Framework

Management direction for vegetation (including threatened, endangered, proposed, sensitive plant and fungi species and/or watchlist plants and plant communities) on the TNF can be found in the following documents, filed at the SO office:

- Forest Service Manual and Handbooks (FSM/H 2670 for TEPS plants)
- National Forest Management Act (NFMA)
- Endangered Species Act (ESA)
- National Environmental Policy Act (NEPA)
- Tahoe National Forest Land and Resource Management Plan (LRMP) as amended by the Sierra Nevada Forest Plan Amendment (SNFPA 2001), Final Supplemental Environmental Impact Statement (January 2004). The standards and guidelines in the January 2004 SNFPA record of decision (ROD) are incorporated by reference.
- Species-specific recovery plans which establish population goals for recovery of those species
- Species management plans
- Species management guides or conservation strategies
- Regional forester policy and management direction

In general, Forest Service direction for sensitive plants/fungi species is to:

- Assist States in achieving their goals for conservation of endemic species.
- As part of the NEPA process, review programs and activities, through a biological evaluation, to determine their potential effect on sensitive species.
- Avoid or minimize impacts to species whose viability has been identified as a concern.
- If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole.
- Establish management objectives in cooperation with the States when a project on National Forest System (NFS) lands may have a significant effect on sensitive species population numbers or distribution. Establish objectives for Federal candidate species, in cooperation with the USFWS and the States.
- Conduct field surveys for TEPS plant species early enough in project planning process that the project can be designed to conserve or enhance TEPS plants and their habitat (SNFPA ROD page 66, S&G #125).
- Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining fen ecosystems and plant species that depend on these ecosystems (SNFPA ROD page 65, S&G #118).

State and Federal laws, Forest Service direction, and other regulatory direction that is relevant to the management and prevention of noxious weeds include:

- Forest Service Manual (FSM) 2080
- Executive Order 13112 of February 3, 1999.

- Sierra Nevada Forest Plan Amendment (SNFPA) standard and guidelines **(S&Gs)**: The SNFPA (2004) lists 14 S&Gs for management of noxious weeds.

Affected Environment

Background

The plant communities on the Tahoe National Forest (TNF) are made up of a series of vegetation types arranged in dynamic patterns. These vegetative patterns are influenced by the geology of the particular area, the climate, and the types of disturbances that the area has experienced. The 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. The types and acres (SNFPA 2001) of TNF vegetation types are displayed in Table 3.06-1.

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, more likely, a combination of these factors. Human activities may or may not be responsible for the current distribution and abundance of the 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 long-term viability 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, four of the plant communities/ecosystems found in the TNF are impacted by motorized vehicle use and are considered limited in the TNF. In addition, two ecologically important disturbance related processes that are contributed to by motorized vehicle use are also discussed in detail:

- Aquatic/riparian
- Serpentine
- Older forests – all vegetation types but primarily mixed conifer and red fir
- Oak woodlands
- Noxious weed infestation
- Habitat fragmentation

Aquatic/riparian, serpentine, older forest and oak woodland 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 ecosystems is a serious threat to these ecosystems. In addition, the connectivity of various ecosystems is very important for plant and wildlife species.

Currently, the TNF has roughly 717,900 acres of land where cross country travel is not prohibited. Many of these acres could not be accessed by motorized vehicles due to terrain and vegetation density.

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

Vascular plants

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*. The TNF also has 21 vascular plants on its watchlist.

Vascular plants are the largest and most dominant organisms on the TNF. For example, trees within old forest ecosystems can reach over 250 feet tall and have life spans of over 1,000 years. Vascular plants are an essential part of the ecosystems represented on the TNF. As described in the SNFPA (2001), vascular plants create the structure of the forest and function as the primary producers, capturing sunlight through photosynthesis and converting it to food consumed by animals and fungi. They provide substrate and habitat for other organisms; influence microclimate (such as sunlight, humidity, and temperature); and provide forage, hiding, and thermal cover for vertebrate and invertebrate species. They produce litter fall that contributes to organic matter and soil development. Some species form symbiotic relationships with fungi and other vascular plants.

Bryophytes, Lichens and Fungi

The TNF sensitive species list currently contains 6 rare mosses, 3 rare fungi and an aquatic lichen. The TNF watchlist tracks *Sphagnum* moss species. As identified in the SNFPA (2001), there is a great need for systematic collecting and taxonomic study of Sierra Nevada bryophytes, lichens and fungi. These organisms are recognized as having important ecosystem function but they have not received intensive study and are some of the least surveyed species in the forest.

Bryophytes

Bryophytes are mosses, liverworts, and hornworts (non-vascular green plants). 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.

Lichens

Lichens are a combination of two different types of organisms (fungi and algae) growing together in a symbiotic relationship. 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.

Fungi

Fungi are organisms without chlorophyll that digest other organic matter. 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
Botrychium minganense	None	0
Botrychium montanum	None	0
Bruchia bolanderi	4	Number of moss plants not estimated
Calochortus clavatus var. *avius*	None	None
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	7	Less than 500
Cypripedium montanum	None	None
Dendrocollybia racemosa	1	Not estimated
Epilobium howellii	4	Less than 1,500
Erigeron miser	14	8,100
Eriogonum umbellatum var. *torreyanum*	11	7,000
Fissidens aphelotaxifolius	None	Number of moss plants not estimated
Fritillaria eastwoodiae	7	Less than 1,000
Helodium blandowii	None	Number of moss plants not estimated

Scientific Name	Known Occurrences on TNF system lands	Estimated number of plants
Hydrothyria venosa	None	Number of lichen not estimated
Ivesia aperta var. *aperta*	5	Less than 5,000
Ivesia aperta var. *canina*	None	None
Ivesia sericoleuca	28	50,000
Ivesia webberi	None	None
Lewisia cantelovii	16	Less than 5,000
Lewisia kelloggii ssp. *hutchisonii*	6	Less than 1,000
Lewisia kelloggii ssp. *kelloggii*	None	None
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	Number of moss plants not estimated
Monardella follettii	None	None
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. Motorized trails un-authorized for motorized use and NFTS roads and trails may or may not have sensitive and/or watchlist species growing within or adjacent to them. Several sensitive and watchlist plant and plant community occurrences are known to occur within and/or near NFTS roads and trails.

Mitigation measures specified in Appendix A will be implemented in all of the Action Alternatives. These mitigation measures will provide benefits to sensitive and watchlist species and other native vegetation. Motorized trails un-authorized for motorized use with serious and adverse erosion problems will not be available for use until those erosion problems are mitigated. Regardless of the alternative selected, native vegetation will be at risk of being negatively impacted by motorized vehicle use until erosion from roads/trails/areas is reduced and/or eliminated. Negative impacts to native vegetation are not considered significant unless those impacts are reducing the viability of a species or a plant community. This analysis therefore focuses on impacts to rare plant species and plant communities. Surveys will be completed during the field season of 2008.

Revegetation of motorized trails un-authorized for motorized use: The amount of time necessary for a motorized trail un-authorized for motorized use to revegetate is a concern primarily due to possible sediment loss through erosion. 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 require 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 and plant communities may continue to be negatively impacted by motorized trails un-authorized for motorized use for a period of time even after the motorized use is removed if erosion from the motorized trail is not reduced and/or eliminated. Continued use of motorized trails un-authorized for motorized use that are in need of erosion control (by 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). Surveys of motorized trails un-authorized for motorized use (and those NFTS roads and trails used to access them) documented that most showed some level of erosion. Therefore, it is important to estimate how long it might take motorized trails un-authorized for motorized use to recover vegetatively once the motorized vehicle use is removed.

It is anticipated that some of the motorized trails un-authorized for motorized use will not recover without restoration actions. These motorized trails un-authorized for motorized use will be restored by the TNF as budgets and personnel are available. Some motorized trails un-authorized for motorized use 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 motorized trails un-authorized for motorized use may be used for non-motorized recreation. Still others will be left alone and they will revegetate without restoration actions. All of these scenarios add to 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 motorized trails un-authorized for motorized use 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 use can extend substantial distances from the road in terrestrial ecosystems (Trombulak and Frissell 2000). Motorized vehicle use 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, while aquatic vegetation is found within the water. The SNFPA (2004) identified aquatic/riparian ecosystems as special aquatic features and defined them as small, irregularly distributed aquatic/riparian habitats. These 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).

Small riparian ecosystems (streams and wetlands) 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 habitats are believed to be two of the most altered and impaired habitats of the Sierra Nevada (California Wildlife Action Plan). 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 motorized trails un-authorized for motorized use cross perennial and/or intermittent streams and/or are located within 100 feet of aquatic/riparian plant communities. The 300 foot zone of influence from an aquatic/riparian plant community with perennial water is called the riparian conservation area (RCA). RCAs are 300 feet wide for aquatic/riparian plant communities with perennial water and 150 feet wide for aquatic/riparian plant communities with intermittent water (SNFPA, 2001). About 459 miles of NFTS motorized roads and trails and motorized trails un-authorized for motorized use are currently located within 100 feet of perennial and/or intermittent water sources on the TNF. The distance of 100 feet from riparian vegetation was chosen as the distance away from a motorized trail that aquatic/riparian vegetation would be indirectly impacted. A distance of 30 feet from aquatic/riparian dependent rare plants was chosen as the distance from a motorized trail where motorized vehicle use could directly impact rare plants.

In this analysis, aquatic/riparian plant communities have been grouped to include: wet meadows, seeps, fens, 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-J4. *Ivesia sericoleuca* was found within 1 foot of TKN-M2.

Hydrologic alteration is considered one of the biggest threats to sensitive and watchlist species dependent on aquatic/riparian plant communities. Many of the NFTS motorized roads and trails and motorized trails un-authorized for motorized use cross perennial and/or intermittent streams and/or are located within 100 feet of riparian vegetation/water (riparian conservation areas). These crossings are altering the hydrologic conditions of the aquatic/riparian plant community at the crossing and downstream from the crossing. The significance of the hydrologic alterations is dependent on the condition of the soil and vegetation at the crossing. Surveys of crossings showed a wide range of existing conditions. Some are well armored with rock and do not show significant signs of erosion. In other cases, the access to the crossing is too steep and erosion of the stream banks is occurring. Refer to Appendix A (Road Cards) for more information about crossings.

Sensitive and 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 negatively impacts 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).

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. Motorized trails un-authorized for motorized use that 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). Motorized trails un-authorized for motorized use with extensive weed infestations may not recover vegetatively.

Light use: If the motorized vehicle disturbance was light (bare soil was not created/is limited, the motorized trail 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 motorized trails un-authorized for motorized use located within wet meadows to heal themselves is seldom a responsible decision with regard to restoring wetland integrity (Zeedyk 1996). The road or trail surface must be reshaped to allow overland runoff to cross over rather than be captured by the motorized trails un-authorized for motorized use. Simple revegetation is seldom sufficient to assure meadow restoration - structural work is usually required (ibid). This is especially true where the motorized trail un-authorized for motorized use has incised below the meadow surface.

Riparian vegetation recovery in disturbed areas located in fen/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.

Intermediate use: In areas that have received intermediate use, the existing condition of riparian vegetation impacted by motorized vehicle roads/trails/areas falls somewhere between being able to recover on its own, and needing extensive restoration work. Riparian vegetation located within 30 feet of motorized trails un-authorized for motorized use will need site specific evaluation to determine what is needed for revegetation, and/or 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 Plant Communities

Serpentines (ultra mafic 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 NFTS motorized roads/trails/areas and motorized trails un-authorized for motorized use (within 100 feet of the motorized trail). There are 58 miles of NFTS and 35 miles of motorized trail 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). In addition to impacting vegetation, motorized vehicle use within serpentine habitats can create health hazards for users since inhaling serpentine dust can introduce asbestos fibers into the lungs (ibid). 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 motorized trails un-authorized for motorized use will be slow especially if the use level was intermediate to heavy and there was a loss of top soil. Even lightly disturbed areas will have increased erosion potential. Therefore, in general terms, vegetative recovery of motorized trails un-authorized for motorized use 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 353,631 acres of older forest on TNF system lands, of which 29,900 acres are currently, impacted by NFTS motorized roads/trails/areas and motorized trails un-authorized for motorized use. This acreage number was obtained using about 100 feet on either side of NFTS motorized roads/trails/areas and motorized trails un-authorized for motorized use that pass through vegetation mapped as CWHR 4 and above on NFS lands. There are about 1,088 miles of NFTS and 627 miles of motorized trails un-authorized for 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 impacts 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 trails un-authorized for motorized use may break 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 motorized tails Un-authorized for motorized use that have little soil compaction. It is likely that motorized trails with moderate to heavy soil compaction (within the wheel tracks) will 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 motorized trail will lean into the trail. However, the bare soil established by the motorized vehicle will 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 40 miles of NFTS and 19 miles of motorized trails un-authorized for 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, motorized trails un-authorized for motorized use 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 motorized trails from adjacent trees may have a better chance of becoming established. However, motorized trails un-authorized for motorized use 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 1,708 miles of NFTS and 925 miles of motorized trails un-authorized for 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 impacts these habitats 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 trails un-authorized for motorized use by native plants will begin within the first year as long as the motorized trails un-authorized for motorized use 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 road or trial 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 79 miles of NFTS and 36 miles of motorized trails un-authorized for 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*.

These habitats are generally steep and have highly erosive soils/rock outcrops/rocky openings. When motorized vehicle use occurs 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 Weed Infestations

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, Tahoe National Forest (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 and provide the entry points for many weeds into the TNF. It is a major "source" for weeds that are moving upslope into coniferous forests.

When an area is heavily infested with weeds, they 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).

Weeds that have the potential to reduce local diversity or transform ecosystems have been called “transformer species” (D’Antonio et al. 2004). Transformer species have the potential to form monotypic stands, and greatly alter resource availability, trophic structure, ecosystem productivity, and/or disturbance regimes (ibid). Some of the transformer species invading the Sierra Nevada include: cheatgrass (*Bromus tectorum*), medusahead (*Taniatherum caputmedusae*), yellow star thistle (*Centaurea solstitialis*), spotted, diffuse and Russian knapweed (*Centaurea maculosa*, *C. diffusa*, and *Acroptilon repens* respectively), perennial pepperweed/tall whitetop (*Lepidium latifolium*), purple loosestrife (*Lythrum salicaria*), dalmatian toadflax (*Linaria genistifolia* var. *dalmatica*), leafy spurge (*Euphorbia esula*), gorse (*Ulex europaea*), French broom (*Genista monspessulana*), Scotch broom (*Cytisus scoparius*), Spanish broom (*Spartium junceum*), Himalayan blackberry (*Rubus discolor*), Russian olive (*Eleagnus angustifolia*) and Saltcedar (*Tamarix parviflora* and *T. ramosissima*) (ibid). A few of these weeds are widespread, but many are still relatively restricted within the Sierra Nevada (SNFPA 2001 in D’Antonio et al. 2004). Areas without motorized vehicle use are more resistant to weed introduction. 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. Motorized vehicle use disturbs native plant communities and makes the habitat more suitable for weed growth by reducing native plant cover. The disturbed areas within and adjacent to major highways, general forest roads, two-tracked non-maintained roads, and motorcycle trails (system and un-authorized-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 motorized trails un-authorized for motorized use 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 motorized trail is unknown. In one study, Rooney (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 carries 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 motorized roads and trails 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 probably further than 100 feet and/or less than 100 feet dependent on many factors.

Motorized vehicle use also disturbs plant communities making the habitat more suitable for weed growth by reducing native plant composition. 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 areas and riparian areas in campgrounds frequently have high levels of public activity, they have a higher risk of weed infestation. Many weeds are adapted to riparian areas and rapidly become established on sites where soils have been disturbed, such as eroding stream banks, road and trail crossings, and undeveloped trails. Also, streams can carry weed seeds and plant parts great distances, hastening weed spread. Aquatic weeds, such as purple loosestrife, can take over whole wetland ecosystems, impeding water flow and reducing the quality of wetland habitats.

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

Weed Species	CDFA*	California Invasive Plant Council**
***Genista monspessulana* (French broom)**	C	High
***Hypericum perforatum* (Klamath weed)**	C	Moderate
***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 roads/trails/areas have a high risk of negative impacts from weed introduction and spread. Surveys of about 62 miles of motorized trails un-authorized for motorized use have been completed. The remainder will be surveyed in FY 2008.

Several of the known occurrences of weeds on the TNF are known to directly and 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 motorized trails un-authorized for 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 ½ mile are at even greater risk of negative impacts from weed infestation.

Table 3.06-4. Motorized Trails Un-authorized for 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	None
TKN-M2	*Ivesia sericoleuca*, aspen, spring	Cheatgrass
TKS-11	Aspen	None
YRN-001	*Epilobium howellii*	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-SF5	Seep/wetland	
SV-005	Aspen, seep	None
SV-P8	Aspen	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 motorized trails un-authorized for motorized use 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 motorized road or trail 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 Appendix M for more information about ecological characteristics of weeds known to occur on the TNF. Continued motorized vehicle use within aspen clones could spread weeds so that aspen regeneration is reduced and increase the risk of loss of these clones.

Native Plant Habitat Fragmentation

Many acres of TNF system lands are considered fragmented with other ownership lands embedded within and adjacent to the Forest. These inholdings are managed by other Federal agencies (such as BLM), private individuals and corporations, the states of California and Nevada, and local municipalities and agencies of municipalities. 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 un-authorized (for public) use, and weed introduction/spread onto NFS lands. The natural resources located on inholding lands can be managed much differently that NFS lands. For example, inholdings can influence plant communities/habitats by reducing the connectivity of plant communities (habitat). Connectivity is desired for many species of plant (and animals). Connectivity 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 are the inventoried roadless areas. Wilderness, special interest areas (SIAs), and research natural areas (RNAs) also provide some native plant connectivity and are briefly described below. 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 the 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. Table 3.06-5 summarizes information about these SIAs.

Table 3.06-5. Special Interest Areas on the TNF

Name	Acres	Key Elements
Placer County Big Tree Grove Botanical area	346	Northern most grove of giant sequoia and unique plant associations.
Devil's Postpile Geologic area	69	Postpile geologic feature in a remote area.
Glacier Meadow Geologic area	84	Represents a landscape shaped by glacial action.
Grouse Falls Scenic area	220	One of the highest cascading waterfalls in California.
Meadow Lake Cultural area	58	Represents historic and prehistoric cultural sites.
Sagehen Headwaters	79	Virgin red fir, mountain hemlock, and mountain mahogany plant communities in an avalanche forest. Over 130 plant species including a rare lichen species.
Mason Fen	30	The largest fen in the Sagehen Basin vicinity. Over 40 plant species known to occur in the fen including *Drosera rotundifolia* (round leaf sundew) and *Drosera anglica* (English sundew). This SIA is currently located within the Sagehen Experimental forest.

RNAs: Lyon Peak/Needle Lake, Sugar Pine Point and Babbitt Peak are the RNAs located on the TNF. Table 3.06-6 summarizes information about these RNAs. 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.

Table 3.06-6. Research Natural Areas on the TNF

Name	Acres	Key Native Vegetation Elements
Lyon Peak/Needle Lake	700	Mountain hemlock
Sugar Pine Point	625	Mixed conifer forest
Babbitt Peak	1061	Washoe pine and mature stands of mountain mahogany

Inventoried Roadless Areas: The TNF has eleven inventoried roadless areas. The character and amount of roads, private land, and motorized trails varies greatly by roadless area. Refer to Table 3.06-7 for the names and acres of inventoried roadless areas on the TNF and section 3.09. Some of the inventoried roadless areas contain motorized roads/trails. Some of the motorized trails un-authorized for motorized use located within inventoried roadless areas 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 NFTS motorized roads or trails. Current use of the motorized trails un-authorized for motorized use in TNF inventoried roadless areas is considered light to moderate primarily due to such factors as level of difficulty and remote location. The existing condition of the NFTS motorized roads/trails/areas and motorized trails un-authorized for motorized use within TNF inventoried roadless areas varies. Refer to Appendix A (Road Cards) for a list of mitigations required by motorized trail proposed to be added to the NFTS.

Table 3.06-7. Inventoried Roadless Areas on the TNF*

Name	Acres**	Elevation (feet)
West Yuba (RARE II)	16,601	3600-6800
East Yuba (RARE II)	18,502	3600-7240
North Fork Middle Fork American (RARE II)	10,653	1600-4800
Bald Mountain (RARE II)	6,253	6300-8760
Middle Yuba (RARE I)	7,855	3200-6800
Castle Peak (RARE I)	9,301	6900-9000
Lakes Basin (RARE I)	551	6640-7440
Duncan Canyon (RARE II)	8,703	5100-7182
Grouse Lakes (RARE II)	10,096	5500-8000
Granite Chief (RARE II)	25,975	5000-8800
North Fork American River (RARE II)	34,275	2100-8000

* Refer to Appendix G of the TNF Land and Resource Management Plan
** Net Tahoe National Forest acres

Large geographic areas such as inventoried roadless areas that are relatively undisturbed by humans are important for native plants both individually and cumulatively to help maintain species viability and biodiversity in all parts of the United States (USDA FS 2000). Nationally, they play an important role in providing habitat for threatened, endangered, proposed and sensitive (TEPS) plant species (ibid). TNF inventoried roadless areas are not known to contain TEP plants, but do have occurrences of sensitive and watchlist plants. Nationally, inventoried roadless areas 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 inventoried roadless areas 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 inventoried roadless areas 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 inventoried roadless areas 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).

Large geographic blocks of land such as inventoried roadless areas are especially important areas for maintaining native plant diversity (Loomis et al. 2000). 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 communities located within relatively large geographic areas 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 can 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 (plant and animal) 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 inventoried roadless areas 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.

Season of use: The impact to native vegetation from the season that the motorized vehicle use occurs varies by plant community and by rare plant species. However, the significance of beneficial or negative impacts from the season of use action is difficult to quantify for a number of reasons. Removing motorized vehicle use of the NFTS during the wet season does reduce the potential amount of erosion from that motorized trail that could occur especially if the trail 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 rare plant and fungi species and/or rare plant communities is difficult. It is reasonable to assume that those rare plants/fungi and/or plant communities located within 30 feet of a motorized trail would not benefit if that rare plant/fungi and/or plant community experienced soil erosion due to motorized vehicle use regardless of the season of use. Some rare plants/fungi would not be or would have limited impacts from season of use restrictions. Those rare plants and plant communities 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 (ultra-mafic soils) plant communities are considered highly erosive year-around. The known occurrences of rare plants located within 30 feet of the NFTS 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 NFTS roads, they would not be at risk from increased erosion (caused by a change in season of use) unless the entire road washed out. Erosion at levels that would wash out entire roads is not expected. Therefore, in this analysis, the effects of implementing the various seasons of use (as they vary by alternative) on unsurveyed potential habitat are analyzed in general terms by plant community grouping.

Temporary order: The TNF has issued a temporary forest order which prohibits travel off of existing roads and trails as shown on forest order exhibit maps. The order is established for a period not to exceed two years to protect resources and help prevent additional motorized trails un-authorized for motorized use from being established while the TNF undertakes implementation of the Travel Management Rule and the production of the Motor Vehicle Use Map (MVUM). Therefore, the creation of new motorized trails un-authorized for motorized use (which is the expression of cross country travel) and the associated resource damage caused by cross country travel has been legally – at least temporarily – stopped. This analysis recognizes the miles of motorized trails un-authorized for motorized use that were known when the analysis began, i.e. 1400 miles. For this analysis, implementation of the temporary order is considered beneficial to native vegetation. Comparing the no action alternative that allows cross country travel to the action alternatives that do not allow cross country travel provides the reader with an overview of how cross country travel affects native vegetation once this temporary order expires.

Change in class of vehicles: Changing the class of vehicle allowed to use a particular road does not change impacts to sensitive species and watchlist plants/plant communities. These roads already have hardened surfaces that lack vegetation. It is likely that direct impacts to sensitive species and watchlist plants/plant communities occurred when the road was developed. Indirect impacts may still be occurring if the sensitive species and watchlist plants/plant communities have survived within 100 feet of the road. These indirect and 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 species and watchlist plants/plant communities being lost or degraded.

Environmental Consequences

Mitigation measures specified in Appendix A will be implemented in all of the action alternatives. These mitigation measures will provide benefits to sensitive and watchlist species. Part of the project description for all of the action alternatives is to mitigate serious and adverse erosion problems on motorized vehicle roads/trails/areas before those roads/trails/areas are available for use. Regardless of the alternative selected, sensitive and watchlist species will continue to be negatively impacted by motorized vehicle use until erosion from roads/trails/areas is reduced and/or eliminated. Surveys of about 62 miles of proposed roads/trails/areas (and those NFTS roads and trails used to access them) showed that some have erosion problems along some portion of the route. Refer to the survey records located in the project files.

All of the action alternatives prohibit cross country travel on 717,900 acres which includes 1,400 miles of motorized trails un-authorized for motorized use and therefore have less risk of negative impacts to sensitive and watchlist plants and plant communities than the No Action alternative. When motorized vehicle use is prohibited on roads/trails/areas (as under the action alternatives) this would benefit sensitive and watchlist species. Other sensitive and watchlist species that need openings would not benefit. Others may continue to be used for non-motorized recreation. Non-motorized recreational activities can also negatively impact sensitive and 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.

Indicator Measures: The following general indicator measures were used to compare alternatives. These indicator measures were selected based on literature review of possible impacts to sensitive plants/fungi and watchlist species and plant communities; native plant connectivity; and profession judgment.

- Prohibition of cross country travel
- Number of perennial and intermittent water crossings.
- Proposed addition to the NFTS within 100 feet of unsurveyed potential habitat.
- Sensitive and/or watchlist species and watchlist plant communities within 30 feet of proposed addition to the NFTS (direct effects). Note: 30 feet was chosen to represent about one vehicle length from a motorized trail edge.
- Sensitive and/or watchlist species and watchlist plant communities within 100 feet of proposed addition to the NFTS (indirect effects). Note: 100 feet was chosen as the distance for indirect impacts such as dust.
- Weed infestations within 100 feet of the proposed addition to the NFTS. Note: 100 feet was chosen to represent the indirect effect of weed introduction and spread.
- Miles of proposed additions to the NFTS within inventoried roadless areas.

Elements of the proposal: In addition to the indicator measures, the alternatives are compared by plant community with a focus on three major parts of the proposal:

- Prohibition of cross country travel (including prohibiting use on trails un-authorized for motorized use)
- Additions to the National Forest Transportation System (NFTS).
- Cumulative effects including all of the above and the reasonably foreseeable.

Impacts to native vegetation including sensitive/watchlist species do not vary significantly by alternative when the class of vehicle is changed. Alternatives were not compared by whether or not they propose wet weather restrictions because the impacts to native vegetation (including sensitive species and watchlist plants/plant communities) cannot be quantified. Refer to preceding discussions.

List of Assumptions: This analysis also based on several assumptions to help analyze direct, indirect and cumulative effects. These assumptions are listed below:

- Impacts to sensitive and/or watchlist species and watchlist plant communities are assumed to be limited to 30 and 100 feet of the motorized trail.
- Sensitive and/or watchlist species and watchlist plant communities located within 100 feet of motorized trails may be (at least) indirectly impacted by motorized vehicle use - regardless of the alternative selected.
- Sensitive and/or watchlist species and watchlist plant communities located within 30 feet of proposed motorized trails may be directly impacted by motorized vehicle use regardless of the alternative selected.
- Sensitive and/or watchlist species and watchlist plant communities occur within the identified potential habitat that has not been surveyed. Occurrence is assumed until surveys are completed.
- Non-native plants (weeds) will continue to spread along and within surfaced and unsurfaced motorized trails.
- NFTS and proposed additions to the NFTS could have increased use which may increase impacts to sensitive/watchlist species through production of dust, etc.
- The projects identified in 3.00-1 will be analyzed and implemented on TNF system lands within the next 5 to 10 years.
- All vehicles will need to be assumed "equal". Hence the impacts to sensitive/watchlist species from a motorcycle are assumed equal to those impacts from a 4-wheeled vehicle. [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)].
- Volunteers can effectively maintain adopted trails over the long term.

Aquatic/Riparian Plant Communities - Summary by indicator measures

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres open to cross country travel in aquatic/riparian plant communities (including motorized trails un-authorized for motorized use).
- Motorized trails un-authorized for motorized use within 100 feet of aquatic/riparian plant communities.
- Motorized trails un-authorized for motorized use with perennial and intermittent stream crossings

No Action: Alternative 1 does not prohibit cross country travel. The TNF currently has 717,900 acres of aquatic/riparian habitat located within 100 feet of aquatic/riparian plant communities. Cross country travel is prohibited on 73,500 of the 717,900 acres. Currently the 717,900 acres includes 1,400 miles of motorized trails un-authorized for motorized use. Under implementation of Alternative 1 impacts to known occurrences of sensitive and watchlist species dependent on aquatic/riparian plant communities would likely increase over time as motorized vehicle use increased. As yet undiscovered sensitive and watchlist species occurrences would be at risk as new motorized trails un-authorized for motorized use were created. Cross country use would damage at least some sensitive and watchlist species occurrences and it is reasonable to expect that some occurrences would be lost. Those sensitive species considered in downward trend would be most at risk. 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 impacts could be significant at least at the local, site specific level. Possible direct impacts include killing and/or injuring sensitive plants and the above ground portions of sensitive fungi by running over them. (In addition, soil compaction could kill the under-ground portion of the fungal species.) Possible direct impacts also include damaging native vegetation within aquatic/riparian plant communities. Severe[1] and persistent disturbance to aquatic/riparian plant communities could convert them to a different type of plant community. The significance of these direct impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. For example, running over a sensitive/watchlist plant 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 damaged. In addition, the significance of impacts is dependent on the amount and condition of the type of habitat needed by a particular sensitive or watchlist species across its range of distribution.

When a sensitive or 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 prohibited in Alternative 1, the risk of significant direct and indirect impacts is higher than in the action alternatives.

Implementation of Alternative 1 could indirectly impact sensitive and watchlist species when cross country motorized vehicles reduce soil health through compaction, increase erosion, change water flows, and/or introduce weeds. Indirect impacts could be significant. Undesirable impacts include severely eroded soils, hydrologically disrupted wetland ecosystems, general habitat destruction, and degraded water quality (Foltz 2006). The significance of possible indirect impacts is unknown due to the factors listed under the direct impacts section. However, in most cases, recommendations for sensitive species – especially aquatic/riparian plant communities are for protection from indirect impacts. Most TNF

[1] Severe disturbance refers to any disturbance that changes the hydrology, soil health, or vegetative cover within the plant community.

sensitive and watchlist species are considered aquatic/riparian dependent and are limited in distribution. Reductions in the health of the soil and/or changes to the amount or health of water/air/vegetation components of the habitats for sensitive/watchlist plants prevent those habitats from maintaining and performing 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 indirect impacts to sensitive and watchlist species.

TNF motorized trails un-authorized for motorized use have about 790 perennial and intermittent water crossing and 114 miles within 100 feet of riparian vegetation. There are about 2,548 perennial and intermittent water crossings by NFTS roads and motorized trails and 219 miles located within 100 feet of riparian vegetation. According to information presented in section 3.02, the condition of NFTS roads and trails 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.

Action Alternatives: All of the action alternatives prohibit cross country travel. This prohibition is expected to stop/reduce the proliferation of new motorized trails un-authorized for motorized use. The prohibition of cross country travel also includes prohibiting use on some portion of the 114 miles of motorized trails un-authorized for motorized use within 100 feet of riparian vegetation. The prohibition of cross country travel also results in fewer perennial stream and intermittent stream crossings. Therefore, the risk of direct and indirect impacts to sensitive and watchlist species and aquatic/riparian plant communities (from cross country travel) is less than under implementation of the no action alternative. Under implementation of the action alternatives impacts to known occurrences of sensitive and watchlist species and aquatic/riparian plant communities would likely be mitigated by implementation of actions to reduce/eliminate negative impacts. As yet undiscovered occurrences of sensitive and watchlist species would most likely be discovered during motorized trail surveys and mitigations would be developed to reduce negative impacts to them. (Note: Management level 1 and temporary roads proposed in Alternative 5 do not have current botanical surveys.) It is standard practice to reduce/eliminate impacts to sensitive and watchlist species when they are found. Aquatic/riparian plant community impacts would be reduced due to mitigations developed to reduce erosion. Refer to Appendix A (Road cards) for mitigations that will be applied to site specific motorized trails. Under the action alternatives, the loss/conversion of aquatic/riparian plant communities due to motorized vehicle cross country use would not occur.

All of the action alternatives prohibit use on some of the 114 miles of motorized trails un-authorized for motorized use located within 100 feet of aquatic/riparian plant communities. Tables 3.06-8 and 3.06-9 display the number of perennial and intermittent water crossings by alternative and the number of miles of motorized trail on NFS lands that are located within 100 feet of aquatic/riparian plant communities (riparian vegetation) by alternative.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trail proposed to be added to the NFTS system within 100 feet of aquatic/riparian plant communities.

- Number of proposed perennial and intermittent water crossings
- Sensitive and/or watchlist species occurrences (associated with aquatic/riparian plant communities) located within 100 feet of proposed motorized trails
- Weed sites located along proposed motorized trails within 100 feet of sensitive/watchlist species occurrences and/or watchlist plant communities.

No Action: Alternative 1 does not propose the addition of motorized trails to the NFTS. However, direct and indirect impacts to sensitive and watchlist plants and plant communities could be significant at least at the local level.

Surveys of about 62 miles of motorized trails un-authorized for motorized use have been completed to date. Aquatic/riparian dependent sensitive species were discovered within 100 feet of several routes; *Bruchia bolanderi* along TKN-J5, *Epilobium howellii* at the end of YRN-001, and *Ivesia sericoleuca* along TKN-M2. Cheatgrass is known to occur within 100 feet of the TKN-M2 *Ivesia sericoleuca* occurrence. Aspen plant communities (watchlist plant communities) were found within 30 feet of TKN-M2, TKS-11, SV-005, SV-P8, and SV-P14. A vernal pool was located at the end of TKN-J2. TKN-J2 is proposed under all alternatives except Alternative 3. Continued motorized vehicle use within this vernal pool would eventually cause a loss of the native plants within that vernal pool. Springs/seeps were located along SV-005, TKN-J5, TKN-M2, and YRS-SF5.

Action Alternatives: For those proposed additions to the NFTS, Tables 3.06-8 and 3.06-9 display the number of perennial and intermittent water crossings by alternative and the number of miles of motorized trail on NFS lands that are within 100 feet of aquatic/riparian plant communities (riparian vegetation) by alternative.

Under the action alternatives, the vernal pool at the end of TKN-J2 is proposed under all alternatives except Alternative 3. Continued motorized vehicle use within this vernal pool would eventually cause a loss of the native plants within that vernal pool. Barriers will be placed at the end of TKN-J2 to eliminated motorized vehicle travel within this vernal pool.

As mentioned above, springs/seeps were located along SV-005, TKN-J5, TKN-M2, and YRS-SF5. SV-005 is proposed in Alternatives 2 and 5. To reduce impacts to the seep/spring, barriers will be placed on both sides of the motorized trail where it passes through the seep. TKN-J5 is proposed in Alternatives 2, 5, 6, and 7. The water from the seep will be directed to the meadow instead of down the route. TKN-M2 is proposed in Alternatives 2, 5 and 6. Barriers will be places along the motorized trail where it passes through the aspen/spring area. YRS-SF5 is proposed in Alternatives 2, 5, 6, and 7. The damaged wetland/spring area will be restored prior to this motorized trail being opened.

Of the action alternatives, implementation of Alternative 5 has the greatest number of perennial water crossings and the most miles associated with proposed additions to the NFTS within 100 feet of riparian vegetation. Therefore, of the action alternatives, Alternative 5 has the greatest risk to water quality and aquatic/riparian plant communities (or conversely the smallest improvement in water quality conditions and aquatic/riparian plant community conditions). Therefore, of the action alternatives, implementation of Alternative 5 would have the greatest risk of negative impacts to sensitive and watchlist species dependent on aquatic/riparian plant communities. It is believed that the mitigations identified for the vernal pool located at the end of TKN-J2, and the springs/seeps located along SV-005, TKN-J5, TKN-M2, and YRS-SF5 will reduce impacts to these plant communities.

Alternative 2 differs from Alternative 5 in that Alternative 2 proposes Reservoir access and Alternative 5 does not; and Alternative 5 proposes the networks (Cal-Ida, Boca, Mosquito, and French Meadows) and Alternative 2 does not. In addition, Alternative 5 proposes adding numerous existing NFTS Maintenance Level 1 and temporary roads (refer to the alternative descriptions in Chapter 2 for a listing) to the NFTS as motorized trails `that are not proposed in Alternative 2. Table 3.06-8 also shows that the action alternatives propose the addition of 127 crossings in Alternative 5, 35 and 37 crossings in Alternatives 2 and 6 respectively, 18 and 19 crossings in Alternatives 4 and 7 respectively, and no crossings in Alternative 3. Table 3.06-9 shows that the action alternatives propose the addition of 19 miles of motorized trail within 100 feet of riparian vegetation in Alternative 5, 6 and 7 miles in Alternatives 2 and 6 respectively, 3 miles in Alternatives 4 and 7, and no miles in Alternative 3.

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 motorized trails are proposed in those alternatives. *Epilobium howellii* at the end of YRN-001 is at higher risk in Alternatives 2, 5, and 6. Since mitigations will be implemented to reduce impacts to all sensitive species occurrences, the risk is not considered significant. However, 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 Appendix M for more information. Alternatives 3 and 4 do not propose TKN-J5 and TKN-M2 and cheatgrass would not be spread along TKN-M2 through motorized vehicle use of the route. The occurrences of *Bruchia bolanderi* along TKN-J5 and the *Ivesia sericoleuca* located along TKN-M2 would therefore benefit.

Of the action alternatives, Alternatives 3, 4, and 7 have the largest potential improvement in water quality conditions (and the least risk to sensitive and watchlist species dependent on aquatic/riparian plant communities) because additions to the NFTS under these alternative would result in the fewest perennial and intermittent water crossings, and fewer miles of motorized vehicle roads/trails/areas within 100 feet of riparian vegetation.

Of the action alternatives, the proposed addition of motorized trails to the NFTS under Alternative 5 would impact the most aquatic/riparian plant communities (and possibly impact sensitive watchlist species that are currently unknown). Alternatives 4 and 7 carry less risk related to the addition of motorized trails to aquatic/riparian plant communities than implementation of Alternatives 6 and 2. Alternative 1 does not propose to add any motorized trails un-authorized for motorized use to the NFTS, so while it has the least impact relative to this aspect of the alternatives; it has the greatest overall risk to sensitive and watchlist species through absence of a prohibition on cross country travel, as previously described. Alternative 3 does not propose to add any motorized trails to the NFTS and it prohibits cross country travel. Therefore Alternative 3 provides the most benefits to sensitive/watchlist species and aquatic/riparian plant communities.

Table 3.06-8. Number of Perennial and Intermittent Water Crossings by Alternative*

Perennial Stream Crossings	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Existing NFTS roads and motorized trails	670	670	670	670	670	670	670
Private and other jurisdiction roads	630	630	630	630	630	630	630
Cross country travel (motorized trails un-authorized for motorized use)	355	0	0	0	0	0	0
Additions to the NFTS	0	19	0	9	59	18	9
Total Motorized	**1655**	**1319**	**1300**	**1309**	**1359**	**1318**	**1309**
Intermittent Stream Crossings							
Existing NFTS roads and motorized trails	790	790	790	790	790	790	790
Private and other jurisdiction roads	520	520	520	520	520	520	520
Cross country travel (motorized trails un-authorized for motorized use)	373	0	0	0	0	0	0
Additions to the NFTS	0	16	0	9	68	19	10
Total Motorized	**1683**	**1326**	**1309**	**1319**	**1378**	**1329**	**1320**

*Crossings include lands under all ownerships.

Table 3.06-9. Miles* of Motorized Use on NFS Lands within 100 Feet of Riparian Vegetation by Alternative

Alternative	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Cross country travel (acres) Motorized trails un-authorized for motorized use	73,500 114	0 0	0 0	0 0	0 0	0 0	0 0
Existing NFTS roads and motorized trails	172	172	172	172	172	172	172
Private/other jurisdiction roads	59	59	59	59	59	59	59
Additions to the NFTS	0	6	0	3	19	7	3
Total Motorized	**345**	**237**	**231**	**234**	**250**	**238**	**234**

***Miles are approximate

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the Tahoe National Forest.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially affect aquatic/riparian plant communities and the sensitive/watchlist species dependent on them as well as the benefits from prohibiting use on motorized trails un-authorized for motorized use are discussed. It is assumed that 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 TNF system and privately owned lands for over a century. Historic management activities on TNF system lands 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 quantify how these past management activities have impacted them. Historically, springs, creeks, and rivers were altered by diversion of water; meadows and fens were converted to other types of habitats due to human activity that dried them out; aquatic/riparian areas were repeatedly and heavily grazed by domestic livestock; and numerous roads were built in areas that changed the hydrology of those habitats. These activities and others have cumulatively reduced the amount of aquatic/riparian plant communities within TNF watersheds that would be suitable habitat for sensitive and watchlist species dependent on them. The amount of habitat reduction is unknown.

In addition, past management has created conditions on the landscape that frequently contribute to cross country travel. For example, skid trails that were created during a fuel reduction/timber harvest project 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 the barriers blocking the skid trail and/or have gone around the barriers. Continued use of the old skid trail creates a motorized trail that has not been designed for the use, and may be located in an area that is not best suited to that use. 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: Current impacts to aquatic/riparian plant communities come from a variety of management activities including motorized vehicles. Motorized vehicle use within aquatic/riparian plant communities and their zones of influence (RCAs) negatively impacts the soil/vegetation/water in those areas. Use of existing NFTS motorized roads and trails and/or the motorized trails un-authorized for motorized use while they are wet can cause the formation of ruts/wheel tracks that can channel water altering area hydrology and causing erosion of soil. Vegetation in and adjacent to areas of use is negatively impacted when it is run over and/or covered in dust. Water quality is also negatively impacted when motorized vehicles add sediment and other pollutants to it. (Refer to section 3.02.) Motorized vehicle use within aquatic/riparian plant communities and their RCAs 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 (Road Cards) 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 that 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 that allow impacts to aquatic/riparian plant communities as livestock eat the vegetation and punch hoof holes into the soil.

Several aquatic/riparian dependent sensitive species are currently impacted by use of NFTS motorized roads/trails/areas and motorized trails un-authorized for motorized use. These impacts are discussed below:

Meesia uliginosa is a sensitive moss that is currently being impacted by cross country motorized vehicle travel in the Summit fen area. In this example, cross country travel onto the fen created bare soil by killing the vegetation where the wheel tracks occurred. The aquatic/riparian plant community at

Summit fen is also indirectly impacted by use of the NFTS motorized trail located above it. The system motorized trail is channeling water and sediment into the fen and may be changing the acidity of the water (PH) of the fen. Formal monitoring of the Summit fen has not occurred. However, 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 peat are at increased risk from drying out and being lost. Wheel tracks can also weaken or destroy the rhizomatous root network of the clonal peat forming plants. Bare ground exposes the organic soils to the atmosphere allowing their decomposition. Functioning fens/peatlands store carbon. Loss of moisture to the fen/peatland can cause the plants that make up these plant communities to die. Peat forming wetlands 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. Forest Plan direction for fen management is as follows: “During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and vehicles.”

Ivesia sericoleuca and *Ivesia aperta* var. *aperta* occurrences are located on the eastside of the forest in meadows and vernally wet areas. Cross country motorized vehicle use has impacted them in several locations. Motorized vehicles have created ruts in these occurrences of sensitive plants that act as drains and/or channels that change the hydrology within the plant community. Direct impacts to these sensitive plants from motorized vehicle use have killed and/or injured individual plants.

Reasonably foreseeable: When past and current impacts are added to the impacts of the reasonably foreseeable future actions identified in Table 3.00-1, risks to aquatic/riparian dependent sensitive/ watchlist species increase.

Some current and reasonably foreseeable management actions do not impact aquatic/riparian plant communities while others are expected to have minimal direct impacts. For example, westside fuel reduction/timber harvest/aspen improvement projects routinely establish a 100 foot buffer around aquatic/riparian plant communities (such as riparian vegetation along streams, fens, springs, and seeps) where no management activities are implemented. Many eastside fuel reduction/timber harvest/aspen improvement projects contain a 50 foot no treatment buffer. Some eastside fuel reduction/timber harvest/aspen improvement projects establish a 25 foot tractor keep out zone near aquatic/riparian communities such as fens where trees can be felled away from fens and removed. For example, Montez and Billabong are both projects with 25 foot tractor keep out zones in aspen clones that are adjacent to fens. The Montez BE finds that “Minimal direct effects to the fen are expected from harvesting conifers to release an aspen stand near the fen because mitigations would be implemented to minimize impacts…Indirect effects of harvesting trees uphill from the fen would be that more water would be available to the fen because conifer trees would no longer be transpiring water into the atmosphere above the fen. The reduction of shade to the site is expected to be minimal and somewhat temporary because trees that provide most of the shade during the summer months would be left in place…An increase in the amount of water would help keep the saturation level high and would maintain an anaerobic system for a longer period during the summer season” (Montez Project Sensitive Plant Biological Evaluation, Susi Urie, Page 8).

Projects other than fuel reduction/timber harvest/aspen improvement also impact aquatic/riparian plant communities. Some projects are designed to improve the health of specific aquatic/riparian plant communities by restoring the hydrology of areas such as the Carmen project. Others are designed to improve the reproduction of aspen clones by removing conifers - such as the Carvin and Brumby projects.

No Action: Implementation of Alternative 1 carries the highest 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 sensitive/watchlist species that grow in areas that are accessible by motorized vehicle 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 with 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 aquatic/riparian plant communities and the sensitive/watchlist plant species dependent on them is high. Cumulative impacts could be significant over the long term and include conversion of fens and other wetlands to other types of plant communities. Aquatic/riparian plant communities frequently lack the vegetative barriers to keep motorized vehicle use from accessing them and significantly impacting their hydrology.

Implementation of Alternative 1 increases the risk of disturbance within aquatic/riparian plant communities because it does not prohibit cross country travel including the use of motorized trails un-authorized for motorized. Cross country travel including use of motorized trails un-authorized for motorized use has contributed to cumulative impacts to fens and *Meesia uliginosa* on the TNF. If the cross country use continues, the sensitive moss *Meesia uliginosa* located in Summit fen could be lost. In addition fens/peatlands and other aquatic/riparian plant communities could be converted to wet meadows or other types of plant communities over the long term.

Bruchia bolanderi is a sensitive moss that occurs along Castle Creek about 50 feet upstream and about 30 feet downstream from the Castle Creek crossing area along proposed road TKN-J5. As of August 2007 it has also been reported from the Summit fen, Round Valley meadow, and Upper Lola Montez areas. The Upper Lola Montez and Castle Creek areas are being impacted indirectly by motorized vehicle use of TKN-J5. Impacts are not currently considered significant since they are indirect impacts and this moss can tolerate some disturbance. However, if disturbance from motorized vehicle use is too frequent or the use causes significant soil compaction, the moss occurrences could be lost. All occurrences 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 these moss occurrences since they are all located in areas that are fairly accessible to motorized vehicles.

Ivesia sericoleuca was discovered along TKN-M2. Cross country motorized vehicle use has killed and/or injured individuals 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. There are tens of thousands of *Ivesia sericoleuca* plants known to occur on TNF system lands at this time. *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. Over the long term, other occurrences of sensitive and watchlist species that are dependent on aquatic/riparian plant communities that are accessible by motorized vehicles traveling cross country could also be significantly reduced. For example, the sensitive plants *Ivesia aperta* var. *aperta* and *Pyrrocoma lucida*.

Aspen clones (watchlist plant communities) were found along TKN-M2, TKS-11, SV-005, SV-P8, and SV-P14. Over the long term, implementation of Alternative 1 could damage the aspen within these areas so much that the aspen clone is killed and/or weakened. Weakened aspen are more susceptible to disease and/or insect infestation. Cross country travel could damage or kill other aspen clones also. Since the health of aspen clones within the Sierra Nevada region is of concern, over the long term, impacts could be significant.

Other factors also add to the risk of negative impacts to aquatic/riparian dependent species from motorized vehicle cross country use. For example, some of the system and motorized trails un-authorized for motorized use end at aquatic/riparian plant communities such as wet meadows. This situation increases the risk of negative impacts to aquatic/riparian dependent resources such as sensitive/watchlist species especially when cross country travel is allowed, as in Alternative 1. For example, YRN-11 is a short motorized trail un-authorized for motorized use that ends at a wet meadow plant community. It does not have barriers to keep users from driving onto the meadow. Placing barriers at the end of YRN-11 (as proposed in the action alternatives - refer to Appendix A, Road Cards) would reduce the risk of cross country travel across this meadow. When motorized vehicle use occurs in wet meadows, soils are compacted, the hydrology is changed, and vegetation is killed. Restoration of aquatic/riparian plant communities is often time consuming and expensive. As mentioned above, many sensitive/watchlist species are dependent on aquatic/riparian plant communities.

Alternative 1 has the greatest number of perennial and intermittent water crossings, the most miles of motorized use within 100 feet of riparian vegetation, and allows cross country travel. Refer to Tables 3.06-8 and 3.06-9. Implementation of Alternative 1 has the greatest risk of introducing and spreading weeds into aquatic/riparian habitats.

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 and plant communities that are aquatic/riparian dependent are not at risk in the short term. The number of fens and other special aquatic features that may be converted to other plant communities due to management actions combined with such variables as climatic variation and future water demands from NFS lands are not fully understood. It is known that implementation of Alternative 1 would continue to impact these limited plant communities by altering their hydrology. Refer to the watchlist report located in Appendix N. It is believed that implementation of Alternative 1 puts these plant communities at risk of being lost over the long term.

Action Alternatives: Implementation of the action alternatives will 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 implementing the various action alternatives, there is a difference in the potential amount of impacts to aquatic/riparian plant communities and the sensitive/watchlist plant species dependent on them. However, those cumulative impacts are not considered significant due to the mitigations listed by motorized trail in Appendix A-Road Cards, which include implementing mitigations to reduce/eliminate direct impacts to sensitive/watchlist species.

Sensitive/watchlist species and/or watchlist plant communities located along proposed additions to the NFTS would be indirectly impacted by vehicle use of the motorized trail. Indirect impacts include reduced vigor through being covered in dust and increased risk of weed infestation. There are currently no mitigations available to reduce dust along motorized trails or to prevent the introduction of weeds along those motorized trails. Therefore, those action alternatives that add the most miles of motorized trail un-authorized for motorized use, and prohibit use on the least number of motorized trails un-authorized for motorized use have a greater risk of indirect impacts to sensitive/watchlist species and watchlist plant communities. These indirect impacts are not considered significant in the short or long term.

Alternative 5: Implementation of Alternative 5 cumulatively impacts aquatic/riparian plant communities and the sensitive/watchlist species dependent on them. Implementation of Alternative 5 has the greatest number of perennial and intermittent water crossings and proposes the most miles of motorized trail additions to the NFTS that are located within 100 feet of riparian vegetation of all of the action alternatives. Therefore implementation of Alternative 5 has the greatest risk of negatively impacting aquatic/riparian plant communities and the sensitive/watchlist species dependent on them.

Maintenance Level 1 and temporary roads proposed as additions to the NFTS in Alternative 5 do not have current botanical surveys. It is possible that these proposed motorized trails have occurrences of sensitive/watchlist species and weeds. Therefore, occurrences of sensitive/watchlist species may exist along these motorized trails that are being impacted by motorized vehicles.

Implementation of Alternative 5 would also impact known occurrences of sensitive species and watchlist plant communities along proposed additions to the NFTS. The significance of those impacts varies by such factors as the location of the species, the number of species in that location, and the amount of disturbance. For example, *Ivesia sericoleuca* is currently being directly and indirectly impacted along a portion of TKN-M2. Individual plants are being killed and injured. Mitigations have been developed to reduce and/or eliminate direct impacts to these *Ivesia sericoleuca* plants. Refer to Appendix A-Road Cards. However, there are no mitigations available that effectively reduce the indirect impacts of increased risk of weed introduction/spread and reduced vigor due to dust. Cheatgrass also occurs along TKN-M2 that is within 100 feet of *Ivesia sericoleuca* plants. Motorized vehicle use along this trail will continue to spread cheatgrass and/or create dust that will cover some of the *Ivesia sericoleuca* plants during part of the growing season. 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 cheatgrass or other vegetation. Over the long term, competition for soil and water due to cheatgrass 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) to sensitive/watchlist species (such as the *Ivesia sericoleuca* in this example), would reduce the significance of these impacts.

In another example, *Bruchia bolanderi* occurrences along TKN-J5 are currently being impacted indirectly by motorized vehicle use. *Bruchia bolanderi* occurrences at this location could also be lost over the long term if hydrology was significantly changed at the crossing of Castle Creek. With routine maintenance, significant changes in the hydrology of Castle Creek (caused by motorized vehicle use at the crossing) are not expected. In addition, over the long term, weeds could be introduced into the aquatic/riparian plant community containing *Bruchia bolanderi*. If aquatic/riparian weeds were to become established in the *Bruchia bolanderi* locations, the sensitive moss plants would be lost. Loss of sensitive species such as *Bruchia bolanderi* is considered a significant effect. When, where, and if aquatic weeds will become established is unknown. However, frequent field observations with rapid implementation of mitigations to reduce/eliminate impacts to sensitive/watchlist species reduce the significance of possible long term impacts.

Motorized vehicle use within watchlist plant communities provides another example of how frequent field observations with rapid implementation of mitigations to reduce/eliminate impacts can reduce the significance of those impacts over the short and long term. Implementation of Alternative 5 would continue to impact the aspen clones located along portions of TKN-M2, TKS-11, SV-005, SV-P8, and SV-P14. Motorized vehicle use within these aspen clones 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. 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 10 years), without mitigations, continued motorized vehicle use within these aspen clones could introduce disease, spread weeds so that regeneration is reduced, and increase the risk of loss of these clones.

Alternatives 2 and 6: Implementation of Alternatives 2 and 6 cumulatively impacts aquatic/riparian plant communities and the sensitive/watchlist species dependent on them. Those cumulative impacts are not considered significant in the short or long term. Since Alternatives 2 and 6 have fewer miles of motorized vehicle roads/trails/areas open for use within 100 feet of riparian vegetation and have fewer perennial and intermittent crossings than Alternatives 1 and 5, the risk of indirect impacts to aquatic/riparian plant communities is less than those discussed under implementation of Alternatives 1 and 5. Alternatives 2 and 6 also proposed fewer additions to the NFTS within 100 feet of riparian vegetation and perennial and intermittent crossings. Alternative 2 differs from Alternative 6 in that Alternative 2 proposes Reservoir access and Alternative 6 does not. Alternatives 2 and 6 reduce by about 88 percent the motorized use of perennial and intermittent crossings and about 85-86 percent of the miles of motorized use within 100 feet of riparian vegetation.

Under implementation of Alternatives 2 and 6, cross country travel by motorized vehicle users would be prohibited. Implementation of Alternatives 2 and 6 would continue indirect/cumulative impacts to special aquatic features along TKN-J5 and TKN-M2; cheatgrass would continue to be spread through motorized vehicle use of TKN-M2; and aspen would continue to be impacted through use of TKS-11, SV-P14, and TKN-M2. *Bruchia bolanderi* along TKN-J5 and *Ivesia sericoleuca* along TKN-M2 would continue to be indirectly impacted by dust and possible weed invasion. Implementation of Alternatives 2 and 6 is not expected to produce significant impacts in the short term (5 years or less) (to aquatic/riparian plant communities or the sensitive/watchlist species dependent on them) because cross country use would be prohibited. Implementation of Alternatives 2 and 6 is not expected to produce significant impacts in the long term due to the assumption of frequent field observations of resource problems with rapid mitigation implementation to reduce/eliminate those problems.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 cumulatively impacts aquatic/riparian plant communities and the sensitive/watchlist species dependent on them. Those impacts are not considered significant in the short or long term. Alternatives 4 and 7 proposed fewer additions to the National Forest Transportation System within 100 feet of riparian vegetation and propose fewer perennial and intermittent crossings than Alternatives 1, 2, 5, and 6. Alternatives 4 and 7 also allow motorized use on fewer miles within 100 feet of riparian vegetation and have less motorized perennial and intermittent crossings than Alternatives 1, 2, 5, and 6. Alternatives 4 and 7 reduce motorized use by about 90 percent of the perennial and intermittent water crossings and reduce about 88 percent of the miles of motorized use located within 100 feet of riparian vegetation.

Implementation of Alternative 4 would not continue to impact *Bruchia bolanderi* and the seep along TKN-J5; *Ivesia sericoleuca*, a spring, and aspen along TKN-M2; or aspen along TKS-11, SV-005, or SV-P8. Alternative 4 does not propose adding TKN-J5, TKN-M2, TKS-11, SV-005, or SV-P8 to the NFTS. However, aspen along SV-P14 would continue to be impacted. In addition, implementation of Alternative 4 would not spread cheatgrass along TKN-M2 through motorized vehicle use since motorized use of that motorized trail would be prohibited. Alternative 7 would continue to impact *Bruchia bolanderi* and the seep along TKN-J5. Alternative 7 would not impact *Ivesia sericoleuca*, a spring and aspen along TKN-M2, or continue to spread cheatgrass along TKN-M2. Alternative 7 would continue to impact aspen along TKS-11, SV-P8, and SV-P14. Cross country travel by motorized vehicle users would not occur as compared to Alternative 1. Alternatives 4 and 7 are not expected to produce significant impacts in the short or long term due to the assumption of frequent field observations of resource problems with rapid implementation of mitigations to reduce/eliminate those problems.

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. Since implementation of Alternative 3 does not add any new motorized trails to the NFTS and prohibits cross country travel - it is not expected to add to direct or indirect impacts to aquatic/riparian plant communities and the sensitive/watchlist species dependent on them. Implementation of Alternative 3 would not continue to impact *Bruchia bolanderi* and the seep along TKN-J5; *Ivesia sericoleuca* and aspen along TKN-M2; or aspen along TKS-11, SV-005, SV-P8, and SV-P14 since those motorized trails would have motorized use prohibited. Implementation of Alternative 3 would not spread cheatgrass along TKN-M2 through motorized vehicle use. Implementation of Alternative 3 provides the greatest benefit to aquatic/riparian plant communities and those sensitive/watchlist species dependent on them.

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*, V*eronica 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 will stay on designated roads and trails regardless of the alternative selected, and motorized vehicle use does not benefit aquatic/riparian plant communities, the alternative with the least number of miles within aquatic/riparian plant communities is the most beneficial to those plant communities and the resources dependent on them.

Serpentine and/or Copper/Heavy Metal Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres of serpentine/copper/heavy metal plant communities where cross country travel is prohibited.

No Action: Alternative 1 does not prohibit cross country travel on 13,400 acres of serpentine soils that contain 35 miles of motorized trails un-authorized for motorized use. Under implementation of Alternative 1 as yet undiscovered sensitive/watchlist species occurrences dependent on serpentine/copper/heavy metal plant communities would be at risk as new motorized trails were created. It is expected that cross country use would damage at least some sensitive/watchlist species occurrences (if they are present on TNF system lands) and it is reasonable to expect that some occurrences would be lost.

Direct and indirect impacts could be significant at least at the local, site specific level and include killing and/or injuring sensitive/watchlist species primarily through cross country travel. Cross country use would also damage other native vegetation in these plant communities increasing the risk of erosion. 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. 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. Some sensitive species have not been found on the TNF, such as *Mielichhoferia elongata* and *Monardella follettii*. If they were found on TNF system lands in/along motorized trails un-authorized for motorized use, the occurrence would be considered an important range extension of the species and disturbances could be considered significant.

TNF system lands contain about 14,412 acres of serpentine plant community. Cross country travel is currently prohibited on about 1,012 of the 14,412 acres. About 1660 acres of these plant communities are impacted by roads and motorized trails. No sensitive or watchlist species have been found in the surveys of about 62 miles of motorized trails un-authorized for motorized use. The TNF has 35 miles of motorized trails un-authorized for motorized use and 58 miles of NFTS located within these plant communities.

Action alternatives: All of the action alternatives prohibit cross country travel on 13,400 acres containing 35 miles of motorized trails un-authorized for motorized use. All of the action alternatives prohibit travel on some portions of the 35 miles of motorized trails un-authorized for motorized use. Therefore, direct/indirect impacts to sensitive/watchlist species dependent on serpentine/copper/heavy metal plant communities from cross country travel would not occur. Motorized trails un-authorized for motorized use are considered an expression of cross country travel.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of proposed additions to the NFTS that pass through serpentine (ultra mafic) soils.
- Miles of proposed additions to the NFTS that are located within 100 feet of sensitive/watchlist plants and/or weed occurrences.

Areas of copper/heavy metal soils are usually small and not identified as distinct soil mapping units. Therefore, the miles of unsurveyed proposed motorized trail in copper and heavy metal areas are not known. Areas of copper/heavy metal are identified during on the ground surveys. For this analysis, the sensitive/watchlist species with potential habitat in copper/heavy metal areas are represented by miles within serpentine plant communities.

No Action: Alternative 1 does not add motorized trails to the NFTS. Refer to Table 3.06-10 which shows the miles of motorized trail within these plant communities by alternative. Implementation of Alternative 1 could also directly and indirectly impact sensitive and/or watchlist species through use of about 58 miles of NFTS located within these plant communities. Unknown occurrences of serpentine dependent sensitive and watchlist plants may occur along NFTS roads and trails. Impacts along NFTS roads and trails could be direct – especially within the 30 foot band along either side of the motorized road or trail, and indirect – primarily from dust and increased risk of weed introduction and spread. Direct and indirect impacts could be significant dependent on the species of plant.

Surveys of about 62 miles of motorized trails un-authorized for motorized use have been completed to date. As noted above, no serpentine dependent sensitive or watchlist species were found in those surveys. In addition, no weed occurrences were found within 100 feet of serpentine/copper/heavy metal plant community during those surveys.

Table 3.06-10. Miles* of Motorized Use within Serpentine Plant Communities by Alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	48	48	48	48	48	48	48
Private/other jurisdiction roads	12	12	12	12	12	12	12
Cross country travel (acres) Motorized trails un-authorized for motorized use (miles)	13,400 35	0 0	0 0	0 0	0 0	0 0	0 0
Additions to the NFTS	0	4	0	2	4	3	3
Total Motorized	**94**	**64**	**59**	**62**	**64**	**63**	**63**

*Miles are approximate

Action Alternatives: Alternatives 2 and 5 propose the most additions to the NFTS in these plant communities - 4 miles. Therefore, implementation of Alternatives 2 and 5 have the greatest risk of negative impacts to sensitive/watchlist species dependent on serpentine/copper/heavy metal plant communities of the action alternatives. However, all Alternative 2 motorized trails will be surveyed in FY 2008 and any sensitive/watchlist occurrences discovered will have mitigations implemented to reduce/eliminate direct impacts to them. Surveys of the Maintenance Level 1 and temporary roads proposed as additions to the NFTS as motorized trails under Alternative 5 do not have current surveys. Serpentine dependent sensitive/watchlist species could occur along these roads that would go undetected. Therefore, the risk of impacts to sensitive/watchlist species is less in Alternative 2 than in Alternative 5. Sensitive/watchlist plant occurrences found in the FY 2008 surveys will be protected from the direct impacts of motorized vehicles, but not indirect impacts. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur.

Alternatives 6 and 7 both propose the addition of about 3 miles of motorized trails to the NFTS within these plant communities and do not propose the Management Level 1 and temporary roads without current surveys that are proposed in Alternative 5. Alternative 4 proposes the addition of 2 miles of motorized trail in these plant communities. Alternative 3 does not propose the addition of any motorized trail within serpentine plant communities and therefore provides the greatest benefit to native serpentine vegetation including sensitive and watchlist species.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the Tahoe National Forest.

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 motorized trails un-authorized for 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 annual weed detection surveys with rapid treatment of weeds. This motorized trail 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 OHVs. *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. This method is most effective when vegetation is available to also help block access. This analysis assumes that users will stay on NFTS roads and motorized trails.

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. Livestock do not usually spend much time in serpentine/copper/heavy metal plant communities due to the lack of forage and canopy to provide shade.

Reasonably foreseeable: Serpentine plant communities are cumulatively impacted when past impacts and the impacts of implementing the alternatives are added to the impacts of those actions identified in Table 3.00-1.

Generally, fuel reduction/timber harvest activities are not implemented on serpentine/copper/heavy metal soils due to the lack of vegetation in those plant communities. However, disturbance adjacent to these plant communities could change the hydrology of the serpentine/copper/heavy metal plant communities (in the short term), cause increased erosion and introduce weeds. These impacts could be locally significant and may be regionally significant over the long term since serpentine/copper/heavy metal plant communities are limited in distribution and are known to have a high number of endemic plants. None of the fuel reduction/timber harvest projects displayed in Table 3.00-1 are known to be located immediately adjacent to serpentine/copper/heavy metal plant communities.

Projects designed to improve the health of specific aquatic/riparian plant communities by restoring the hydrology of areas such as the Carmen project and others designed to improve the reproduction of aspen clones by removing conifers - such as the Carvin and Brumby projects do not significantly impact serpentine/copper/heavy metals plant communities.

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. Alternative 1 has the most miles of motorized vehicle use within serpentine/copper/heavy metal plant communities (94 miles) and does not prohibit cross country travel. Since these plant communities are frequently open terrain (Kruckeberg 1984) and lack vegetation to prevent cross country travel by motorized vehicles, the risk of resource damage from cross country travel is high.

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 unless entire occurrences are negatively impacted. Since vegetative cover on serpentine plant communities is generally sparse, cross country travel could negatively impact entire occurrences if they exist in the unsurveyed potential habitat. Refer to Appendix J (Biological Evaluation for Sensitive Plants and Fungi) and Appendix N (Watchlist Plant and Plant Community Report) 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: All action alternatives would reduce the number of motorized trails un-authorized for motorized use in serpentine/copper/heavy metal plant communities. However, implementation of the action alternatives could cumulatively impact sensitive/watchlist species dependent on serpentine/copper/heavy metal plant communities. Surveys to date have not detected any sensitive/watchlist species along proposed additions to the NFTS that are serpentine/copper/heavy metal plant community dependent. However, some of the unsurveyed motorized trails pass through serpentine soils that have not yet been surveyed (YRN-7 and YRN-M2).

None of the reasonably foreseeable actions listed in Table 3.00-1 are expected to significantly impact serpentine/copper/heavy metal plant communities because the reasonably foreseeable projects listed are not located within or immediately adjacent to serpentine plant communities. Refer to the discussion of impacts to serpentine plant communities under the no action alternative. The action alternatives propose 8 motorized trails that pass through serpentine soils. Two of the 8 are NFTS Maintenance Level 1 roads or temporary roads proposed under Alternative 5 only. The other motorized trails 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 additions to the NFTS in these plant communities. Therefore, implementation of Alternatives 2 and 5 have the greatest risk of cumulatively impacting sensitive species dependent on serpentine/copper/heavy metal plant communities of the action alternatives. The risk of cumulative impacts is higher in Alternative 5 than in Alternative 2 because the NFTS Maintenance Level 1 roads and temporary roads proposed as additions to the NFTS as motorize trails 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 will have mitigations implemented to reduce and/or eliminate impacts from motorized vehicles when they are discovered. Occurrences could go undetected under implementation of Alternative 5 along the proposed roads that do not have recent botanical surveys.

Alternatives 6 and 7: Cumulative impacts from implementation of Alternatives 6 and 7 are not considered significant. Alternatives 6 and 7 both propose the addition of about 3 miles of motorized trail within these plant communities and do not propose adding NFTS Maintenance Level 1 or temporary roads to the NFTS. Alternative 6 and 7 prohibit use of 32 miles of motorized trails un-authorized for motorized use within these plant communities. Sensitive/watchlist plant occurrences would be indirectly impacted, but would have mitigations implemented to reduce/eliminate direct impacts to them under implementation of Alternatives 6 and 7 (should they occur in the unsurveyed habitat). Therefore, implementation of Alternatives 6 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 6 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 4: Cumulative impacts from implementation of Alternatives 3 and 4 are not considered significant. Alternative 4 proposes the addition of 2 miles of motorized trail and prohibits cross country travel in these plant communities. Alternative 4 proposes ARM-3r. Alternative 3 does not propose the addition of any motorized trails to the NFTS and would prohibit use on all 35 miles of motorized trails un-authorized for motorized use located within serpentine/copper/heavy metal plant communities. Therefore, implementation of Alternatives 3 and 4 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 Alternative 3 may also impact *Allium sanbornii* var. *congdonii*, *Allium sanbornii* var. *sanbornii, Chlorogalum grandiflorum* and *Perideridia bacigalupi* if they occur along NFTS roads and trails but those impacts are not considered significant in the short or long term unless entire occurrences are eliminated.

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 of older forest plant communities where cross country travel is prohibited.

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 330,200 acres which includes 627 miles of motorized trails un-authorized for motorized use. Under implementation of Alternative 1 as yet undiscovered sensitive species occurrences dependent on older forest plant communities would be at risk as new motorized trails 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 353,631 acres of older forest on TNF system lands, of which 29,900 acres or about 9 percent are currently, impacted by motorized vehicle use. This acreage number was obtained using about 100 feet on either side of motorized trails that pass through vegetation mapped as CWHR 4 and above on NFS lands. The significance of 9 percent disturbance is unknown.

Direct 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 and/or injure these older forest dependent sensitive species directly, and indirectly kill or injure them through soil changes and the introduction and 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 impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of sensitive species that occur in a specific location and how many of them are damaged.

Cypripedium fasciculatum is an older forest dependent species on the TNF. Several occurrences of *Cypripedium fasciculatum* are currently impacted by maintenance of system roads. In addition, NFTS roads 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 vehicle could eventually 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. Implementation of Alternative 1 could significantly impact occurrences of *Cypripedium fasciculatum* over the long term.

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 does not prohibit 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 not prohibited. Not prohibiting cross country travel on 330,200 acres including 627 miles of motorized trails un-authorized for motorized use greatly increases the risk of negative indirect impacts to sensitive species.

Action Alternatives: All of the action alternatives prohibit cross country travel 330,200 acres including 627 miles of motorized trails un-authorized for motorized use. (All of the action alternatives prohibit use of some portion of the 627 miles of motorized trail un-authorized for motorized use.) Therefore, direct/indirect impacts to sensitive species dependent on older forest plant communities from cross country travel would not occur. Refer to Table 3.06-11.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails un-authorized for motorized use proposed to be added to the NFTS system within older forest plant communities. The miles of proposed additions of motorized trails to the NFTS that pass through older forests (CWHR 4 and above) is the indicator used to analyze impacts to unsurveyed older forest habitats. Table 3.06-11 displays the number of miles of motorized trails to be added to the NFTS in older forest plant communities by alternative.
- Sensitive species (associated with older forests) located within 100 feet of proposed motorized trail additions to the NFTS. Surveys to date have shown that *Cypripedium fasciculatum* is located within 30 feet of several NFTS roads.
- Weed occurrences located within 100 feet of proposed motorized trail additions to the NFTS. Surveys to date have identified Himalayan blackberry along a NFTS road that is within about 200 feet of an occurrence of *Cypripedium fasciculatum*.

Table 3.06-11. Miles* of Motorized Use within Older Forest Plant Communities by Alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	1,088	1,088	1,088	1,088	1,088	1,088	1,088
Private/other jurisdiction roads	220	220	220	220	220	220	220
Cross country travel (acres)	330,200	0	0	0	0	0	0
Motorized trails un-authorized for motorized use (miles)	627	0	0	0	0	0	0
Additions to the NFTS	0	36	0	17	141	33	22
Subtotal Motorized	**1934**	**1344**	**1308**	**1325**	**1449**	**1341**	**1330**

*Miles are approximate

No Action: Alternative 1 does not add motorized trails to the NFTS. Refer to Table 3.06-12 which shows the miles of motorized trail within these plant communities by alternative. Implementation of Alternative 1 could also directly impact sensitive species through use of about 1088 miles of existing NFTS roads and trail located within these plant communities. Direct and indirect impacts could be significant.

Surveys of about 62 miles of motorized trails un-authorized for motorized use have been completed to date. Sensitive species dependent on older forests were not found in those surveys. No new weed occurrences were found in older forest plant communities in these surveys.

Action Alternatives: Implementation of Alternative 5 proposes the most miles of additions to the NFTS in these plant communities – 141 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. These are primarily indirect impacts from dust and increased weed introduction and spread. Since Alternative 5 proposes adding existing NFTS Maintenance Level 1 and temporary roads which do not have current botanical surveys, there is a risk that older forest dependent species will be directly impacted along those routes. Sensitive plant occurrences found in the FY 2008 surveys will be protected (impacts will be reduced and/or eliminated) from the direct impacts of motorized vehicles. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur. However, if these plants occur within 30 or 100 feet of the motorized trails without current botanical surveys that are proposed in Alternative 5 (refer to the alternative description in Chapter 2 for a listing) they will remain undetected and will continue to be directly and indirectly impacted.

Alternative 2 proposes to add 36 miles of motorized trails to the NFTS in older forest plant communities. Alternative 6 would add 33 miles, Alternative 7 – 33 miles, and Alternative 4 – 17 miles. All sensitive plant occurrences found in the FY 2008 surveys (as mentioned earlier none were found in the FY 2007 surveys) will have actions implemented to reduce and/or eliminate direct impacts from motorized vehicles. If occurrences are found on or along motorized trails proposed in Alternatives 2, 4, 6, or 7; they will be indirectly impacted through dust and increased risk of weed introduction and spread. Refer to the Weed Risk Assessment located in Appendix M of the DEIS for more information about weed introduction and spread.

Alternative 3 does not propose the addition of any motorized trails to the NFTS within older forest plant communities. Implementation of Alternative 3 would not directly or indirectly impact sensitive species.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the Tahoe National Forest.

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 closing motorized trails un-authorized for motorized use 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 motorized trail 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 older forest plant communities in the Sierra Nevada have been directly removed or have had their functions impaired. 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 (and animal) 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. In addition, the underground mycelial network has been broken through the creation of openings such as clearcuts and roads. 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*. The amount of reduction is unknown. Motorized vehicle use has added to the cumulative impacts to older forest plant communities.

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 353,600 acres of older forest on TNF system lands, of which 29,900 acres or about 9 percent are currently, impacted by motorized vehicle use. This acreage number was obtained using about 100 feet on either side of motorized vehicle roads and trails 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 Appendix L of the DEIS for a discussion of cumulative effects to older forest dependent animal species. Effects (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 6 known *Cypripedium fasciculatum* occurrences within the TNF boundary. One of the 6 known occurrences on TNF system lands, one occurrence contains only 3 plants (Lafayette Ridge occurrence). Of the remaining 5 known occurrences on TNF system lands, 4 are being indirectly impacted by dust and have an increased risk of weed infestation due to motorized vehicle use of the existing NFTS roads and trails. *Cypripedium fasciculatum* occurrences are known to be located along 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.)

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 known occurrences of *Cypripedium fasciculatum*.

Reasonably foreseeable: Over the long term, with continued disturbance, older forest plant communities will continue to be fragmented through implementation of current and reasonably foreseeable management actions. In general terms, motorized vehicle use of NFTS motorized roads and trails create linear disturbances. As mentioned previously, there are 1,088 miles of NFTS roads and trails on TNF lands. The impacts of linear disturbances within older forest plant communities are not fully studied. The fuel reduction/timber harvest activities identified in Table 3.00-1 impact older forests but must retain some older forest characteristics due to SNFPA direction for maintenance of specific canopies and retention of larger trees. Reasonably foreseeable project other than fuel reduction/timber harvest have little impact older forest plant communities.

No action: Implementation of Alternative 1 cumulatively impacts older forest plant communities. When past impacts and the impacts of implementing Alternative 1 are added to the impacts of those actions identified in Table 3.00-1, those impacts could be significant. Alternative 1 does not prohibit cross country travel on 330,200 acres including 627 miles of motorized trails un-authorized for motorized located in 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.

When the impacts of all past, current and reasonably foreseeable management actions are added together, the possible impacts of cross country travel including use of motorized trails un-authorized use and NFTS roads and trails within older forests has the potential to significantly impact older forests and the sensitive species dependent on them over the long term (5 years plus). The majority of the known older forest dependent *Cypripedium fasciculatum* plants are currently being indirectly impacted by dust from use of NFTS roads and trails – estimated at about 90 percent. The significance of this indirect impact (dust) is unknown. In addition, one of the known occurrences of *Cypripedium fasciculatum* is currently at risk of Himalayan blackberry infestation (blackberries within 100 feet of individual plants). One of the biggest impacts of disturbance of any kind is the introduction and spread of weeds. Refer to Appendix M (Weed Risk Assessment) of the DEIS for more discussion of how weeds are introduced and spread within older forest plant communities.

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: All action alternatives would reduce the number of miles 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. Surveys to date (about 62 miles) have not detected any sensitive species along proposed additions to the NFTS that s that are older forest plant community dependent. However, past management activities have cumulatively reduced the amount of older forest plant communities within TNF watersheds and use of the NFTS adds to those cumulative impacts. The significance of the addition of impacts to older forest plant communities from use of the NFTS to cumulative effects is unknown and is not being analyzed in this document other than the acknowledgement that use of the NFTS contributes to cumulative effects. Some of the unsurveyed motorized trails un-authorized for motorized use pass through older forest plant communities and may have sensitive species present. This is unknown until the surveys are complete. None of the reasonably foreseeable actions listed in Table 3.00-1 are expected to significantly impact older forest plant communities on their own because the reasonably foreseeable projects listed are not located within older forest plant communities and/or will retain the largest trees, large down wood, and will not significantly reduce canopy closure.

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's, 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. Implementation of Alternative 5 has the greatest number of miles of proposed additions to the NFTS located within older forest plant communities of all of the action alternatives. Management Level 1 and temporary roads proposed in Alternative 5 do not have current botanical surveys and may have occurrences of sensitive species and weeds. Occurrences of sensitive/watchlist species along these roads may be experiencing negative impacts from motorized vehicle use. 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 the sensitive species and the amount of impact.

Alternatives 2 and 6: Implementation of Alternatives 2 and 6 could cumulatively impact *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa,* and/or *Phaeocollybia olivacea* 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 because all motorized trails proposed in these alternatives will be surveyed and impacts to sensitive species will be mitigated. The risk of negative impacts due to implementation of Alternatives 2 and 6 is less than under implementation of Alternative 1 due to the prohibition of cross country travel. As described above, Alternative 2 proposes the addition of 36 miles of motorized trails to the NFTS and Alternative 6 proposes 33 miles. Both alternatives prohibit use on about 94-95 percent of the motorized trails un-authorized for motorized use located within older forest plant communities.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 could cumulatively impact *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa,* and/or *Phaeocollybia olivacea* 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 because all motorized trails proposed in these alternatives will be surveyed and impacts to sensitive species will be mitigated. The risk of negative impacts due to implementation of Alternatives 4 and 7 is less than under implementation of Alternative 1 due to the prohibition of cross country travel. As described above, Alternative 4 proposes the addition of 17 miles of motorized trails un-authorized for motorized use to the NFTS and Alternative 7 proposes 22 miles. Both alternatives prohibit use on about 96-97 percent of the motorized trails un-authorized for motorized use located within older forest plant communities.

Alternative 3: Implementation of Alternative 3 could cumulatively impact *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa,* and/or *Phaeocollybia olivacea* primarily through dust and increased risk of weed introduction created by use of system routes. However, implementation of Alternative 3 has the least number of miles of motorized vehicle trail available for 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 prohibits cross country travel.

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 over the long term primarily because all occurrences would have direct impacts from motorized vehicle use would be reduced and/or eliminated.

Oak Woodland Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres of oak woodland where cross country travel is prohibited.

No Action: Implementation of Alternative 1 would 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 on 13,500 acres of oak woodland plant communities containing 19 miles motorized trails un-authorized for motor use. Under implementation of Alternative 1 as yet undiscovered sensitive/watchlist species occurrences would be at risk as new motorized trails were created. It is expected that cross country use would damage at least some sensitive/watchlist species occurrences (if they are present on TNF system 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 22 miles of NFTS Motorized roads and trails plus 19 miles of motorized trails un-authorized for motorized use located within them. There are about 386 acres of oak woodland that currently prohibit cross country travel.

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 directly and indirectly kill or injure them through soil changes and the introduction and spread of weeds. Cross country use would also damage other native vegetation in these plant communities by increasing the risk of erosion. The significance of direct 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 plants that occur in a specific location and how many of them are damaged. 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.

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 unsurveyed potential habitats 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 is allowed. Allowing unrestricted motorized vehicle use across the forest greatly increases the risk of negative indirect impacts to sensitive/watchlist species.

Action alternatives: All of the action alternatives prohibit cross country travel. Therefore, direct impacts to sensitive/watchlist species within oak woodland plant communities from cross country travel would not occur. Refer to Table 3.06-12. Alternative 5 prohibits use on 17 of the 19 miles (90 percent) of motorized trails un-authorized for motorized use located within oak woodland plant communities. All of the other action alternatives (including Alternative 3) prohibit use on all of the 19 miles of motorized trails un-authorized for motorized use in oak woodlands.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails proposed to be added to the NFTS system within oak woodland plant communities.
- Miles of motorized trail proposed for addition to the NFTS with sensitive/watchlist and/or weed occurrences located within 30 or 100 feet.

No Action: Alternative 1 does not propose the addition of motorized trails to the NFTS. Surveys of about 62 miles of motorized trail un-authorized for motorized use have been completed to date. No sensitive/watchlist species or new weed occurrences were found in oak woodlands during those surveys.

Table 3.06-12. Miles* of Motorized Use within Oak Woodland Plant Communities by Alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	22	22	22	22	22	22	22
Private/other jurisdiction roads	19	19	19	19	19	19	19
Cross country travel (acres)	13,500	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	19	0	0	0	0	0	0
Additions to NFTS	0	0	0	0	2	0	0
Subtotal Motorized	**60**	**41**	**41**	**41**	**43**	**41**	**41**

*****Miles are approximate

Action Alternatives: All action alternatives would reduce the number of miles of motorized vehicles use in oak woodland plant communities. Refer to Table 3.06-12 which shows the miles of proposed additions to the NFTS within these plant communities by alternative. None of the action alternatives add significant numbers of miles of motorized trails un-authorized for motorized use to the NFTS. Alternative 5 proposes two miles of additions to the NFTS in these plant communities. Therefore, of the action alternatives, implementation of Alternative 5 has the greatest risk of negative indirect impacts to sensitive/watchlist species that may occur within oak woodland plant communities. Possible impacts would be primarily indirect impacts from dust and increased weed introduction and spread. In addition, many of the NFTS Maintenance Level 1 and temporary roads proposed under Alternative 5 do not have current botanical surveys and there is a risk that sensitive/watchlist species could be impacted if they occur along them. Alternatives 2, 4, 6, and 7 all add less than one mile of motorized trail to the NFTS (the numbers in Table 3.06-12 are rounded). This is less than one percent of the motorized trails un-authorized for motorized use located within oak woodlands. Alternative 3 does not propose the addition of any motorized trails to the NFTS within oak woodlands and would not directly impact sensitive/watchlist species through motorized vehicle use of those routes.

Sensitive/watchlist plant occurrences found in the FY 2008 surveys will be protected (impacts will be reduced and/or eliminated) from the direct impacts of motorized vehicles. 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 motorized trails without current surveys proposed in Alternative 5 they will remain undetected and will continue to be directly and indirectly impacted.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact oak woodland plant communities and the sensitive species that may occur within them, as well as the benefits from closing motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by implementing frequent evaluation of routes, mitigations implemented to reduce impacts to sensitive/watchlist species, and detection/treatment of weeds. This motorized trail evaluation combined with rapid mitigation of resource damage avoids significant impacts to oak woodlands plant communities and sensitive/watchlist species in the short and long term.

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 3.06-13 for the number of miles of proposed additions to the NFTS by alternative. Other on going 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 plants or fungi and/or any watchlist plants 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 Table 3.00-1, risks to oak woodlands increase. Some of the oak woodland plant communities managed by the TNF are located in steep inner gorges. The TNF has some oak tree species that occur within mixed conifer plant communities - but mixed conifer plant communities are not considered oak woodlands. Even though mixed conifer plant communities are not oak woodlands, the oaks that occur within them are considered valuable resources. Therefore, some of the fuel reduction/timber harvest activities identified in Table 3.00-1 retain some oaks within mixed conifer plant communities and remove conifers allowing oaks to receive more light and nutrients – for example the Canyon Forest Health project. However, very few fuel reduction activities and no timber harvest activities occur in oak woodlands on the TNF. The biggest impact of disturbance of any kind within oak woodlands is the 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. There are no known occurrences of sensitive/watchlist species located within oak woodlands on TNF system lands. However, there is a high risk of weed infestation in these lower elevations. Cross country travel would spread weeds. Refer to Appendix M or the DEIS for the effects of weed infestation. In summary, weeds can displace sensitive/watchlist species if the weeds become established and spread within occurrences. 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 use of motorized trails unauthorized for motorized use within oak woodlands has the potential to significantly impact sensitive/watchlist species over the long term (5 years plus). Any sensitive/watchlist species discovered within oak woodlands in the FY 2008 surveys would have mitigations implemented to reduce and/or eliminate direct impacts. However, indirect impacts from dust and increased risk of weed introduction and/or spread would occur.

Action Alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles of motorized trail in oak woodlands. However, implementation of the action alternatives could cumulatively impact sensitive/watchlist species located within oak woodlands even though surveys to date (about 62 miles) have not detected any sensitive/watchlist species in them. Past management activities have cumulatively reduced the amount of oak woodland within TNF watersheds. Motorized vehicle use adds to the cumulative impacts to oak woodland plant communities, but the significance of those impacts is unknown.

Alternative 5: Compared to Alternative 1, implementation of Alternative 5 has less risk of negative impacts to sensitive plants/fungi and/or watchlist species within oak woodlands primarily because it prohibits cross country travel. Of the action alternatives, implementation of Alternative 5 carries the highest risk of negative impacts to oak woodland plant communities since it has the largest number of proposed additions to the NFTS. Alternative 5 proposes the addition of 7 motorized trails that do not have current botanical surveys for a total addition of 2 miles. However, compared to Alternative 1, Alternative 5 reduces cumulative impacts to oak woodland plant communities by prohibiting motorized use on about 90 percent of the motorized trails un-authorized for motorized use in these plant communities.

Alternatives 2, 3, 4, 6, and 7: These action alternatives propose the addition of less than mile of motorized trail to the NFTS within oak woodlands. These alternatives also prohibit motorized use on close to 100 percent of the motorized trails un-authorized for motorized use. Adding less than 1 mile of motorized trail to the NFTS is not considered a significant addition to cumulative impacts to oak woodlands or the sensitive/watchlist species that may be growing there. The less than one mile of motorized trail proposed for addition to the NFTS will be surveyed in FY 2008 and if sensitive/watchlist species are found, they will have mitigations implemented to reduce or eliminate direct impacts. Indirect impacts could still occur from dust and increased risk of weed introduction and spread.

Forest edges and openings

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres of forest edge and opening plant communities where cross country travel is prohibited. (Note: there is overlap between these plant communities and aquatic/riparian, serpentine, older forest, and oak woodland plant communities. Therefore the acres and number of miles of motorized trails un-authorized for motorized use present in forest edge and openings plant communities contains some of the acres and miles shown in other plant communities and the totals from all plant communities do not add up to 1,400 miles.)

No Action: Implementation of Alternative 1 would 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 on 498,700 acres with 925 miles of motorized trails un-authorized for motorized use. Under implementation of Alternative 1 known and as yet undiscovered sensitive/watchlist species occurrences would be at risk as new motorized trails were created. It is expected that 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.

The TNF has about 543,300 acres of forest edges and openings. Forest edge and opening plant communities currently contain about 1,708 miles of NFTS motorized roads and trails, and 925 miles of motorized trails un-authorized for motorized use. Cross country travel is currently prohibited on 44,600 acres.

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 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. 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*, *Lupinus dalesiae*, and *Phacelia stebbinsii* are known to be impacted by use of NFTS motorized trails. Occurrences of *Lilium humboldtii* ssp. *humboldtii* are also known to be impacted by use of NFTS roads and trails.

Cross country impacts within forest edges and 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 does not prohibit 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. Not prohibiting cross country travel greatly increases the risk of negative impacts to sensitive/watchlist species.

Action Alternatives: All of the action alternatives prohibit cross country use on 498,700 acres of forested edges and openings. (All of the action alternatives prohibit use of some portion of the 925 miles of motorized trails un-authorized for motorized use located in these plant communities.) Therefore, direct/indirect impacts to sensitive/watchlist species within forest edges and openings from cross country travel would not occur. Refer to Table 3.06-13.

Table 3.06-13. Miles of Motorized Use within Forested Plant Communities* by Alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	1,708	1,708	1,708	1,708	1,708	1,708	1,708
Private/other jurisdiction roads	289	289	289	289	289	289	289
Cross country travel (acres)	498,700	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	925	0	0	0	0	0	0
Additions to the NFTS	0	43	0	16	191	45	26
Subtotal Motorized	**2922**	**2040**	**1997**	**2013**	**2188**	**2042**	**2023**

*Forested plant communities are those that are not considered older forest, oak woodland, aquatic/riparian, high elevation opening/rocky area, and serpentine. Miles represent motorized trails that pass within 100 feet of forested plant communities. Miles are approximate and NFS lands only.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails to be added to the NFTS within forest edges and openings.
- Miles of motorized trails proposed to be added to the NFTS that have sensitive/watchlist species or weed occurrences within 100 feet.

No Action: Alternative 1 does not add motorized trails to the NFTS.

Action Alternatives: Table 3.06-13 shows the miles of motorized trails proposed to be added to the NFTS within these plant communities by alternative. Alternative 5 adds 191 miles of motorized trails to the NFTS or about 21 percent of the motorized trails un-authorized for motorized use in forest edges and openings. Alternatives 2 and 6 add 43 and 45 respectively or about 5 percent. Alternatives 4 and 7 add 16 and 26 miles respectively- about 2 and 3 percent of the motorized trails un-authorized for motorized use. Alternative 3 does not propose the addition of any motorized trails within forest edges and openings and would not directly or indirectly impact sensitive/watchlist species through motorized vehicle use of motorized trails un-authorized for motorized use.

Sensitive/watchlist plant occurrences found in the FY 2008 surveys will 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 NFTS Maintenance Level 1 and temporary roads in Alternative 5 (refer to the alternative description section of this document for a listing) they will remain undetected and will continue to be directly and indirectly impacted. The significance of impacts to sensitive/watchlist species varies by such factors as the type of species, amount of disturbance, and location.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact forest edges and openings and the sensitive/watchlist species that may occur within them, as well as the benefits from closing motorized trails un-authorized for motorized use 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/watchlist species, and rapid detection/treatment of weeds. This motorized trail evaluation combined with rapid mitigation of resource damage avoids significant impacts to forest edges and openings and sensitive/watchlist species in the short and long term.

Past: Plants that are dependent on openings and edges within forested plant communities are not considered habitat specific and the 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 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, past management has created conditions on the landscape that frequently contribute to cross country travel through the creation of skid trails and temporary roads. For example, temporary roads that were created during timber harvest projects are generally blocked off where they connect to system roads and trails once the project has been implemented. The temporary road may not be decommissioned because future silvicultural projects are planned. In a number of areas motorized vehicle users have removed the barriers blocking the temporary road and/or have gone around the barriers. Continued use of the temporary road creates a motorized trail that has not been designed for motorized use over the long term. Past management activities have cumulatively added to the amount of forest edge and 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. Forest edge and opening habitats along roads/trails/areas have frequently become invaded by weeds. Most of the known weed occurrences on the TNF are associated with roads, trails, and landings. Motorized vehicle use 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 Appendices J (Sensitive Plant BE) and M (Weed Risk Assessment). Known impacts to specific sensitive/watchlist plants from current motorized vehicle use are discussed below.

The TNF has limited numbers of *Lewisia kelloggii* var. *hutchisonii* and limited amounts of suitable habitat. Several occurrences are currently being directly and indirectly impacted by cross country motorized vehicle use and use of system routes. 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, continued and increased cross country motorized vehicle use within these occurrences will 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.

Most of the known occurrences of *Clarkia biloba* ssp. *Brandegeae* on the TNF are growing next to roads. Occurrences are currently being run-over by cross country motorized vehicles. 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.

Lilium humboldtii ssp. *humboldtii* is currently being impacted primarily indirectly from use of lower elevation system routes. Impacts to known occurrences include introduction and spread of weeds. Since this is a spring flowering bulb species, impacts from dust are not considered significant.

Lupinus dalesiae occurrences are being directly and indirectly impacted by maintenance of system roads in several locations. *Phacelia stebbinsii* plants are being directly and indirectly impacted by motorized vehicle use on system and user created motorized trails in the Pierce OHV area. Use of system and motorized trails un-authorized for motorized use creates dust and increases the risk of weed introduction and spread.

Reasonably foreseeable: Forest edge and opening habitats are cumulatively impacted when past and current impacts are added to the reasonably foreseeable future actions identified in Table 3.00-1. The lower elevation forest edge and opening habitats located along system roads/trails/areas have frequently received weed seed from motorized vehicle use. All of the projects identified on Table 3.00-1 will disturb existing forest edge and openings and/or create new ones. All of the ground disturbing projects identified in Table 3.00-1 will or have already received botanical surveys to identify presence or absence of sensitive/watchlist species. Where sensitive/watchlist species are or where found, mitigations are implemented to reduce and/or eliminate impacts to them.

No action: Implementation of Alternative 1 allows cross country use on 498,700 acres containing 925 miles of motorized trails un-authorized for motorized use within NFS forest edge/opening habitats and carries the greatest risk of negative impacts to those habitats. Cross country use could directly and 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 increase risks to 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 prohibition of cross country travel 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.

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.

Action Alternatives: Surveys of about 62 miles of proposed motorized vehicle roads/trails/areas thus far have not identified any new occurrences of sensitive/watchlist species growing in forest edge and opening plant communities. If any sensitive/watchlist species occurrences are found in the FY 2008 surveys, direct impacts to them (from motorized vehicle use) will be reduced or eliminated. However, indirect impacts from dust and increased risk of weed introduction and spread could still occur. Refer to the discussion of impacts to forest edge and opening plant communities under the no action alternative. Since these types of plant communities have a high likelihood of having been disturbed in the more recent past, there is a high risk of weeds being present. Many of the proposed additions to the NFTS that pass through these plant communities pass through plantations of various ages. The list of proposed additions to the NFTS that pass through forest edges and openings is located within the project file since it is a long list (9 pages long). However, Table 3.06-13 displays the number of miles of motorized trails un-authorized for motorized use within forested plant communities by alternative.

Alternative 5: Of the action alternatives, implementation of Alternative 5 has the highest risk of indirect and cumulative impacts to forest edge/opening dependent sensitive/watchlist species since it has the greatest number of motorized roads/trails/areas open for use. However, implementation of Alternative 5 has less risk of indirect/cumulative impacts to sensitive/watchlist species dependent on forest edges/openings than Alternative 1 because it does not allow cross country travel. Impacts are not considered significant over the short term (5 years or less). Over the long term, the risk of weeds being introduced and spread along the 191 miles of proposed motorized trail additions to the NFTS and 1,708 miles of NFTS roads and trails is high. However, it is assumed that routine evaluation of motorized trails will occur by personnel who can identify weed species while the infestation is small in size and easily treated.

Alternatives 2 and 6: Implementation of Alternatives 2 and 6 could indirectly cumulatively impact sensitive/watchlist species dependent on forest edge and opening habitats but those impacts are not considered significant. Alternatives 2 and 6 prohibit use on about 95 percent of the motorized trails un-authorized for motorized use in forest edge and opening plant communities and do not allow cross country travel by motorized vehicles. If sensitive/watchlist species occurrences are found along motorized trails that have not been surveyed, mitigations will be developed to reduce and/or eliminate impacts to them.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 could indirectly and cumulatively impacts forest edge and opening plant communities but those cumulative impacts are not considered significant. Alternatives 4 and 7 have fewer miles of motorized vehicle roads/trails/areas open for use than Alternatives 1, 2, 5, and 6. Alternatives 4 and 7 add 16 and 26 miles of motorized trails un-authorized for motorized use or about 2 and 3 percent of the motorized trails un-authorized for motorized use to the National Forest Transportation System within forest edge and opening plant communities. Alternatives 4 and 7 also have a lower risk of introduction and spread of weeds than Alternatives 1, 2, 5, and 6.

Alternative 3: Implementation of Alternative 3 adds to the indirect and cumulative impacts of forest edge and opening plant communities and the sensitive/watchlist species dependent on them, but those impacts are not considered significant. Alternative 3 does not add any roads/trails/areas to the NFTS. Implementation of Alternative 3 does not allow cross country use. Implementation of Alternative 3 would prohibit use on all 925 miles of motorized trails un-authorized for motorized use but motorized vehicle use would continue on 1,708 miles of NFTS roads and motorized trails. This alternative has the lowest risk of weed introduction and spread which is a benefit for all sensitive/watchlist species.

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 plant, *Lilium humboldtii* ssp. *humboldtii*. Impacts to watchlist plants are not considered significant unless entire occurrences are lost.

High elevation openings and rocky areas

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres of high elevation opening and rocky areas where cross country travel is prohibited

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 28,800 acres containing 36 miles. High elevation openings and rocky areas are generally considered accessible to motorized vehicles due to the lack of vegetation. Under implementation of Alternative 1 known and as yet undiscovered sensitive/watchlist species occurrences would be at risk of impacts from motorized vehicles. 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.

There are about 43,240 acres of high elevation openings and rocky areas on TNF system lands, with about 79 miles of NFTS roads and motorized trails and 36 miles of motorized trails un-authorized for motorized use located within them. About 14,400 acres of high elevation openings and rocky area currently have a prohibition for cross country travel.

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 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. 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 system routes.

Cross country impacts within high elevation openings and rocky areas containing sensitive/watchlist species would be considered significant. These areas are considered highly erosive with harsh growing conditions.

Action Alternatives: All of action alternatives prohibit cross country travel on 28,800 acres of high elevation opening and rocky area plant communities. All of the action alternatives prohibit use of some portion of the 36 miles of motorized trails un-authorized for motorized use. Therefore, direct/indirect impacts to sensitive/watchlist species within high elevation openings and rocky areas from cross country travel would not occur. Refer to Table 3.06-14.

Table 3.06-14. Miles of Motorized Use within High Elevation Opening and Rocky Areas by Alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	79	79	79	79	79	79	79
Private/other jurisdiction roads	26	26	26	26	26	26	26
Cross country travel (acres)	28,800	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	36	0	0	0	0	0	0
Additions to the NFTS	0	3	0	0	3	3	2
Total Motorized	**141**	**108**	**105**	**105**	**108**	**108**	**107**

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails proposed to be added to the NFTS system within high elevation openings and rocky areas.
- Sensitive/watchlist species occurrences (associated with high elevation openings and rocky areas) located within 100 feet of proposed additions to the NFTS. Surveys of about 62 miles of motorized trails un-authorized for motorized use have been completed to date. Erigeron miser was found within 100 feet of TKN-J5 and at the end of TKN-J4. The occurrence of Erigeron miser located at the end of TKN-J4 is a known occurrence. Erigeron miser was also found within 100 feet of the YRS-F1 near Fordyce Creek.)
- Weed occurrences located within 100 feet of proposed additions to the NFTS. No weeds were found at any of the Erigeron miser sites referred to above.

No Action: Alternative 1 does not add propose the addition of motorized trails to the NFTS.

Action Alternatives: Table 3.06-14 shows the miles of motorized trails added to the NFTS within these plant communities by alternative. Alternatives 2, 5 and 6 add 3 miles of motorized trails to the NFTS or about 8 percent of the motorized trails un-authorized for motorized use in high elevation openings and rocky areas. Alternative 7 adds 2 miles – about 6 percent. Alternatives 3 and 4 do not add miles in high elevation openings and rocky areas and would not directly or indirectly impact sensitive/watchlist species in those areas.

Erigeron miser occurrences located at the “cement slab” at the end of TKN-J5 and along Fordyce Creek (YRS-F1) are both currently being directly and indirectly impacted by use of motorized trails un-authorized for motorized 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). TKN-J5 is proposed for addition to the NFTS in Alternatives 2, 5, and 6. YRS-F1 is proposed for addition to the NFTS in Alternatives 2, 5, 6, and 7. Mitigations to reduce impacts to these *Erigeron miser* occurrences are displayed in Appendix A (Road Cards) of the DEIS.

Sensitive/watchlist species occurrences found in the FY 2008 surveys will 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 Maintenance Level 1 and temporary roads proposed to be added as motorized trails to the NFTS in Alternative 5 they will remain undetected and will continue to be directly and 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

The spatial boundary of the cumulative effects analysis area is the Tahoe National Forest.

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 closing motorized trails un-authorized for motorized use 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 motorized trail 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 are located at 6,000 feet and above and are generally areas with shallow soil. They can be found within forested areas or on ridges above forested areas. Historic management activities have altered high elevation opening and rocky area habitats in a number of ways. These areas were grazed by livestock, timber was removed, roads and 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 heavily disturbed may remain unvegetated. 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 openings and rocky areas have become infested with weeds such as Klamath weed. Historic management activities have cumulatively reduced the amount and reduced the habitat quality for: *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 any where 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 high elevation openings and rocky areas are primarily recreation related. *Erigeron miser* occurrences occur along system and proposed motorized trails un-authorized for motorized use. *Erigeron miser* grows only on the TNF. It grows 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 located within and adjacent to roads/trails/areas.

Other on going projects on the forest that impact high elevation openings and rocky areas include: motorized vehicle use of system routes; special uses projects such as utility corridor construction and 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 projects. 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 Table 3.00-1 are implemented in high elevation openings or rocky areas.

No action: Implementation of Alternative 1 adds to the cumulative impacts to sensitive/watchlist species dependent on high elevation openings and rocky areas through cross country travel on 28,800 acres containing 36 miles of motorized trails un-authorized for motorized use in these plant communities. Over the long term, continued and increased cross country motorized vehicle use within sensitive/watchlist species occurrences will eventually kill significant numbers of plants. Implementation of Alternative 1 may 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) if motorized vehicle use eliminates entire occurrences through cross country travel. It is believed that the *Asplenium trichomanes-ramosum* occurrence located on the TNF is a disjunct occurrence and probably does not occur any where 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. Refer to the following discussion:

The terrain where *Eriogonum umbellatum* var. *torreyanum* grows is extremely difficult for motorized vehicles travels to travel on. Most of the known occurrences do not have motorized vehicle impacts and are not located in areas where it is believed motorized vehicle use will occur.

The known occurrences of *Lewisia longipetala* are near hiking trails not motorized vehicle trails. They are not located in areas where it is believed motorized vehicle use will occur due to the steepness and remoteness of the habitat.

There is only one occurrence of *Tauschia howellii* known to occur on the TNF. It is believed that motorized vehicle use will not occur in the steep, highly erosive habitat where this plant occurs. Current indirect impacts to this occurrence include dust, changed hydrology, and increased risk of weed introduction primarily from the staging/parking area that is located directly above this occurrence. These impacts are not considered significant at this time. If cross country motorized vehicle use increases over the long term (as projected), it is possible that this occurrence could be significantly impacted. The long term risk can not be quantified however. Implementation of Alternative 1 increases the risk of disturbance within these habitats.

The occurrences of *Claytonia megarhiza* on TNF system lands are north of Mount Lola and are believed to be inaccessible to motorized vehicles*.* *Tonestus eximius* has not been found on the TNF. Impacts to either species would be significant.

Therefore, 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. 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 and 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 the habitat itself, damage to the habitat can be severe. The plants dependent on these habitats 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 15 motorized trails un-authorized for motorized use located in high elevation (6,000 feet plus) openings/rocky areas on NFS lands. These motorized trails include: H652-5-5, TKN-J4, TKN-J5, TKS-11, YRN-11, YRS-003b, YRS-F1, YRS-F1b, YRS-F1c, YRS-G3, and YRS-G3w. TKN-J4, TKN-J5, and YRS-F1 have occurrences of *Erigeron miser* within 100 feet of the route. Mitigations have been developed to reduce and/or eliminate impacts to these sensitive plant occurrences (refer to Appendix A – Road Cards). Mitigations would also be developed for sensitive/watchlist species occurrences found in the FY 2008 surveys.

Alternatives 2, 5, and 6: Cumulative impacts from implementation of Alternatives 2, 5, or 6 are not considered significant. All of these alternatives prohibit cross country travel. All of these alternatives propose the addition of about 3 miles of motorized trails un-authorized for motorized use to the NFTS. Conversely, Alternatives 2, 5, and 6 prohibit use on 33 miles of the 36 miles of the motorized trails un-authorized for motorized use in these plant communities or about 91 percent of them. There is less risk to sensitive/watchlist species dependent on high elevation opening/rocky area plant communities than in Alternative 1. However, of the action alternatives, implementation of Alternatives 2, 5, and 6 have the highest risk of negative indirect impacts to sensitive/watchlist species dependent on high elevation openings and rocky areas since they have the largest number of motorized roads/trails/areas open for use. Indirect impacts include impacts from dust and increased weed risk. Of the action alternatives, implementation of Alternatives 2, 5, and 6 have the highest risk of introducing and spreading weeds into high elevation openings and rocky areas. Of the action alternatives, implementation of Alternatives 2, 5, and 6 also add the greatest amount to the cumulative impacts to these species, but those impacts are not considered significant in the short and long term. Alternatives 2, 5, and 6 continue the indirect impacts to *Erigeron miser* occurrences located along TKN-J4, TKN-J5, and YRS-F1, through motorized vehicle use of those motorized trails.

Alternative 7: Cumulative impacts from implementation of Alternatives 7 are not considered significant. This alternative prohibits cross country travel, therefore there is less risk to sensitive/watchlist species dependent on high elevation opening/rocky area plant communities than in Alternative 1. This alternative proposes the addition of about 2 miles of motorized trails un-authorized for motorized use to the NFTS. Conversely, it prohibits use on 34 miles of the 36 miles of motorized trails un-authorized for motorized use in these plant communities or about 91 percent of them. There is less risk of indirect impacts to sensitive/watchlist species dependent on high elevation opening/rocky area plant communities than in Alternatives 2, 5, and 6 because there are fewer miles of motorized trail proposed and therefore less dust and weed risk. Alternative 7 continues the indirect impacts to *Erigeron miser* occurrences located along TKN-J4, TKN-J5, and the YRS-F1 near Fordyce Creek, through motorized vehicle use of those routes.

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 prohibit cross country use. Alternatives 3 and 4 do not propose the addition of any motorized trails un-authorized for motorized use to the NFTS. Alternatives 3 and 4 prohibit use on all 36 miles of motorized trails un-authorized for motorized use within these plant communities. Alternatives 3 and 4 do not indirectly impact *Erigeron miser* occurrences located along TKN-J4, TKN-J5, and the YRS-F1 near Fordyce Creek.

Therefore, 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. Implementation of the action alternatives would not impact *Asplenium trichomanes-ramosum*.

Noxious Weeds

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact sensitive/watchlist species in the short and long term by increasing the risk of weed introduction and spread on TNF system lands. 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 motorized trails un-authorized for motorized use by not prohibiting cross country travel on most of the forest (except closed areas such as areas on the American River Ranger District). Motorized vehicles could access more NFS lands and potentially spread weeds to all accessible sensitive/watchlist plant occurrences. Under implementation of Alternative 1, the number of motorized trails un-authorized for motorized use would increase through cross country use.

Those motorized trails un-authorized for motorized use that are known to have weed infestations have a high risk of weeds spreading along that route. Surveys to date have identified several motorized trails that are infested with weeds. Refer to Table 3.06-15. The motorized trails displayed in Table 3.06-15 have the highest short and long term risk of weed spread. However, different weeds have different ecological impacts. Table 3.06-15 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 motorized trails un-authorized for motorized use identified in Table 3.06-15 would continue to be used and that use would spread weeds. Possible effects are discussed by weed species below.

Cheatgrass: Cheatgrass exists and will continue to spread on both sides of the forest. It will remain patchy in occurrence on the westside of the forest and will not cover large areas unless all vegetation is removed from infested areas, such as in a large wildfire. On the eastside of the forest, vehicles will continue to spread seed of this non-native grass. Cheatgrass eventually takes over plant communities such as sagebrush/bitterbrush if those plant communities experience continued disturbance. This is especially true after wildfire events. Motorized vehicle use across the landscape increases the risk of cheatgrass seed dispersal. Cheatgrass infestation also increases the risk of wildfire ignition. Increased wildfires in sagebrush/bitterbrush plant communities could lead to habitat conversion. Sensitive/watchlist species located in areas where there is cheatgrass could be lost over the long term (5 years plus). Motorized trails un-authorized for motorized use known to have cheatgrass infestations within 100 feet of the motorized trails include: ARM-5, SV-P14, TKN-J9, TKN-M1 TKN-M2, YRS-SF6, YRM-M4 and YRN-509. Barriers will be placed between ARM-5 and the cheatgrass openings to reduce the spread of cheatgrass along that route. Boulders will be placed along TKN-J9 and the landing heavily infested with cheatgrass to keep motorized vehicles from spreading cheatgrass from the landing areas. The cheatgrass along TKN-M1 will be treated until the seed bank is exhausted. The cheatgrass in the turnaround area along YRS-SF6 and at the electronic site at the end of YRN-509 will be treated also. An *Ivesia sericoleuca* occurrence located along TKN-M2 has patches of cheatgrass within 100 feet of this sensitive plant. Therefore, the *Ivesia sericoleuca* along TKN-M2 has a high risk in the short and long term of being infested with cheatgrass. Individual plants of *Ivesia sericoleuca* could be lost in the short term. The entire occurrence could be lost over the long term if the cheatgrass infestation becomes large. Therefore, this occurrence will be monitored annually and any cheatgrass that is introduced into the occurrence will be hand pulled.

Musk thistle: Musk thistle will continue to spread along motorized trails and across landscapes located on the eastside of the forest. The areas most likely to experience musk thistle infestation include those where bare ground is formed, native vegetation is reduced, and a seed source is near. Motorized vehicles spread thistle seeds in the soil and mud attached to tires and vehicles. The bare soil areas created adjacent to motorized trails provide areas where thistle seeds can readily germinate and grow. Motorized trails un-authorized for motorized use known to have musk thistle infestations within 100 feet of the motorized trails include: SV-P14 and TKN-J13. There is an aspen clone located along SV-P14. Motorized vehicle use of these motorized trails would spread musk thistle into the aspen clone and to other areas. Over the long term motorized vehicle use could spread musk thistle to areas with sensitive/watchlist species. A manual treatment for the eradication of musk thistle on the eastside of the forest is ongoing.

Bull thistle: Bull thistle will continue to spread on both sides of the forest. The areas most likely to experience bull thistle infestation include those where bare ground is formed, native vegetation is reduced, and a seed source is near. Vehicles create bare soil and eliminate native vegetation within and adjacent to wheel tracks. Cross country use and use of motorized trails un-authorized for motorized use will spread this weed to new areas. Over the long term, bull thistle may be spread to sensitive species occurrences. Bull thistle is known to occur along TKS-M9 and YRS-SF6. There are no known occurrences of sensitive/watchlist species along these routes. However, there is a long term risk of spreading bull thistle from TKS-M9 and YRS-SF6 to areas of sensitive/watchlist species.

Klamath weed: Klamath weed will continue to spread on both sides of the forest. Occurrences will remain patchy and will be located primarily along the sides of routes. Klamath weed seedlings are not strong competitors so reducing other vegetation benefits them. Therefore, it is expected that they will remain in disturbed areas. However, it is also expected that existing biological control agents will control this weed so it does not become widespread. Klamath weed is known to occur along YRN-M3b. There are no known sensitive/watchlist species occurrences along YRN-M3b. However, there is a long term risk of spreading Klamath weed from YRN-M3b to areas of sensitive/watchlist species.

Scotch and Spanish broom: Scotch and Spanish brooms will continue to spread on the westside of the forest. Occurrences will be located primarily along roads, trails and other disturbed areas. However, these brooms will invade adjacent forest also. Scotch and/or Spanish broom will continue to spread through vehicle use of the motorized trails un-authorized for motorized use where they occur: YRM-M3, YRM-M4, YRN-008, YRN-509, and within the Cal Ida network. There are no known sensitive and/or watchlist plants along theses motorized trails, but there is a long term risk of spreading these brooms to sensitive/watchlist plant occurrences. The brooms at these sites will be treated manually until the seed bank is exhausted.

Table 3.06-15. Known Weed Occurrences within 100 Feet of Motorized Trails Un-authorized for Motorized Use

Route ID	Weed occurrences known to occur within 100 feet of a motorized trail	Ecological impact rating (Cal IPC)
ARM-5	Large patches of cheatgrass are located adjacent to the trail	High
SV-P14	Musk thistle is within about 100 feet.	Moderate
TKN-J9	Wooly mullein and cheatgrass along route	Cheatgrass - High wooly mullein - Limited
TKN-J13	Musk thistle is adjacent to the trail.	Moderate
TKN-M1	Cheatgrass is located in and adjacent to the trail	High
TKN-M2	Patches of cheatgrass adjacent to the north end of the trail	High
TKS-M9	Small amounts of bull thistle and orchard grass adjacent.	Moderate
YRM-M3	Scotch broom is adjacent	High
YRM-M4	Scotch broom and cheatgrass	High
YRN-008	Scotch broom	High
YRN-509	Scotch and Spanish broom and cheatgrass	High
YRN-M3b	Klamath weed	Moderate
YRS-SF6	Bull thistle and cheatgrass	Moderate
35-4-P (Cal Ida)	Cheatgrass and tumble mustard are adjacent	High

Wooly mullein: Wooly mullein will continue to spread via seeds. Vehicles will spread seeds by moving them from place-to-place in soil or mud on tires. Vehicles will create bare soil areas that will help this weed become established. Continued disturbance will create new areas for it to move into. Wooly mullein is known to occur within 100 feet of TKN-J9. There are no known sensitive/watchlist species occurrences along TKN-J9. However, there is a long term risk of spreading wooly mullein from TKN-J9 to areas of sensitive/watchlist species.

Action Alternatives: All of the action alternatives prohibit 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 from weed introduction and spread is less under the action alternatives in the short and long term compared to the no action alternative. Weeds will continue to spread on the forest, but it is believed the rate of spread will be slower than under the no action alternative primarily due to the prohibition of cross country travel.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails un-authorized for motorized use proposed to be added to the NFTS system with weed occurrences with 100 feet of the motorized trail.
- Sensitive/watchlist species occurrences and/or watchlist plant communities located within 100 feet of proposed additions to the NFTS that have weed occurrences within 100 feet of the motorized trail.

No Action: Alternative 1 does not propose the addition of any motorized trails to the NFTS.

Action Alternatives: Surveys to date have located weed occurrences within 100 feet of: 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. Those action alternatives that propose these motorized trails un-authorized for motorized use be added to the NFTS have a high risk of introducing weeds into sensitive/watchlist species occurrences and watchlist plant communities over the long term. TKN-M2 also has a sensitive species occurrence of *Ivesia sericoleuca* that has cheatgrass within 100 feet of it. Motorized vehicle use of TKN-M2 increases the risk of weed introduction and spread into this sensitive species occurrence in the short term (5 years or less). Aspen clones (watchlist plant communities) were found along TKN-M2, TKS-11, SV-005, SV-P8, and SV-P14. Motorized vehicle use of TKN-M2 and SV-P14 increases the risk of weeds being introduced and spreading within these aspen clones.

Alternatives 2, 5, and 6 propose the addition of all of the motorized trails un-authorized for motorized use known to have weed occurrences (except Alternative 2 does not propose 35-4-P). Alternatives 2, 5, and 6 propose the addition of TKN-M2 to the NFTS. Therefore, implementation of Alternatives 2, 5, and 6 have a high risk of introducing cheatgrass into the *Ivesia sericoleuca* occurrence and aspen clone located along TKN-M2 in the short and long term and cheatgrass and musk thistle into the aspen clone along SV-P14. Alternatives 2, 5, and 6 have a high risk of introducing weeds into sensitive/watchlist plant occurrences in other areas over the long term.

Alternative 7 proposes the addition of 9 of the 14 motorized trails known to have weed occurrences. Alternative 7 does not propose the addition of TKN-M2 to the NFTS. Implementation of Alternative 7 has a high risk of introducing weeds into sensitive/watchlist plant occurrences over the long term.

Alternative 4 proposes the addition of 7 of the 14 motorized trails known to have weed occurrences. Alternative 4 does not propose the addition of 4 of the 5 motorized trails known to impact aspen clones. Alternative 4 proposes SV-P14 and would continue to impact the aspen and spread weeds along that route. Implementation of Alternative 4 has a high risk of introducing weeds into sensitive/watchlist plant occurrences over the long term.

Alternative 3 does not propose the addition of any of the 14 motorized trails un-authorized for motorized use known to have weed occurrences. Implementation of Alternative 3 could still spread weeds to sensitive/watchlist species occurrences and watchlist plant communities over the long term. However, since Alternative 3 does not allow cross country travel and does not propose any additions to the NFTS, it is believed that the rate of weed spread would be slower. This is unproven.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

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 cross country travel including motorized trails un-authorized for motorized use 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 motorized trail evaluation to detect weeds combined with rapid treatment of those weeds avoids significant impacts to TNF system lands 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 motorized trails 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. Weed infestations degrade NFS lands (including habitats for sensitive/watchlist species) by directly competing with native plants and causing their displacement. The number and types of weed infestations known on the TNF are displayed in Appendix M in the Weed Risk Assessment for this project. Weeds are known to occur along NFTS roads and motorized trails as well as motorized trails un-authorized for motorized use. Ongoing management actions such as utility corridors maintenance, mining operation, 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). Weeds do not occur within all occurrences of these sensitive plants, but where they do the sensitive 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.

Motorized vehicle use of NFTS roads and motorized trails is also an ongoing activity that is known to negatively impact sensitive plants/fungi and/or watchlist plants and plant communities through the introduction of weeds. Motorized vehicle use of NFTS roads and motorized trails removes native vegetation, creating bare soil conditions. Dust from use of native surface motorized trails decreases native vegetation cover by reducing rates of photosynthesis, leaf conductance, transpiration, and water-use efficiency. Dust from motorized vehicle use has also been shown to increase temperatures of leaves and stems and decrease leaf surface areas (Munger et al 2003) negatively impacting plant vigor. Reduced native plant vigor increases the chance that weeds can become established.

Reasonably foreseeable: Implementation of those projects identified in Table 3.00-1 may introduce weed seed and/or weed plant parts into new areas. Equipment that operates off 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 TNF management actions. However, all of the projects listed in Table 3.00-1 involve travel on system roads and could introduce weed seed into new areas from their vehicles. Ground disturbance favors weed spread if the weeds are already on or near the area being disturbed. It is reasonably foreseeable that weeds will continue to spread on the TNF and will be introduced into sensitive species occurrences over the long term.

No action: Implementation of Alternative 1 adds to the cumulative risk of weeds being introduced and spreading into sensitive/watchlist species occurrences. As identified in the weed risk assessment for this project (Appendix M) 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. Implementation of Alternative 1 does not prohibit cross country travel including motorized trails un-authorized for motorized use. Therefore, it has the greatest risk of negative impacts to TNF native plant communities and the sensitive/watchlist species dependent on them, of any of the alternatives. Implementation of Alternative 1 carries the highest risk of weed introduction into sensitive/watchlist species occurrences and watchlist plant communities since it allows motorized vehicle use on the greatest amount of NFS land.

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 located in Appendix M and the discussion under the no action alternative for more information. All of the action alternatives prohibit cross country travel. Therefore, all of the action alternatives have less risk of introducing weeds into sensitive/watchlist species occurrences and/or watchlist plant communities than Alternative 1. In addition, the mitigations identified in Appendix A (Road Cards) will reduce the rate of spread of weeds along those motorized trails where the mitigations are implemented.

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 sensitive/watchlist species and/or watchlist plant communities since it proposes the addition of the most motorized trails un-authorized for motorized use to the NFTS. Alternative 5 adds about 283 of the 1,400 miles of motorized trails un-authorized for motorized use– or about 22 percent. Surveys of Alternative 5 proposed NFTS Maintenance Level 1 and temporary roads are not current, therefore these motorized roads may have weed occurrences that would go undetected and would spread and grow in size. It is unknown whether these NFTS Maintenance Level 1 and temporary roads have occurrences of sensitive/watchlist species, watchlist plant communities, or weeds. Implementation of Alternative 5 has a high risk of impacting sensitive/watchlist species and/or watchlist plant communities over the long term through the spread of weeds. Implementation of Alternative 5 prohibits cross country travel so it has less risk of spreading weeds into sensitive/watchlist species occurrences and/or watchlist plant communities over the long term than implementation of Alternative 1.

Alternatives 2 and 6: Alternatives 2 and 6 have a greater risk of spreading weeds into sensitive/watchlist species occurrences and/or watchlist plant communities over the long term than Alternatives 3, 4, and 7, but not as great a risk as Alternatives 1 and 5. Alternative 2 proposes the addition of 73 of the 1,400 miles of the motorized trails un-authorized for motorized use into the NFTS or about 6 percent. Alternative 6 proposes the addition of 70 miles or about 5 percent. In addition, Alternative 2 adds shoreline access on dry soils in the Prosser, Boca and Stampede reservoir areas. 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. When these weed occurrences are covered with water, many of the weed seeds are killed. However, some of the weed seed floats to new areas. Any motorized vehicle use in the areas where the weeds are located will spread the weeds to new areas. Alternative 2 also proposes the addition of Eureka Diggings and Greenhorn areas. These are generally unvegetated areas where vehicles are not restricted to routes. These unvegetated areas provide sites where weeds can readily become established without competition from native vegetation. Established weed sites can spread weed seed to new areas as vehicles go from infested sites to other areas. Therefore, the risk of spreading weeds into sensitive/watchlist species occurrences and/or watchlist plant communities is higher in Alternative 2 than in Alternative 6, primarily because Alternative 2 has more designated open areas for motorized vehicle use.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 have a lower risk of spreading weeds into sensitive/watchlist species occurrences and/or watchlist plant communities than implementation of Alternatives 1, 2, 5, and 6. Alternative 4 proposes the addition of 31 miles of motorized trails un-authorized for motorized use to the NFTS or about 2 percent of the 1400 miles. Alternative 7 proposes the addition of about 45 miles or about 3 percent. The long term risk of negative impacts to sensitive/watchlist species and/or watchlist plant communities from weed introduction and spread is lower because these alternatives propose the addition of fewer miles to the NFTS and prohibit cross country travel.

Alternative 3: Alternative 3 has the least long term risk of weed introduction and spread into sensitive/watchlist species occurrences and/or watchlist plant communities because it does not propose the addition of motorized trails un-authorized for motorized use to the NFTS, and prohibits cross country travel.

Plant Biodiversity and Plant Community Fragmentation

1. Prohibition of cross country travel

Indicator used to measure effects:

- Acres of inventoried roadless area with cross country travel prohibited.

No action: Alternative 1 does not prohibit use of the motorized trails un-authorized for motorized use located within inventoried roadless areas, and it allows cross country travel. Under implementation of Alternative 1, 54 miles of motorized trails un-authorized for motorized use located within inventoried roadless areas would be available for motorized vehicle use and accessible areas within those inventoried roadless areas 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 to native plant biodiversity and fragmentation of the native plant communities. Impacts could be significant over the long term.

Inventoried roadless areas are considered some of the largest unroaded native plant communities on the TNF (except for Granite Chief Wilderness). Since inventoried roadless areas have not been surveyed, impacts to native plant biodiversity and fragmentation of native plant communities are assessed versus impacts to sensitive/watchlist species occurrences. Sensitive/watchlist species occurrences and watchlist plant communities add to native plant diversity and are considered important components of the native plant communities where they are located.

Action Alternatives: None of the action alternatives allow cross country travel within inventoried roadless areas. Therefore there is less long term risk to native plant diversity and less risk of fragmentation impacts to native plant communities located within inventoried roadless areas under implementation of the action alternatives (compared to the no action alternative). Of the action alternatives, Alternative 5 closes the fewest miles of motorized trails un-authorized for motorized use within these areas and has the highest long term risk to native plant diversity and greatest risk of fragmentation impacts to native plant communities located within inventoried roadless. Alternative 5 would prohibit use of 38 miles of motorized trails un-authorized for motorized use within these areas or about 70 percent of the 54 miles of motorized trails un-authorized for motorized use. Alternative 2 would prohibit use of about 45 miles of motorized trails un-authorized for motorized use or about 83 percent; Alternative 6 would prohibit use of about 46 miles or about 85 percent, Alternative 7 would prohibit use of about 47 miles or about 87 percent, and Alternatives 3 and 4 prohibits use of all 54 miles of motorized trails un-authorized for motorized use located within inventoried roadless areas. Alternatives 3 and 4 have the lowest risk to native plant diversity and least risk of fragmentation impacts to native plant communities located within inventoried roadless areas.

2. Additions to the National Forest Transportation System (NFTS)

Indicator used to measure effects:

- Miles of motorized trails un-authorized for motorized use proposed for addition to the NFTS that are located within inventoried roadless areas. (The TNF currently has 109,100 acres of inventoried roadless area with 54 miles of motorized trails un-authorized for motorized use.)

No action: Alternative 1 does not propose the addition of any motorized trails un-authorized for motorized use to the NFTS, but also does not prohibit cross country travel on 109,100 acres including 54 miles of motorized trails un-authorized for motorized use located within inventoried roadless areas. Alternative one has the highest long term risk to native plant diversity and greatest risk of fragmentation impacts to native plant communities located within inventoried roadless of all the alternatives.

Action Alternatives: All of the action alternatives would reduce miles and acres open for motorized vehicles in inventoried roadless areas by prohibiting cross country travel. Of the action alternatives, Alternative 5 proposes the addition to the NFTS of the greatest number of motorized trails un-authorized for motorized use located in inventoried roadless areas – about 16 miles. Sixteen miles of motorized trail is about 30 percent of the existing miles of motorized trails un-authorized for motorized use within these areas. Of the action alternatives, Alternative 5 has the highest long term risk to native plant diversity and greatest risk of fragmentation impacts to native plant communities located within inventoried roadless areas. Refer to Table 3.06-16 which displays the number of miles of motorized trails un-authorized for motorized use proposed for addition to the NFTS in inventoried roadless areas. Alternative 2 adds 9 miles, Alternative 6 adds 8 miles, and Alternative 7 adds seven miles of motorized trails un-authorized for motorized use to the NFTS. These additions range from 13 to 17 percent of the miles of the motorized trails un-authorized for motorized use within these areas. Alternatives 3 and 4 do not add any motorized trails un-authorized for motorized use within inventoried roadless areas to the NFTS. Alternatives 3 and 4 have the lowest risk to native plant diversity and least risk of fragmentation impacts to native plant communities located within inventoried roadless areas.

Large blocks of land such as inventoried roadless areas are especially important areas for maintaining native plant and plant community diversity (Loomis et al. 2000). Inventoried roadless areas provide a natural benchmark or control to judge the effects of human development on natural systems and to understand relatively undisturbed ecological processes. In addition, naturally functioning ecosystems (plant communities) such as those often found in inventoried roadless areas provide many valuable services including watershed protection, carbon storage, nutrient cycling, pest control, pollination, and fish and wildlife habitat (ibid).

Table 3.06-16. Total Miles of Motorized Use in Inventoried Roadless Areas by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	129	129	129	129	129	129	129
Private/other jurisdiction roads	23	23	23	23	23	23	23
Cross country travel (acres)	109,100	0	0	0	0	0	0
Motorized trails un-authorized for motorized use (miles)	54	0	0	0	0	0	0
Additions to the NFTS	0	9	0	0	16	8	7
Subtotal Motorized	**206**	**161**	**152**	**152**	**168**	**160**	**159**

Sensitive/watchlist species located along motorized trails are more likely to be exposed to disruption by human activities and to experience problems with weeds. Adding motorized trails un-authorized for motor vehicles use to the NFTS within inventoried roadless areas increases the risk that sensitive/watchlist species and/or watchlist plant communities will be lost and/or have the plant community where they are located fragmented by the motorized vehicle use and weeds. Once these motorized trail additions are shown on maps, they could receive increased use. In addition, as demand increases, these motorized trails are expected to see increased use. Additional use could increase the risk of weed seed being introduced into the inventoried roadless area. Early detection of new weed introductions would be difficult since these areas are remote and generally accessible only by specialized 4 wheel drive/ motorcycle equipment. TNF personnel trained in weed identification rarely travel them. Weeds could be introduced and go undetected for long periods of time. Infestations of weeds into these relatively weed free areas could negatively impact sensitive/watchlist species occurrences. Over the long term, sensitive/watchlist species occurrences and/or watchlist plant communities could be displaced and/or severely impacted by weeds.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the Tahoe National Forest.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact inventoried roadless areas and the sensitive/watchlist species and/or watchlist plant communities that may occur within them, as well as the benefits from prohibiting cross country travel 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/or watchlist plant communities, and conducting early detection and treatment of weeds. Frequent motorized trail evaluation to detect weeds combined with rapid treatment of those weeds avoids significant impacts to TNF system lands and sensitive species in the short and long term.

Past: Past actions that have impacted the inventoried roadless areas on the TNF include all of the past actions identified under the different plant communities in this report. Inventoried roadless areas were not identified until 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 for more information.

Current: Current management activities that occur within TNF inventoried roadless areas include use of NFTS roads and motorized trails, activities on private land that are adjacent to NFS lands, livestock grazing and minerals operations. The amount of use of NFTS roads and motorized trails, the types of private land activities, the amount and location of livestock grazing, and the minerals operations also vary by inventoried roadless area. For example, the motorized trails un-authorized for motorized trails are proposed in the West Yuba inventoried roadless area: YRN-M3b, YRN-M3a, YRN-7, and YRN-M2. All of these motorized trails except YRN-7 were pioneered by miners to access mining claims. The East Yuba roadless area also has active mining operations. YRN-001, YRN-M1, YRN-11, YRN 5a and 5c, YRN-9, YRN-007, and YRN-4 are all motorized trails un-authorized for motorized use within the East Yuba roadless area. 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. Motorized trails un-authorized for motorized use that are 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 each roadless area.

Reasonably foreseeable: Implementation of those projects identified in Table 3.00-1 would not impact inventoried roadless areas. None of those projects are located within inventoried roadless areas.

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 inventoried roadless areas 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 on 109,100 acres including all 54 miles of motorized trails un-authorized for motorized use within roadless areas.

Motorized vehicle disturbance within inventoried roadless areas 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. Plant community fragmentation is an issue for at least some sensitive/watchlist species. Those sensitive/watchlist plants with specific pollination and habitat requirements are the most vulnerable to habitat fragmentation impacts. For example, *Cypripedium fasciculatum* requires mycorrhizal connections under ground and specific pollinators and is associated with older forests. Motorized roads and trails are frequently identified as the cause of habitat fragmentation. Cross country motorized vehicle use has been shown to have the same fragmentation effects as motorized vehicle routes. 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 roads and motorized trails in the various roadless areas is described in section 3.09 (Inventoried Roadless Areas and Special Areas). Under Alternative 1, cross country use in roadless areas could create higher road and 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 inventoried roadless areas are considered high risk watersheds. Refer to section 3.02 (Soil and Watershed Resources).

The inventoried roadless areas on the TNF are considered relatively free of motorized roads and trails and are assumed to provide quality habitat for native plants/fungi. Since complete botanical surveys of inventoried roadless areas and other areas of the forest are not available, these assumptions are unproven. However, it is reasonable to expect relatively undisturbed large geographic areas to provide quality habitat for native plants/fungi.

Large blocks of unfragmented land (such as roadless areas) play an important role in providing habitat for threatened, endangered, proposed (TEP), and sensitive plant species (USDA FS 2000). Nationally, roadless areas provide large, relatively undisturbed blocks of important habitat including more than 1,400 sensitive and almost 100 TEP plant species (ibid). The inventoried roadless areas on the TNF have not been completely surveyed. It is expected that inventoried roadless areas on the TNF provide important biological strongholds for native plant species and communities just as they do across the nation. Sensitive, watchlist, and other native plants in TNF inventoried roadless areas are less likely to be exposed to disruption by human activities such as collection, trampling, and other disturbance. This lower level of disruption may make roadless areas important references for understanding the natural composition and dynamics of native plant communities.

TNF inventoried roadless areas are less likely to experience problems with nonnative invasive species (weeds) and are more likely to be able to maintain intact native plant communities. Roadless areas provide or affect habitat for almost 60 percent of the TEP species found on or affected by NFS lands (USDA FS 2000). This is over 10 percent of all plant species listed under the Endangered Species Act within the United States, and almost 70 percent of Forest Service designated sensitive species (ibid). TEPS species benefit within inventoried roadless areas by having reduced risk of future habitat degradation and disturbance, and conservation of existing biological strongholds. Implementation of the no action alternative would not provide these benefits to sensitive species.

TEPS species are at increased risk of adverse cumulative effects from increased population growth and associated land uses, land conversions, and nonnative species (weed) invasions. Therefore, the value of relatively unfragmented blocks of land such as inventoried roadless areas to TEPS species is likely to increase as habitat loss and habitat degradation increase in scope and magnitude. Implementation of the no action alternative increases habitat loss and habitat degradation. Habitat loss and degradation, and adverse effects to TEPS and other native plant species viability from the invasion and/or encroachment of non-native plant and animal species are increasing.

Action Alternatives: All of the action alternatives reduce impacts to native plants and plant communities by prohibiting cross country travel and reducing the amount of motorized roads and trails within inventoried roadless areas. The action alternatives that propose the addition of the most miles of motorized trails un-authorized for motorized use to the NFTS within inventoried roadless areas have the greatest risk of negatively impacting native plant biodiversity and fragmenting native plant communities (and the sensitive species within them). The risk to native plants is closely tied to the high risk of introducing weeds into large blocks of land that are currently considered weed free.

Alternative 5: Of the action alternatives, implementation of Alternative 5 has the greatest risk of negative impacts to native plant diversity and has a greater risk of negative impacts to native plant communities through fragmentation. Of the action alternatives, Alternative 5 proposes the addition of the greatest number of motorized trails un-authorized for motorized located in inventoried roadless areas to the NFTS – about 16 miles. Sixteen miles of motorized trail is about 30 percent of the existing miles of motorized trails un-authorized for motorized use within these areas. Of the action alternatives, implementation of Alternative 5 has more miles of proposed motorized trail additions to the NFTS and more risk of weed introduction and spread within large geographic areas. The significance of these impacts is hard to quantify. However, the risk is believed to be a long term risk (over five years) since motorized vehicle use of motorized trails un-authorized for motorized use is currently considered low.

Alternatives 2, 6 and 7: Implementation of Alternatives 2, 6 and 7 have more risk of negative impacts to native plant diversity and native plant community fragmentation caused by weed introduction and spread than Alternatives 3 and 4, but not as much as Alternatives 1 and 5. Alternative 2 adds 9 miles, Alternative 6 adds 8 miles, and Alternative 7 adds seven miles of motorized trails un-authorized for motorized use to the NFTS. These additions range from 13 to 17 percent of the miles of the motorized trails un-authorized for motorized use within these areas. Conversely, Alternative 2 would prohibit use on about 45 miles of motorized trails un-authorized for motorized use or about 83 percent; Alternative 6 would prohibit use on 46 miles or about 85 percent, Alternative 7 would prohibit use on about 47 miles or about 87 percent.

Alternatives 3 and 4: Implementation of Alternatives 3 and 4 have the least risk of negative impacts to native plant biodiversity and fragmentation of native plant communities within roadless areas through introduction and spread of weeds. Alternative 3 and 4 do not propose additions to the NFTS within inventoried roadless areas. Alternatives 3 and 4 prohibit use on all motorized trails un-authorized for motorized use located within roadless areas. Implementation of Alternatives 3 and 4 will benefit sensitive/watchlist species (if they occur there)/native plant diversity/native plant community connectivity by reducing the risk of weed introduction and spread by motorized vehicles.

The value of large blocks of land such as inventoried roadless areas 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, weed and non-native animal infestation, etc.

3.07. Recreation and Scenic Values

Regulatory Framework

National Forest Management Act (NFMA): The National Forest Management Act (NFMA), and its implementing regulations, required the inventory and evaluation of the forest's recreation and scenic resources. Management Area direction is included for Visual Quality Objects and Recreation Opportunity Spectrum. This and other Forest Plan direction is summarized is *Chapter 3.00 Introduction*.

Travel Management Rule: In the designation trails or areas, the responsible official shall consider effects on forest resources.

Affected Environment

Introduction

This section of the Motorized Travel Management environmental analysis examines the extent to which alternatives respond to recreation resource management direction established in the Tahoe National Forest Land and Resource Management Plan. The Forest Plan recreation direction was established under the implementing regulations of the National Forest Management Act (NFMA). The NFMA requires the provision of a broad spectrum of forest and rangeland-related outdoor recreation opportunities that respond to current and anticipated user demands. Specifically for "off-road vehicle" use, the NFMA requires that these opportunities be planned and implemented to protect land and other resources, promote public safety, and minimize conflicts with other uses of the National Forest System lands.

Overview

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 for the TNF, the Forest received an estimated three million six hundred ninety thousand visits in 2001. A visit is defined as the entry of one person upon a national forest to participate in recreation activities for an unspecified period of time. A visit could be one hour or several days. Based on this survey, broadly speaking, approximately one third of visitors are primarily focused on winter sports, one third motorized vehicle activities and one third non-motorized activities. This chapter will focus on the "summer" visitors. It is acknowledged that forest visitors take part in many recreational activities so there is a great amount of overlap of activities. For example, some people will use a four wheel drive vehicle to access dispersed camping sites and to go fishing while others may travel to a developed campground with a passenger vehicle to hike or explore the forest on a motorcycle or mountain bike. With this in mind the statistics associated with Forest visits and recreation activities should be seen as sampling trends and not precise figures. To discuss these recreation opportunities we will look at both Motorized and Non-motorized recreation opportunities. The other issue to keep in mind is the high amount of private land within the TNF boundary much of it in a checkerboard pattern of square miles alternating from private land to National Forest system land.

From a recreation management point of view, as stated in the Forest Land Management Plan a key goal of recreation is to provide for a wide range of recreation opportunities. For OHV recreation opportunities this means the Forest should be providing OHV recreation opportunities in a variety of settings from semi-primitive motorized areas to fairly developed roaded natural areas. OHV trails should also offer a range of trail experiences in terms of length, range of difficulty from easy to difficult, and a range of recreation opportunities including access to dispersed camping, access to fishing, hunting, viewing wildlife, access to scenic vistas, and other opportunities to explore the back country of the Forest. There is also a desire to provide OHV trails that are designed for user enjoyment in terms of vegetation type, layout of the trails with pleasing alignments, loop opportunities, or trail systems that connect so users can explore a variety of trails, and opportunities for solitude and remoteness. An additional component to consider is the convenience and access to both formal developed trail heads and informal staging from paved roads and their relationship to desired trail systems.

The following narrative represents the activities occurring on National Forest system lands, not on private land.

Motorized Recreation Opportunities

California is experiencing the highest level of OHV use of any state in the nation. There were 786,914 ATVs and OHV motorcycles registered in 2004, up 330% since 1980. Annual sales of ATVs and OHV motorcycles in California were the highest in the U.S. for the last 5 years. Four-wheel drive vehicle sales were extremely high. They increased 1500% to 3,046,866 from 1989 to 2002. The Tahoe National Forest has seen an increase in demand over time. The Forest has worked with the California Parks and Recreation Department, Off-Highway Motor Vehicle Recreation Division and used grants from the Division in tandem with USFS dollars to provide OHV trailheads, OHV campground facilities, build OHV trails, maintain OHV trails, restore areas damaged by OHV use, and enforce OHV rules on National Forest System lands.

Motorized recreation opportunities encompass a wide range of activities and for convenience can be separated by Off Highway Vehicle use and all other Motorized Vehicle use. Table 3.07-1 displays the amount and type of current motorized opportunities on the Forest.

Table 3.07-1. Amount and Type of Current Motorized Opportunities

Road and Trail Category	Season of Use	Miles
Roads open to highway legal vehicles only	May 1 to Dec. 31	23.6
Roads open to highway legal vehicles only	May 1 to Nov.1	7.5
Roads open to highway legal vehicles only	Open All Year	601.7
Roads open to all vehicles	May 1 to Dec. 31	6.6
Roads open to all vehicles	May 1 to Nov. 1	98.0
Roads open to all vehicles	Jan. 1 to Sept. 15	5.5
Roads open to all vehicles	Open All Year	1,786.1
Trails open to high clearance vehicles	May 1 to Nov. 1	5.3
Trails open to high clearance vehicles	Open All Year	184.5

Road and Trail Category	Season of Use	Miles
Trails open to ATVs and motorcycles (<48”)	Open All Year	17.5
Trails open to motorcycles	May 1 to Nov. 1	0.8
Trails open to motorcycles	Open All Year	126.6
Other jurisdiction roads (i.e. County and State)	Open All Year	928.8
Other non-system roads (Private)	Open All Year	1,584.9
Roads and trails un-authorized for motor vehicles remaining	Not Applicable	1388.9
	Total	**6,768**

Authorized Off Highway Vehicle Recreation Opportunities

For purposes of this report, Off Highway Vehicle (OHV) use is considered to be the use of four wheel drive (4WD) vehicles, all terrain vehicles (ATVs), and motorcycles, on rough roads and trails that require some skill and challenge to operate. Four wheel drive vehicles operating on paved or smoothly graded roads will be considered part of general motorized use. Based on the National Visitor Use Monitoring report, about 4 percent of users or about 147,600 visits can be attributed to OHV use as their primary activity while around 10 percent or 369,000 visits can be attributed to OHV use where OHV use is one of several activities reported by the user. Table 3.07-2 displays the amount of National Forest System roads and trails currently authorized for use by Off Highway Vehicles.

Table 3.07-2. Amount of Roads and Trails Currently Authorized for Use by Off Highway Vehicles

Description	Season of Use	Miles
Roads open to all vehicles	May 1 to Dec. 31	6.6
Roads open to all vehicles	May 1 to Nov. 1	98.0
Roads open to all vehicles	Jan. 1 to Sept. 15	5.5
Roads open to all vehicles	Open All Year	1,786.1
	Subtotal Roads Open to All Vehicles	**1,896.2**
Trails open to high clearance vehicles	May 1 to Nov. 1	5.3
Trails open to high clearance vehicles	Open All Year	184.5
	Subtotal Trails Open to High Clearance Vehicles	**189.8**
Trails open to ATVs and motorcycles (<48”)	Open All Year	17.5
	Subtotal Trails Open to ATVs and Motorcycles	**17.5**
Trails open to motorcycles	May 1 to Nov. 1	0.8
Trails open to motorcycles	Open All Year	126.6
	Subtotal Trails Open to Motorcycles	**127.4**
	Total All Miles	**2,230.9**

The Forest has almost 1,900 miles of rough surface roads which are currently authorized for use by all vehicles including passenger cars as wells as four wheel drive (4WD) vehicles, all terrain vehicles (ATVs), and motorcycles. In addition the Forest provides approximately 334 miles of general purpose trails that allow hiking, mountain biking, and motorized use together. Of those, approximately 190 miles are primarily used by 4WD, 18 miles are primarily used by ATVs and 127 miles are primarily used by motorcycles.

The Forest does not collect specific use figures for each trail or area but we can characterize use in certain areas of the Forest including Sugar Pine Reservoir, Burlington Ridge, Downie River Lavezzola Area, Gold Valley, Truckee, Greenhorn Creek and Fordyce Creek.

Sugar Pine Reservoir: The motorcycle trail system near Sugar Pine Reservoir is the closest OHV opportunity for residents in the Sacramento Metropolitan Area on the Tahoe National Forest. As such it supports the highest use of motorcycles on the forest. Most of these trails are considered easy or moderate with just a few miles of more difficult trail which provides a family oriented experience. The Forest has only a limited number of trails designed for ATV use and these are also located in the Sugar Pine area.

Burlington Ridge: The motorcycle trail system centered on Burlington Ridge receives a moderate amount of use on easy and moderate difficulty trails. The area provides a unique woods riding opportunity with very tight turns winding through the trees. Some sections require stopping to work the motorcycle through the tight turns. Past use of this area was predominately by local residents of Grass Valley and Nevada City. Recently, however, the area the area has been discovered by people from outside the local area and has received an increase in use.

Downie River Lavezzola Area: On the far northern part of the Yuba River District very difficult motorcycle trails (Double Black Diamond) provide challenging remote opportunities in a relatively pristine environment. These trails receive much lighter use than others on the Forest. These trails provide one of the few high Sierra opportunities for semi-primitive, highly challenging motorcycle trails and are considered a very valuable resource for motorcycle riders. Trails in this area are very rocky, narrow and steep. Only the most experienced of riders have the skills to negotiate these trails.

Gold Valley: The Gold Valley Area provides some moderate difficulty four wheel drive and motorcycle opportunities in a remote setting. There are several dispersed sites located adjacent Pauley Creek which provide excellent camping opportunities.

Truckee: The terrain on the east of the Forest is relatively flat with open vegetation. The Truckee Area provides some motorcycle trails near Boca, Prosser, and Stampede Reservoirs. Boca, Prosser and Stampede Reservoirs themselves are also currently used by motorized vehicles below the high water to access the shoreline for camping, boating, and other day use activities. The area also provides several 4WD trails with at least moderate challenges.

Greenhorn Area: Located just outside of Nevada City, the Greenhorn is 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. There are several residences immediately adjacent to the Greenhorn Area who are concerned about the amount and type of OHV use in the area. Law enforcement in response to illegal activities occurring in the area has been a continuing problem.

Fordyce Area: The Fordyce Area is one of the most popular and well known four wheel drive destinations in the Sierra Nevada. The very popular and renowned Fordyce Jeep trail accommodates over 2000 jeeps during the Sierra Trek event, on a very difficult and challenging trail.

Other Authorized Motorized Vehicle Recreation Opportunities

The existing Forest Service road system provides motorized access and recreation driving opportunities to most areas of the Forest. Motorized recreation activities include driving for pleasure and providing access to hiking and walking, fishing, bicycling, viewing natural features, hunting, boating, developed and primitive camping, picnicking, viewing wildlife, backpacking, resort use, visiting historic sites, nature study, gathering forest products, horseback riding, and nature center activities. Many 4WD vehicles that are capable of OHV use never get off of Forest system roads and the driver uses them as passenger vehicles or high clearance vehicles but never actually needs to put the vehicle into 4WD mode. On the other hand, off highway vehicles are also used to access many of the above activities in remote areas on rough roads that could not be accessed by regular passenger vehicles. Based on the National Visitor Use Monitoring Results for the Tahoe National Forest one can infer that about two thirds (2,460,000 visits) of Forest Visits are at least partly tied to general summer motorized recreation to the extent that they use motor vehicles to access all the recreation opportunities described above including non-motorized activities. The survey also shows that 5.3% of visitors or approximately 195,570 visitors indicated that driving for pleasure was their primary activity. The amount of National Forest Transportation System roads open to these types of activities and season of use are shown in Table 3.07-3.

Table 3.07-3. National Forest Transportation System Roads currently authorized for motor vehicle use

Description	Season of Use	Miles
Roads open to highway legal vehicles only	May 1 to Dec. 31	23.6
Roads open to highway legal vehicles only	May 1 to Nov. 1	7.5
Roads open to highway legal vehicles only	Open All Year	601.7
Subtotal Roads Open to Highway Legal Vehicles Only		**632.8**
Roads open to all vehicles	May 1 to Dec. 31	6.6
Roads open to all vehicles	May 1 to Nov. 1	98.0
Roads open to all vehicles	Jan. 1 to Sept. 15	5.5
Roads open to all vehicles	Open All Year	1,786.1
Subtotal Roads Open to All Vehicles		**1,896.2**
Grand Total All Roads		**2,529.0**

There is a total of approximately 630 miles of roads currently authorized as open for motor vehicle use by highway legal vehicles only. The public use of these roads is restricted to licensed insured drivers in registered vehicles. More than 600 miles of these roads are currently open year round. There are also almost 1,900 miles of roads open to all vehicles including ATVs and non-street legal motorcycles. Almost 1,800 miles of these roads are open all year.

Class of vehicles allowed on the existing road system

Motor vehicle operation on National Forest System roads is subject to both federal and state laws and regulations. National Forest Transportation System (NFTS) roads maintained by the TNF to accommodate standard four wheel passenger cars are subject to the Federal Highway Safety Act and are considered highways for purposes of National Forest transportation management and the California Vehicle Code (CVC). These roads are currently open to highway legal vehicles only.

NFTS roads maintained for high clearance vehicles are generally not suitable for standard four wheel passenger vehicles. As such, they are not subject to the Federal Highway Safety Act, are considered roughly graded roads for purposes of the CVC Division 16.5, and are generally open to all vehicle classes including off highway vehicles (OHVs). The class of vehicle able to be used on motorized NFS trails is based on existing trail width and design features and management objectives for each trail.

Class of vehicles allowed on the existing road system is an important concept that can affect OHV recreation opportunities depending on how it is implemented on the Forest. Mixed use is the combination of highway and non-highway legal vehicles on the same road. Appendix S (Mixed Use) provides a more detailed description of mixed use and how recommendations will be made. From a recreation opportunity point of view it is clear if mixed use is not allowed on certain roads, access to OHV loop opportunities could be cut off to unlicensed vehicles and opportunities for OHV use could be diminished. The final route designation decision will identify the class of vehicle and season of use that will be allowed for each route included in the designation. The following roads were brought forward to be analyzed for motorized mixed use (mixing highway-legal vehicles with non-highway-legal vehicles).

Table 3.07-4. Roads currently authorized for highway legal vehicles being considered for mixing highway-legal vehicles with non-highway-legal vehicles

Road Number	Road Name	Length (miles)
120-08	Pendola Extension	3.6
14	Grouse Ridge	5.8
14-01	Fall Creek	2.3
14-07	Grouse Ridge CG	0.3
17	Carr Lindsey	4.3
18	Bowman (over the snow)	14.5
18-06	Blue Lake	1.0
20-12	Burlington Ridge	5.6
20-12-01	Skillman CG	0.7
20-12-03	Towle Mill	1.3
20-16	Diamond Creek	4.0
21	Washington Gaston	10
25	Cal-Ida	12.5
27	Fiddle Creek	9.9
29	Omega	6.0
29-02	Alpha	3.2
32	Chalk Bluff	2.1
34	Jouberts	11.9
35	Eureka	10.8
41	Pinoli Ridge	14.3
424-06	Lower Greenhorn	5.4
49-47	Union Flat CG	0.2
654-02	Indian Spring CG	0.9
654-03	Indian Spring Staging	0.1
738-04	Golden Quartz	0.3
843-37	Faucherie Lake	3.4
85	Rattlesnake	11.0
85-13	Lola Montez Lake	0.8
93	Gold Valley	10.9
93-02	Monarch	1.8
93-03	Pauley Creek	4.4
93-04	Hog Canyon	4.7
98	Banner Mine	8.1
01	Jackass Point	2.9

Road Number	Road Name	Length (miles)
03	Barker Pass	10.9
04	Bear Valley	6.4
05	Treasure Mtn.	10.5
06	Sawtooth	10.3
07-40	Lake of Woods	4.1
07-6	Little Truckee Parking Area	0.15
09	Haskell Peak	14.3
11	Sagehen	5.2
11-4	Sagehen SP	0.7
11-4-2	Sagehen CG	0.4
12	Yuba - Weber	17
12-2	Yuba Pass CG	0.3
12-99	South Bonta	3.5
15	Nichols Mill	8.2
261-4 and spurs	Logger CG	0.2
28	Church Creek	2.7
3-4	Niehaus	6.5
49-53	South Fork State Tract	0.2
49-54	Carvin Creek Tract	0.8
49-56	Haskell Creek Tract	0.5
52	Chapman Calpine	8.2
54	Williams Creek	12.7
541-10	Cold Canyon	1.4
5688	Bald Ridge	14.6
5708	Pole Creek	7.0
70	Pass Creek Loop	7.5
70-80	East Meadows CG	0.5
70-80-20	East Meadow CG	0.3
71	Carman Valley	11.4
72	Verdi Peak	11.7
72-2	Verdi Peak Spur	2.9
76	Austin Meadows	2.1
780-12	Carpenter Valley	14.6
86	Meadow Lake	6.1
89-33-1	Prosser Hill OHV	0.1
89-55	Rice Canyon	2.7
89-88	Old 71	0.7
10-16	Sugar Pine OHV Staging Area	0.2
16	Canyon View Loop	6.7
19	Texas Hill Mears	3.4
19-16	Hellester	8.7
24	Brimstone	2.5
24-16	Parker Flat OHV Staging Area	0.2

Road Number	Road Name	Length (miles)
24-21	Big Reservoir	0.4
33	Peavine	9.7
33-27	Peavine Spur	0.4
43	Robison Flat	5.7
43-24 and spurs	Robinson Flat Campground	0.1
44	Cavanah Deep	11.6
44-22	Last Chance	4.8
45	Monumental Creek	6.3
57	Red Star	4.7
68	Coyote Spring	5.5
88-11	Mitchell Mine	2.8
88-14	China Wall OHV Staging Area	0.2
88-30	Secret House	0.3
96	Mosquito Ridge	2.7
96-91	Ahart CG	0.4

Un-Authorized Motorized Vehicle Recreation Opportunities

In addition to the Forest Service system roads, trails and areas there are approximately 1,400 miles of routes un-authorized for motor vehicle use that are being analyzed for possible inclusion in the National Forest Transportation System as open for motor vehicle use. There are also five un-authorized areas that are being analyzed in this project for open use by motor vehicles or subject to closure.

Roads and Trails Un-authorized for motorized use: Many of these are presently being used for general motor vehicle use or OHV use and provide access to dispersed camping, hunting, and other recreation opportunities. While the Forest can not afford to add all of these routes to the National Forest Transportation System, it will be important to consider what kind of recreation opportunities, both general motorized and OHV, are being forgone and where and how, valuable routes might be retained. The amount of roads and trails with un-authorized motor vehicle use are shown in Table 3.07-5.

Table 3.07-5. Roads and trails with un-authorized use by motorized vehicles

Description	Miles
National Forest System Maintenance Level 1 roads not authorized for public use by motor vehicles, but currently being used	160.0
Temporary roads for Forest Service projects.	66.1
User created roads and trails	1,162.8
Total Un-Authorized Roads and Trails Currently Being Used by Motor Vehicles	**1,388.9**

Areas: There are currently five areas which are being used by motorized vehicles as open areas. Two of these areas (Greenhorn Creek and Eureka Diggings) are currently being used by four wheel drives, ATVs and motorcycles as play areas. Such open play areas are relatively scarce in a forested setting. Most open play areas are located at lower elevations outside of the National Forests. The other three open areas being used are Boca, Prosser and Stampede Reservoirs. As the water levels are drawn down in these reservoirs, motor vehicles are used to access the shoreline for boating, camping, fishing and picnicking. They are typically not used as open play areas as are Eureka Diggings and Greenhorn Creek. Table 3.07-6 displays the open areas currently being used by motor vehicles.

Table 3.07-6. Areas currently being used by motorized vehicles

Area	Type of Use	Acres
Greenhorn Creek	Open Area	27
Eureka Diggings	Open Area	60
Boca, Prosser, and Stampede Reservoirs	Shoreline access on dry soils	2,589
	Total Acres	**2,676**

Cross Country Travel: Unauthorized cross country travel also still occurs on the Tahoe National Forest. This use continues since it is not prohibited by a specific Forest Order. In addition to specific roads and trails, geographic areas of the Forest 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. These previous administrative decisions regarding land suitability for motorized use on the Tahoe National Forest are summarized in the following figure.

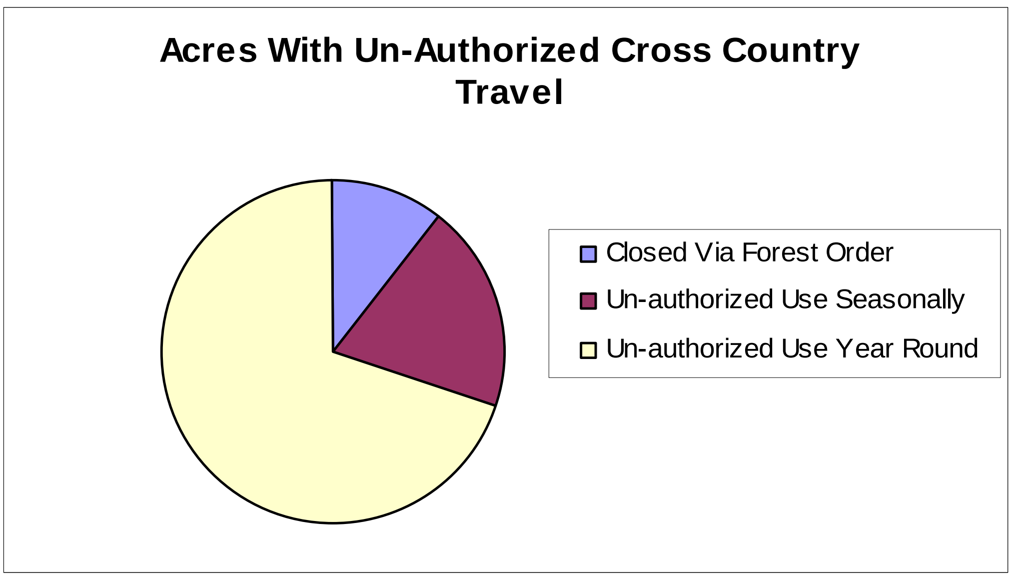

Figure 3.07-1. Un-authorized cross country travel

Approximately 86,500 acres of the Tahoe National Forest have Forest Orders prohibiting any motorized vehicle use. 156,500 acres receive un-authorized cross country use during a portion of the year and 561,400 acres have un-authorized cross country use year round.

Developed Recreation Opportunities

Developed recreation facilities attract a significant amount of the motorized recreation users. The TNF provides a wide range of facilities located in attractive settings primarily located along reservoirs or rivers. The developed facilities include: 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 can also be a base facility for OHV activities.

Non-Motorized Recreation Opportunities

Approximately one third of visitors to the Forest engages in non-motorized activities and has identified them as their primary activities. Hiking/walking is the highest activity followed by fishing, bicycling, other non-motorized, viewing natural features, relaxing, non-motorized boating, primitive camping, picnicking, viewing wildlife, backpacking, nature study, and horseback riding. These uses occur in many areas of the forest. Hiking and primitive camping are popular in Grouse Lakes Vehicle Closure Area, Castle Peak area, and Granite Chief Wilderness. The two most popular hiking trails on the forest are Loch Leven trail heading south from Big Bend and the trail to Five Lakes Basin accessed from the road to Alpine Meadows ski area. The Pacific Crest Trail provides an excellent remote hiking route that generally follows the Sierra crest and runs right down the middle of the Forest. Mountain Biking is popular across the forest and is quite popular along the trails north of Downieville, trails in the Grouse Lakes Vehicle Closure Area, the greater Truckee area and the Pioneer Trail along State Highway 20. Tables 3.07-7 and 3.07-8 display the amount of non-motorized recreation opportunities available on the Forest.

Table 3.07-7. Acres available for non-motorized recreation opportunities

Category	Acres
Open only to non-motorized use year round	86,500
Open to both motorized and non motorized use	717,900

Table 3.07-8. Trails available for non-motorized recreation opportunities

Category	Miles
Trails open to both Motorized and Non-motorized users	334.7
Trails open only to non-motorized users	286.3
Trails open only to hikers and equestrians (No mountain bikes allowed)	145.1
Un-Authorized Trails open to Motorized and Non-motorized users	897.0
Total Miles of Trails Available for Non-Motorized Use	**1,663.1**

Of the approximately 800,000 acres on the Tahoe National Forest, 86,500 are open only to non-motorized use. There are approximately 1,660 miles of trails available for non-motorized users, of these 430 miles are open only to non-motorized users.

Recreation Opportunity Spectrum

Recreation Opportunity Spectrum is a recreation planning concept adopted by the Forest Service that helps identify a range of recreation opportunities from primitive settings to urban settings. More detailed definitions of each setting can be found in the section titled “Forest Plan Management Standards and Guidelines.” On the Tahoe National Forest two areas (Granite Chief Wilderness and the North Fork

American Wild River) are managed for primitive opportunities and setting. Grouse Ridge Vehicle closure area and the North Fork American River Canyon are the primary semi-primitive non-motorized areas along with two Research Natural Areas, an Experimental Forest, and the remainder of Granite Chief roadless area north of Granite Chief Wilderness. Semi-primitive motorized areas are located in the northern third of East and West Yuba roadless areas, the Sierra Buttes area, most of the Middle Yuba roadless area, several areas adjacent to the Grouse Ridge Vehicle Closure Area, most of Castle Peak roadless area, the Loch Leven Lakes area and the North Fork of the Middle Fork American River roadless area along with several smaller areas. Roaded natural areas, which can be compared to general forest areas, can be found throughout the rest of the Forest with the exception of some areas considered rural (more developed) along Interstate 80, the city of Truckee, Highway 89 south, and developed areas between Truckee and Stampede Reservoir. As discussed above, the main issue is keeping track of semi-primitive motorized and non-motorized recreation opportunities and how road management may affect these valued recreation opportunities.

Recreation Demand

As the population of California continues to grow, the recreation demand has continued to grow on the Forest. The 1990 Forest plan indicated that there was a high demand for semi-primitive non-motorized and primitive recreation opportunities and a shortage of acres available on the Forest due its vast road system. The plan also noted a high demand for semi-primitive motorized recreation opportunities and a

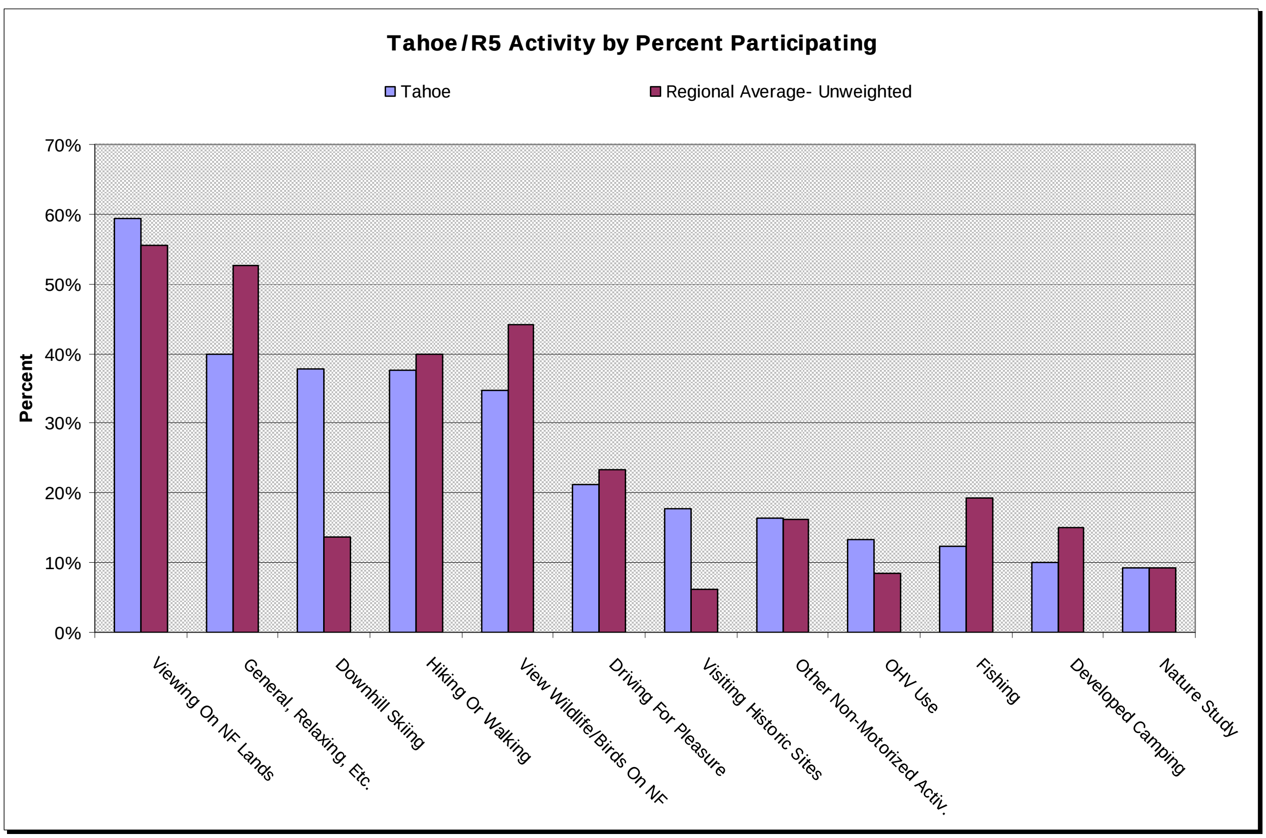

Figure 3.07-2. Visitor Activities - Forest

similar shortage of acres. With high demand for both semi-primitive motorized and non-motorized recreation opportunities it is not surprising that users have strong opinions on how trails should be allocated for either use. In some areas there are user conflicts over motorized activities compared to non-motorized activities. For example in East and West Yuba roadless areas the conflict is primarily between motorcycles and mountain bikes on certain popular trails. In other areas, the conflict is between the noise from motorized use and the desire for non-motorized users to have peace and quiet. On some trails there is a mix of use that all users seem willing to accommodate. The nearly equal demand for both motorized and non-motorized opportunities continues today and there is a concern that we manage the resource to ensure that future demand will be met.

Recreation demand is defined as what people desire when they visit the forest. Demand can be assessed in a variety of ways. First we need to look at existing uses; how people are currently using the forest. In 2001 a recreation use survey was conducted and results were summarized in a focus package. Although not always a visitors primary activity, the activities that people participate in at some point during their stay on the forest show that the ten most popular are: viewing scenery and natural features; relaxing; downhill skiing; hiking; viewing wildlife; driving for pleasure; visiting historic sites; other non-motorized activities such as swimming and water play; OHV; and fishing. Since this survey was conducted we have also seen an increase in picnicking, snowmobiling, and bicycling.

The survey asked which activities the visitor did during their visit; the visitor could check more than one activity. For Figure 3.07-2 (previous page), the X axis displays recreation activities while the Y axis shows percent participation.

We also need to look at where visitors come from, or our market zone, to understand some of their needs. Most visitors to the Tahoe National Forest are coming from local surrounding counties as well as from the greater Reno and Sacramento areas and from the Bay area.

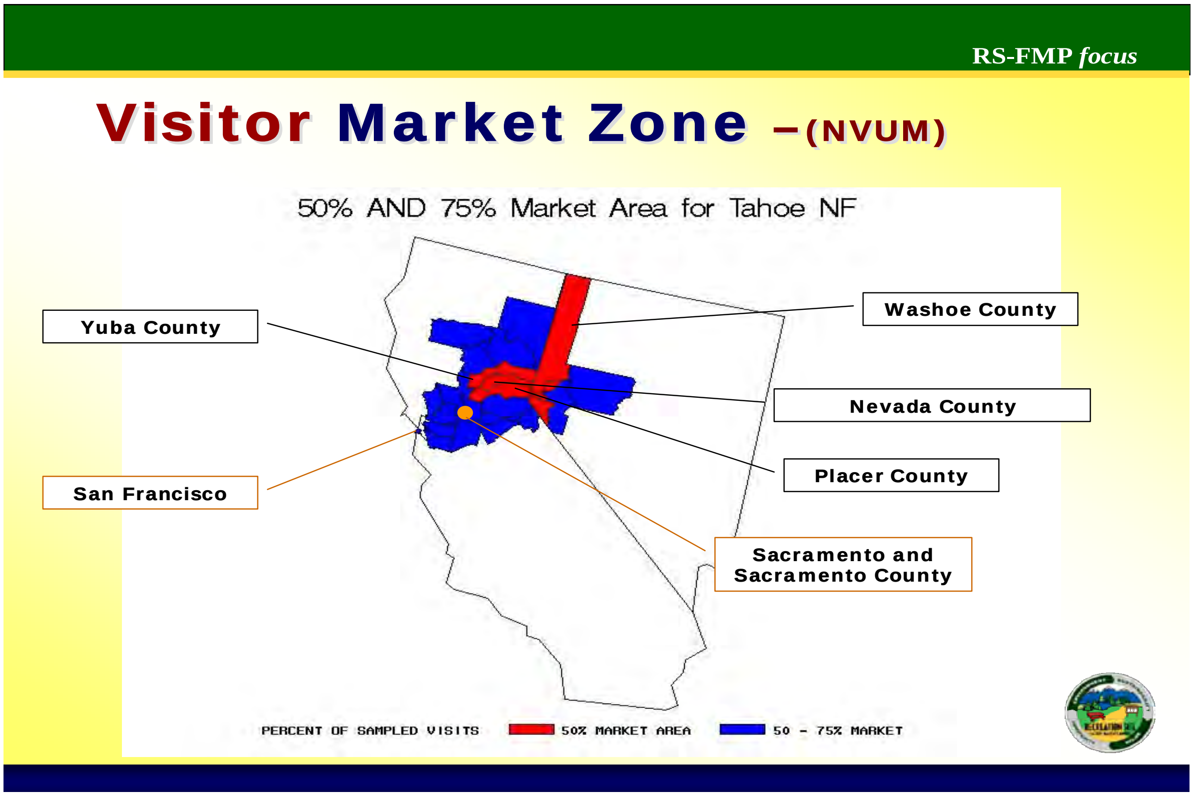

Figure 3.07-3. Tahoe National Forest Visitor Market Zone

Counties contributing larger amounts of visitation to the forest are pointed out, and San Francisco is pointed out to illustrate its proximity to the forest. The 50% cutoff distance was about 50 miles and the 75% cutoff was about 200 miles.

When we look at the type of recreation activities that are occurring in areas where our visitors live, we see that use on the forest is very similar to use in our market area. We also see the projected increase in all forms of use over the next several years.

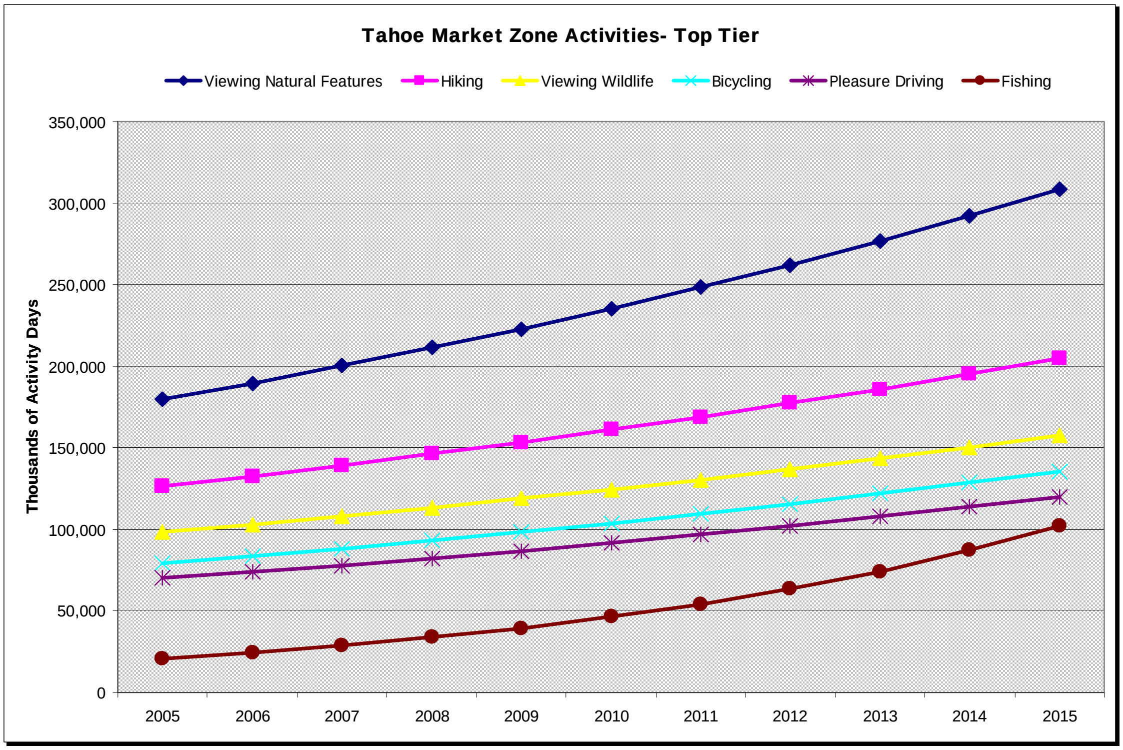

Figure 3.07-4. Tahoe National Forest Market Zone Top Tier Activities

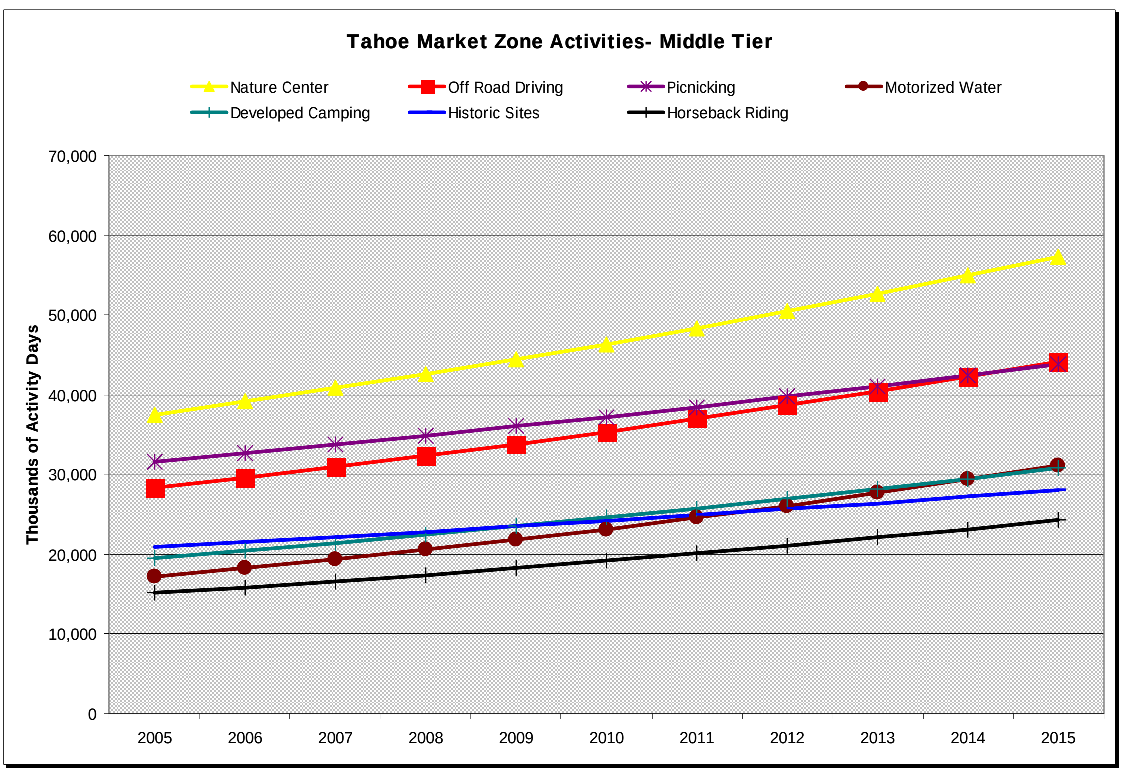

Figure 3.07-5. Tahoe National Forest Market Zone Middle Tier Activities

Demand also looks at the characteristics of our visitors. One important factor to note is the potential impact from an aging population.

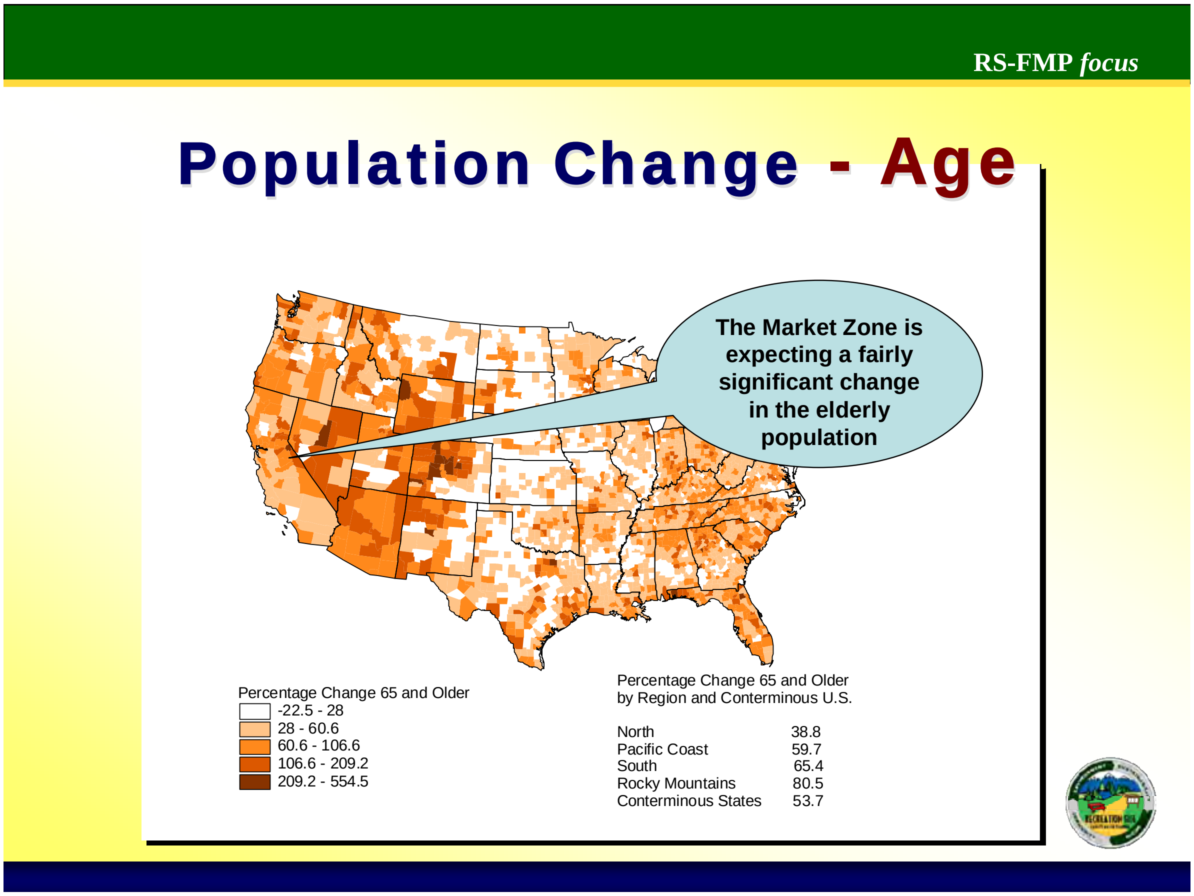

Figure 3.07-6. Tahoe National Forest Market Area Population Changes

In addition to the overall population increasing, the elderly population (65 and over) will see dramatic increases due to the Baby Boomer generation reaching retirement age starting in 2011.

Our market zone is a retirement destination and will potentially see significant increases as the Baby Boomer generation retires and relocates. CA SCORP-California's senior population will double by 2020. Additional mobility enhancements will be needed to ensure their independence and access to outdoor experiences. This generation, born and bred in prosperity, is looking for an amenity-rich and meaningful outdoor recreation experience, increasing the need for programs, facilities, and infrastructure. Boomer seniors will be drawn to conservation and heritage causes, adding much-needed capacity to California's citizen-steward ranks. They will travel extensively and participate in record numbers in second-home and RV ownership. They will assemble vast collections of digital equipment and motorized and mechanized outdoor recreation gear.

U.S. Census Bureau

As the Baby-Boom generation (those born between 1946 and 1964) starts reaching retirement age in 2011, the size of the elderly population (ages 65 and over) is projected to increase in all states. California and Florida would continue to rank first and second, respectively, in having the largest number of elderly.

There is a general changing attitude that leisure time is not a privilege, but a right earned by years of hard work. Improved health care, greater emphasis on maintaining lifelong physical fitness and a changing image of what “old” people can or cannot do are also factors that contribute to greater participation in outdoor recreation and leisure activities. They have more free time available for activities. Some are interested in continuing education and have a strong desire to learn about nature, wildlife viewing, and history/culture, for example. Some people are interested in high-risk activities, and a number of people over the age of 40 are beginning such activities as rock climbing.

Figure 3.07-7. Tahoe National Forest Projected Changes In Visitor Activities

Projected demand shows that most of the activities that are important to users of the forest today will continue to be important to users in the future. Since population projections indicate steadily increasing use by all user types, it is important to maintain opportunities for these uses.

Costs and Funding for Trail Maintenance

While OHV use has been increasing, grants from the state have started to decline in the last several years. Budgets for TNF recreation management including OHV management have also been declining over the last few years. Maintaining the Tahoe National Forest trail system both motorized and non-motorized becomes more difficult every year. Volunteers provide significant support to maintaining trails on the Forest. However, the combination of grants, USFS money, and volunteers is not fully keeping up with maintaining the existing trail system. The ability to maintain trails through existing funding sources and volunteer efforts will be an important criterion in terms of how many additional OHV trails the Forest can add to the system.

Scenic Values

The public values scenery as an important component of their recreation opportunity on the Tahoe National Forest. The NVUM survey showed that approximately 6 percent of visitors identified viewing natural features as their main activity while 59.3 percent identified it as part of Total Activity Participation. For evaluating OHV trails, scenic values were considered in two primary ways. Where trails provided riding opportunities to scenic vistas or the trail provided scenic viewing opportunities this was identified and considered as a recreation opportunity. Where trails were visible from other key viewing points and did not blend in with the landscape, this was identified as well. The Forest has a Visual Management System that has set Visual Quality Objectives for various areas of the forest. To the degree OHV trails being considered do not meet VQOs these effects will be identified and be part of the effects analysis. The VQOs are: Preservation VQO; management activities except very low visual impact recreation facilities are prohibited. Preservation VQOs are consistent with Primitive ROS (i.e., Wilderness areas). Retention VQO; provides for management activities which are not visually evident. Partial Retention VQO; provides for management activities that remain visually subordinate to the characteristic landscape. Modification VQO; provides for management activities which may dominate the original characteristic landscape. However, such features as roads must remain visually subordinate to the broader characteristic landscape. Maximum Modification; allows for vegetative and landform alterations that dominate the characteristic landscape. However, roads must remain visually subordinate to the proposed composition as viewed in background. More detailed definitions and photos displaying the VQO concepts can be found in the National Forest Landscape Management Volume 2 Chapter 1, the Visual Management System, Forest Service, USDA, Agriculture Handbook Number 462. All of the OHV trails under consideration meet the required Visual Quality Objectives so the effects analysis will focus on the potential for aesthetic impacts.

Environmental Consequences

Off Highway Vehicle Recreation Opportunities

For environmental consequences the alternatives will be compared in general for all Off Highway Vehicle (OHV) recreation opportunities and then where appropriate specific opportunities or areas will be compared by alternative. The alternatives are listed in order of which alternative provides the most additional OHV opportunities descending to the least OHV opportunities. Alternative 1 provides the most OHV recreation opportunities followed by Alternative 5, 2, 6, 7, 4, and the least opportunities provided by Alternative 3. Other aspects of motorized opportunities and non motorized opportunities are then discussed.

Alternative 1 (No Action) allows for the most OHV opportunities

It provides 189.8 miles of National Forest System trails open to high clearance trail vehicles, of which only 5.3 miles have seasonal restrictions. It also has 17.5 miles of National Forest System trails open year round for ATVs and motorcycles and 127.4 miles open for motorcycles. Almost all (99.4%) of the National Forest System motorcycle trails are open year round.

Use would be allowed to continue on 1,388.9 miles of routes un-authorized for motorized use. To the degree these routes need maintenance and are not maintained, there could be some diminishment to the quality of OHV experiences.

- **OHV Road Opportunities**: Approximately 1,896.2 miles of native surface roads would be open to all vehicles including non-street legal ATVs and motorcycles. Of these, 1,786.1 miles (94%) would remain open year round.
- **OHV Open Area Opportunities**: Prosser Pits, Greenhorn Creek, and Eureka Diggings would be OHV open areas all year. Motor vehicles would also continue to be able to drive below the high water line at Boca, Prosser and Stampede Reservoirs to access the shoreline provided the soils were dry. All together these locations would provide 2,703 acres of OHV open area opportunities.
- **Cross Country Travel**: Cross country travel in motor vehicles could continue year round on 561,400 acres and seasonally on an additional 156,500 acres. Only 86,500 acres would be closed to cross country travel under current Forest Orders.

Alternative 5 provides for the next highest level of OHV opportunities

- **OHV Trail Opportunities**: Alternative 5 provides 434.1 miles of National Forest System trails open to high clearance trail vehicles, 29.4 miles open to ATVs and motorcycles, and 154.3 miles open to motorcycles. Many of the motorcycle trails are difficult routes in remote settings. All of these National Forest System trails would be subject to seasonal closures during the wet time of the year. The increases in miles above are from conversion of some unauthorized routes to NFS trails. Use on all of the remaining un-authorized routes would be prohibited.
- **OHV Road Opportunities**: The miles of National Forest System roads open to all vehicles would increase from 1,896.2 to 2,316.3. This is a 22% over the current miles of these roads available for all vehicles. This increase is due to mixed use being approved on 481 miles of passenger car roads. This provides significant OHV road opportunities and in many cases allows links to key OHV trails that provide loops and continued riding that otherwise would be chopped up into shorter segments of OHV trail or leave segments unconnected. This also provides for OHV opportunity by allowing vehicles to drive directly from a campsite to an OHV road or trail when in immediate proximity without having to trailer the unlicensed vehicle. The majority of these roads (90%) would be closed during the winter when soils are wet.
- **OHV Open Area Opportunities**: In addition to the existing open area at Prosser pits and additional open area would be designated at Greenhorn Creek bringing the total to 54 acres of designated open areas for OHV opportunities, primarily for ATVs and some motorcycles. Open areas allow for off -trail experiences within a defined location. Eureka Diggings would be closed to motorized vehicles.

  - Motorized vehicles would be prohibited from accessing the shoreline below the high water line at Boca, Prosser, and Stampede Reservoirs. This will cut off access from some OHV trails to the campgrounds along reservoir shorelines during low water conditions. As a result, non-street legal vehicles will have to be transported on trailers between these OHV trails and the campgrounds. It would also prevent some boat launching and motorized access to the water for fishing.
- **Cross Country Travel**: Cross country travel would be prohibited across the entire Forest as it is in the rest of the action alternatives.

Alternative 2 prohibits cross-country travel but provides a moderate level of OHV opportunities

Alternative 2 provides most of the OHV opportunities that the OHV community brought forward in public meetings. In general, this alternative proposes to add most of the known high quality OHV opportunities that do not have significant environmental consequences. It has significantly fewer opportunities than Alternative 5 and the No Action Alternative but more opportunities than Alternatives 6 and 7, and significantly more opportunities than Alternatives 3, and 4.

- **OHV Trail Opportunities**: Alternative 2 provides 233.3 miles of National Forest System Trails open to high clearance trail vehicles, 20.4 miles open to ATVs and motorcycles, and 153.2 miles open to motorcycles. Many of the motorcycle trails are difficult routes in remote settings. The majority of these National Forest System trails would be open all year. Use on all of the remaining routes un-authorized for motor vehicles would be prohibited.
- **OHV Road Opportunities**: The miles of National Forest System roads open to all vehicles would increase from 1,896.2 to 2,315.9 miles. This is a 22% over the current miles of these roads available for all vehicles. This increase is due to mixed use being approved on 481 miles of smooth surface roads. This provides significant OHV road opportunities and in many cases allows links to key OHV trails that provide loops and continued riding that otherwise would be chopped up into shorter segments of OHV trail or leave segments unconnected. This also provides for OHV opportunity by allowing vehicles to drive directly from a campsite to an OHV road or trail when in immediate proximity without having to trailer the unlicensed vehicle.
- **OHV Open Area Opportunities**: In addition to the existing open area at Prosser pits and additional open area would be designated at Greenhorn Creek (27 acres) and Eureka Diggings (60 acres) bringing the total 54 acres of designated open areas with OHV opportunities primarily for ATVs and some motorcycles. Open areas allow for off -trail experiences within a defined location. In addition, the Prosser, Boca, and Stampede reservoirs allow for motorized access to their lowered shoreline in this alternative. This allows for connection of some OHV trails to campgrounds along reservoir shorelines during low water conditions, allows boat launching and motorized access to the water for fishing. All total. 2,703 acres would be designated as open areas.
- **Cross Country Travel**: Cross country travel would be prohibited across the entire Forest as it is in the rest of the action alternatives.

Alternative 6 prohibits cross-country travel but provides a moderate level of OHV opportunities

Alternative 6 provides most of the OHV opportunities that the OHV community brought forward in public meetings. In general, this alternative proposes to add most of the known high quality OHV opportunities that do not have significant environmental consequences. It has significantly fewer opportunities than Alternative 5 and the No Action Alternative but more opportunities than Alternatives 7, and significantly more opportunities than Alternatives 3, and 4.

- **OHV Trail Opportunities**: Alternative 6 provides 227.1 miles of National Forest System Trails open to high clearance trail vehicles, 29.4 miles open to ATVs and motorcycles and 148.6 miles open to motorcycles. The motorcycle trails still include some difficult trails in remote settings but not as many as Alternatives 5 and 2.
  - All of these National Forest System trails would be subject to seasonal closures during the wet time of the year.
  - Use on all of the remaining routes for motor vehicle use would be prohibited.
- **OHV Road Opportunities**: These alternative increases the number of roads open to all vehicles far less than Alternatives 2 and 5 but more than alternatives 3, 4, and 7. The miles of National Forest System roads open to all vehicles would increase from 1,896.2 to 2,141.2 miles. This is a 13% increase over the current miles of roads open all vehicles. This increase is due to mixed use being approved on 276 miles of smooth surface roads. This provides significant OHV road opportunities and in many cases allows links to key OHV trails that provide loops and continued riding that otherwise would be chopped up into shorter segments of OHV trail or leave segments unconnected. This also provides for OHV opportunity by allowing vehicles to drive directly from a campsite to an OHV road or trail when in immediate proximity without having to trailer the unlicensed vehicle. However, the majority of these roads (96%) would be closed during the winter when soils are wet.
- **OHV Open Area Opportunities**: Open areas allow for off -trail experiences within a defined location. OHV open area opportunities in this alternative would be limited to the existing designated area at Prosser Pits. Greenhorn Creek and Eureka Diggings would be closed to motorized vehicles. Motorized vehicles would also be prohibited from accessing the shoreline below the high water line at Boca, Prosser, and Stampede Reservoirs. This will cut off access from some OHV trails to the campgrounds along reservoir shorelines during low water conditions. As a result, non-street legal vehicles will have to be transported on trailers between these OHV trails and the campgrounds. It would also prevent some boat launching and motorized access to the water for fishing.
- **Cross Country Travel**: Cross country travel would be prohibited across the entire Forest as it is in the rest of the action alternatives.

Alternative 7 provides a modest increase in OHV Trail Opportunities, a slight increase in OHV road opportunities, no increase in OHV open area opportunities and prohibits cross country travel

- **OHV Trail Opportunities**: Alternative 7 provides a more modest level of OHV opportunities with 214.6 miles of National Forest System Trails open to high clearance trail vehicles, 20.4 miles open to ATVs and motorcycles and 144.7 miles open to motorcycles. The motorcycle trails still include some difficult trails in remote settings but not as many as Alternatives 5 and 2. The majority of these National Forest System trails would be open all year. Use on all of the remaining routes un-authorized for motor vehicles would be prohibited.

- **OHV Road Opportunities**: This alternative slightly increases amount of roads open to all vehicles. The miles of National Forest System roads open to all vehicles would increase from 1,896.2 to 1899.7 miles. This is an increase of less than one percent over the current miles of roads open to all vehicles. This provides fewer OHV road opportunities compared to the other alternatives. This slight increase is due to mixed use being approved on 3.4 miles of smooth surface roads. This provides only a slight increase in OHV road opportunities. OHV riding opportunities would be less continuous and less convenient with trailer needs more frequent. It will require placing non-street legal vehicles on trailers to access to key OHV trails that would otherwise provide loops. It also chops up many routes into shorter segments of OHV trails and leaves segments unconnected. This also limits OHV opportunities by not allowing vehicles to drive directly from a campsite to an OHV road or trail when in immediate proximity without having to trailer the unlicensed vehicle. A positive aspect is that the majority of these roads (94%) are open all year.
- **OHV Open Area Opportunities**: Open areas allow for off -trail experiences within a defined location. OHV open area opportunities in this alternative would be limited to the existing designated area at Prosser Pits. Greenhorn Creek and Eureka Diggings would be closed to motorized vehicles. Motorized vehicles would be prohibited from accessing the shoreline below the high water line at Boca, Prosser, and Stampede Reservoirs. This will cut off access from some OHV trails to the campgrounds along reservoir shorelines during low water conditions. As a result, non-street legal vehicles will have to be transported on trailers between these OHV trails and the campgrounds. It would also prevent some boat launching and motorized access to the water for fishing.
- **Cross Country Travel**: Cross country travel would be prohibited across the entire Forest as it is in the rest of the action alternatives.

Alternative 4 provides a modest increase in OHV Trail Opportunities, a slight increase in OHV road opportunities, no increase in OHV open area opportunities, and prohibits cross country travel

- **OHV Trail Opportunities**: Alternative 7 provides a modest level of OHV opportunities by providing 203.3 miles of National Forest System Trails open to high clearance trail vehicles, 20.4 miles open to ATVs and motorcycles and 141.6 miles open to motorcycles. None of the motorcycle trails include difficult trails in remote settings. All of these National Forest System trails would be subject to seasonal closures during the wet time of the year. Use on all of the remaining routes un-authorized for motor vehicles would be prohibited.
- **OHV Road Opportunities**: This alternative maintains the current amount of roads open to all vehicles. The miles of National Forest System roads open to all vehicles would increase from 1,896.2 to 1899.7 miles. This is an increase of less than one percent over the current miles of roads

open all vehicles. This provides fewer OHV road opportunities compared to the other alternatives. This slight increase is due to mixed use being approved on 3.4 miles of smooth surface roads. This provides only a slight increase in OHV road opportunities. OHV riding opportunities would be less continuous and less convenient with trailer needs more frequent. It will require placing non-street legal vehicles on trailers to access to key OHV trails that would otherwise provide loops. It also chops up many routes into shorter segments of OHV trails and leaves segments unconnected. This also limits OHV opportunities by not allowing vehicles to drive directly from a campsite to an OHV road or trail when in immediate proximity without having to trailer the unlicensed vehicle. All of these roads would be closed during the winter when soils are wet.

- **OHV Open Area Opportunities**: Open areas allow for off -trail experiences within a defined location. OHV open area opportunities in this alternative would be limited to the existing designated area at Prosser Pits. Greenhorn Creek and Eureka Diggings would be closed to motorized vehicles. Motorized vehicles would also be prohibited from accessing the shoreline below the high water line at Boca, Prosser, and Stampede Reservoirs. This will cut off access from some OHV trails to the campgrounds along reservoir shorelines during low water conditions. As a result, non-street legal vehicles will have to be transported on trailers between these OHV trails and the campgrounds. It would also prevent some boat launching and motorized access to the water for fishing.
- **Cross Country Travel**: Cross country travel would be prohibited across the entire Forest as it is in the rest of the action alternatives.

Alternative 3 provides the lowest level of OHV opportunities. OHV road, trail and open area opportunities are limited to existing National Forest Transportation System

All roads, trails and open areas un-authorized for motor vehicles currently being used are closed and cross country travel is prohibited. As a result, this alternative provides the least additional OHV opportunities in general and specifically for 4wd, ATVs and motorcycles compared to all the other alternatives.

- **OHV Trail Opportunities**: Alternative 7 provides the lowest level of OHV opportunities by providing 189.8 miles of National Forest System Trails open to high clearance trail vehicles, 17.5 miles open to ATVs and motorcycles, and 127.4 miles open to motorcycles. None of the trails include difficult trails in remote settings. A positive aspect is that the majority of these National Forest System trails would be open all year. Use on all of the routes un-authorized for motor vehicles would be prohibited.
- **OHV Road Opportunities**: This alternative maintains the current amount of roads open to all vehicles. This provides very few OHV road opportunities compared to the other alternatives. OHV riding opportunities would be less continuous and less convenient with trailer needs more frequent. It will require placing non-street legal vehicles on trailers to access to key OHV trails that would otherwise provide loops. It also chops up many routes into shorter segments of OHV trails and leaves segments unconnected. This also limits OHV opportunities by not allowing vehicles to drive directly from a campsite to an OHV road or trail when in immediate proximity

without having to trailer the unlicensed vehicle. A positive aspect is that the majority of these roads (99%) are open all year.

- **OHV Open Area Opportunities**: Open areas allow for off -trail experiences within a defined location. OHV open area opportunities in this alternative would be limited to the existing designated area at Prosser Pits. Greenhorn Creek and Eureka Diggings would be closed to motorized vehicles. Motorized vehicles would be prohibited from accessing the shoreline below the high water line at Boca, Prosser, and Stampede Reservoirs. This will cut off access from some OHV trails to the campgrounds along reservoir shorelines during low water conditions. As a result, non-street legal vehicles will have to be transported on trailers between these OHV trails and the campgrounds. It would also prevent some boat launching and motorized access to the water for fishing.
- **Cross Country Travel**: Cross country travel would be prohibited across the entire Forest as it is in the rest of the action alternatives.

Tables 3.07-9 through 3.07-12 compares off-highway vehicle opportunities by class of vehicle and season of use.

Table 3.07-9. Miles of OHV Trail Opportunities by Alternatives

Route Type	Time of Year	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Trail open to high clearance trail vehicles	All Year	184.5	226.9	184.5				208.2
Trail open to high clearance trail vehicles	Seasonally	5.3	6.5	5.3	203,3	434.1	227.1	6.4
	Subtotal	**189.8**	**233.3**	**189.8**	**203.3**	**434.1**	**227.1**	**214.6**
Trails open to ATVs and motorcycles	All Year	17.5	20.4	17.5	0.0	0.0	0.0	20.4
Trails open to ATVs and motorcycles	Seasonally	0.0	0.0	0.0	20.4	29.3	29.3	0.0
	Subtotal	**17.5**	**20.4**	**17.5**	**20.4**	**29.4**	**29.4**	**20.4**
Trails open to motorcycles	All Year	126.6	152.4	126.6	0.0	0.0	0.0	143.9
Trails open to motorcycles	Seasonally	0.8	0.8	0.8	141.6	154.3	148.6	144.7
	Subtotal	**127.4**	**153.2**	**127.4**	**141.6**	**154.3**	**148.6**	**144.7**
Un-authorized routes remaining open		1388.9	0	0	0	0	0	0
	Total All Routes	**1,596.2**	**253.7**	**207.3**	**223.7**	**463.5**	**256.5**	**235.0**

Table 3.07-10. Miles of OHV Road Opportunities by Alternative

Class of Vehicles Allowed	Time of Year	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Roads open to all vehicles	All Year	1786.1	2174.6	1786.1	0	229.9	75.6	1789.7
Roads open to all vehicles	Seasonally	110.1	141.4	110.3	1899.7	2086.4	2065.6	110.0
	Subtotal	**1,896.2**	**2315.9**	**1,896.2**	**1899.7**	**2316.3**	**2141.2**	**1899.7**
Roads open to highway legal vehicles only	All Year	601.7	213	601.7	598.3	213.1	369.9	598.3
Roads open to highway legal vehicles only	Seasonally	31.1	0	31.1	31.1	0	18	31.1
	Subtotal	**632.8**	**213.1**	**632.8**	**632.8**	**213.1**	**387.9**	**629.4**

Table 3.07-11. Acres of OHV Open Area Opportunities by Alternative

Area	Type of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Prosser Pits	Open Area	27	27	27	27	27	27	27
Greenhorn Creek	Open Area	27	27			27		
Eureka Diggings	Open Area	60	60					
Boca, Prosser, and Stampede Reservoirs	Shoreline access on dry soils	2,589	2,589					
	Total Acres	**2,703**	**2,703**	**27**	**27**	**54**	**27**	**27**

Table 3.07-12. Acres Used for Cross Country Travel by Alternative

Type of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Closed by Forest Order	86,500	804,400	804,400	804,400	804,400	804,400	804,400
Un-authorized use occurs seasonally	156,500	0	0	0	0	0	0
Un-authorized use occurs year round	561,400	0	0	0	0	0	0

This table includes National Forest System routes plus proposed routes for each alternative. Miles for each alternative are listed by route type.

Other Motorized Recreation Opportunities

There is a wide range of motorized recreation opportunities that are not focused on OHV. Examples include dispersed camping, boating, fishing, hiking, hunting, wildlife viewing and appreciation of nature. All of these activities use motor vehicles to access desired locations on the Forest but do not necessarily need or pursue 4WD opportunities. In some cases 4wd vehicles are used for access but not used for OHV opportunities. All the alternatives provide access to dispersed camping sites. Each alternative provides slightly different mileages consistent with the number of OHV routes included in the alternative. In other words, where fewer OHV trails are provided, access to dispersed camping sites is also limited. Table 3.07-13 shows the mileage comparisons by alternative. Out of all the potential motorized recreation activities, hunting and possibly fishing have a high potential to be affected, depending on the alternative because many people who participate in these activities use OHVs for access to or participation in their activity. Impacts for other motorized activities can range from the lack of ATV use on roads open to highway legal passenger cars only during hunting season to lost access to a dispersed camp site if the route to it is not identified on the map, to a lack of vehicle access to a favorite fishing spot, or motorized shoreline access at lakes and reservoirs where routes are not designated. Other motorized recreation activities may be impacted as well. In general, Alternative 1, the no action alternative, provides the greatest number of motorized opportunities because access to all dispersed sites and unauthorized routes is available. Alternative 5 provides the next highest level of opportunity because about 44% of the routes un-authorized for motor vehicles remain open to OHV use. In descending order alternatives 2, 6, 7, and 4 provide fewer opportunities for other motorized recreation including hunting and fishing on unauthorized roads than alternatives 5 and 1. Alternative 3 would provide the least number of opportunities because it prohibits motor vehicles on all routes un-authorized for that use. It should be pointed out that regardless of the alternative selected, the existing Forest Service road and trail systems will continue to provide a base of motorized opportunity including dispersed camping, and hunting and fishing with OHVs. If the route designation process adds additional miles of road or trail to the National Forest System then additional motorized opportunities will be available for users.

Table 3.07-13. Other Motorized Recreations Opportunities by Alternative

Road/Trail Category	Season of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Roads open to all vehicles	**All Year**	1,786.1	2,174.6	1,786.1		229.9	75.6	1789.7
Roads open to all vehicles	**April 1 to Dec. 31**				39.9	43.2	43.2	
Roads open to all vehicles	**Jan. 1 to Sept. 15**	5.5	5.5	5.5				5.5
Roads open to all vehicles	**May 1 to Dec. 31**	6.6	30.1	6.6	1761.9	1937.8	1912.8	6.6
Roads open to all vehicles	**May 1 to Nov. 1**	98.0	105.7	98.0	92.3	99.9	104.0	97.9
Roads open to all vehicles	**May 1 to Sept. 15**				5.5	5.5	5.5	
	Subtotal	**1896.2**	**2315.9**	**1896.2**	**1899.7**	**2316.3**	**2141.2**	**1899.7**
Roads open to highway legal vehicles only	**All Year**	601.7	213.0	601.7	598.3	213.1	369.9	598.3
Roads open to highway legal vehicles only	**May 1 to Dec. 31**	23.6		23.6	23.6	0.0	18.0	23.6
Roads open to highway legal vehicles only	**May 1 to Nov. 1**	7.5	0.0	7.5	7.5	0.0	0.0	7.5
	Subtotal	**632.8**	**213.1**	**632.8**	**629.4**	**213.1**	**387.9**	**629.4**
	Grand Total	**2529.0**	**2529.0**	**2529.0**	**2529.0**	**2529.0**	**2529.0**	**2529.0**

Non-Motorized Recreation Opportunities

There are several areas where non-motorized users are concerned about OHV use directly or indirectly affecting their activities through noise and trail wear and tear. The key areas of concern identified are East and West Yuba areas, Castle Peak area, Grouse Ridge Closure Area, and TKN-M1. In East and West Yuba the non-motorized public is interested in seeing trails available for hiking that are not heavily used by motor vehicles or mountain bikes. Alternatives 3 and 4 meet this need the best by not providing additional motorized trails in the East and West Yuba Area. Mountain bike use on certain trails in East Yuba is so heavy that motorcycle use is limited because of the constant stopping and slowing down to allow mountain bikes to pass. In the Castle Peak area, both motorized and non-motorized users are drawn to the scenic qualities and the opportunity for solitude. Some routes in alternatives 2, 5, 6 and 7 are proposed for addition in the Grouse Ridge area. Detailed effects for these three areas can be found in Chapter 3.10. TKN-M1 is a 3.6 mile trail currently used by mountain bikes and motorcycles. Under all alternatives except alternative 3, it is proposed to be designated as a motorcycle trail.

Table 3.07-14. Non-motorized recreation opportunities

Trail Category	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Trails open to motorized and non motorized users	334.7	407.0	334.7	365.3	617.8	405.1	379.7
Trails open only to non-motorized users	286.3	1,111.1	1,183.3	1,152.8	900.2	1,112.9	1,138.3
Trails open only to hikers and equestrians (No mountain bikes allowed)	145.1	145.1	145.1	145.1	145.1	145.1	145.1
Un-authorized trails open to motorized and non-motorized users	897.0	0	0	0	0	0	0

Mixed Use

In regards to mixed use, where unlicensed vehicles travel with licensed vehicles, Alternatives 2 and 5 provide the best OHV opportunities by providing an additional 481.2 miles of roads where unlicensed vehicles can operate because there is a low safety risk due to such factors as low road speed in a campground. Without these changes, it would be difficult for unlicensed vehicles to drive without transporting their OHV by trailer. Alternative 6 provides mixed use opportunities on an additional 276 miles. The remaining alternatives; 1, 3, 4 and 7 do not provide significant opportunities for mixed use and therefore provide less unlicensed OHV opportunity.

Table 3.07-15. Mixed use by Alternative

Road Number	Road Name	Length (miles)	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
49-47	Union Flat CG	0.2		X			X	X	
93	Gold Valley	10.9		X			X		
25	Cal-Ida	12.5		X			X		
27	Fiddle Creek	9.9		X			X		
34	Jouberts	11.9		X			X		
35	Eureka	10.8		X			X		
93-02	Monarch	1.8		X			X	X	
93-03	Pauley Creek	4.4		X			X	X	
93-04	Pauley Creek Spur	4.7		X			X		
98	Banner Mine	8.1		X			X		
654-02	Indian Spring CG	0.9		X			X	X	
654-03	Indian Spring Staging	0.1		X			X	X	
14	Grouse Ridge	5.8		X			X	X	
14-01	Fall Creek	2.3		X			X	X	
14-07	Grouse Ridge CG	0.3		X			X	X	
17	Carr Lindsey	4.3		X			X	X	
18	Bowman	14.5		X			X	X	
18-06	Blue Lake	1		X			X	X	
20-12	Burlington Ridge	5.6		X			X	X	
20-12-01	Skillman CG	0.7		X			X	X	
20-12-03	Towle Mill	1.3		X			X	X	
20-16	Diamond Creek	4		X			X	X	
21	Washington Gaston	10		X			X		
29	Omega	6		X			X		
29-02	Alpha	3.2		X			X	X	
32	Chalk Bluff	2.1		X			X	X	
41	Pinoli Ridge	14.3		X			X		
85	Rattlesnake	11		X			X		
85-13	Lola Montez Lake	0.8		X			X	X	
424-06	Lower Greenhorn	5.4		X			X	X	
843-37	Faucherie Lake	3.4		X		X	X	X	X
01	Jackass Point	2.9		X			X	X	

Road Number	Road Name	Length (miles)	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
03	Barker Pass	10.9		X			X	X	
3-4	Niehaus	6.5		X			X	X	
04	Bear Valley	6.4		X			X		
05	Treasure Mtn.	10.5		X			X	X	
06	Sawtooth	10.3		X			X		
07-40	Lake of Woods	4.1		X			X	X	
08	Pole Creek	7		X			X	X	
09	Haskell Peak	14.3		X			X		
11	Sagehen	5.2		X			X	X	
11-4	Sagehen SP	0.7		X			X	X	
11-4-2	Sagehen CG	0.4		X			X	X	
12	Yuba - Weber	17		X			X		
12-2	Yuba Pass CG	0.3		X			X	X	
12-99	South Bonta	3.5		X			X	X	
15	Nichols Mill	8.2		X			X		
28	Church Creek	2.7		X			X	X	
41	Pinoli Ridge	17.6		X			X	X	
49-53	South Fork State Tract	0.2		X			X	X	
49-54	Carvin Creek Tract	0.8		X			X	X	
49-56	Haskell Creek Tract	0.5		X			X	X	
52	Chapman Calpine	8.2		X			X	X	
54	Williams Creek	12.7		X			X	X	
70	Pass Creek Loop	7.5		X			X	X	
70-80	East Meadows CG & Spurs	0.8		X			X	X	
71	Carman Valley	11.4		X			X	X	
72	Verdi Peak	11.7		X			X	X	
72-2	Verdi Peak Spur	2.9		X			X	X	
76	Austin Meadows	2.1		X			X	X	
86	Meadow Lake	6.1		X			X		
88	Bald Ridge	14.6		X			X	X	
89-55	Rice Canyon	2.7		X			X	X	
89-88	Old 71	0.7		X			X	X	
261-4	Logger CG and spurs	3.8		X			X	X	
541-10	Cold Canyon	1.4		X			X		
780-12	Carpenter Valley	14.6		X			X		
16	Canyon View Loop	6.7		X			X	X	
19	Texas Hill Mears	3.4		X			X	X	
24	Brimstone	2.5		X			X	X	
19-16	Hellester	8.7		X			X	X	
44	Cavanah Deep	11.6		X			X		
44-22	Last Chance	4.8		X			X		
45	Monumental Creek	6.3		X			X	X	
57	Red Star	4.7		X			X	X	

Road Number	Road Name	Length (miles)	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
93	Packer Saddle	0.9		X			X	X	
68	Coyote Spring	5.5		X			X	X	
33	Peavine & spur	10.1		X			X	X	
88-11	Mitchell Mine	2.8		X			X	X	
88-30	Secret House	0.3		X			X	X	
10-16	Sugar Pine OHV Staging Area	0.2		X			X	X	
24-16	Parker Flat OHV Staging Area	0.2		X			X	X	
88-14	China Wall OHV Staging Area	0.2		X			X	X	
43-24	Robinson Flat Campground	0.1		X			X	X	
43-24-01	Robinson Flat Campground	0.01		X			X	X	
43-24-01-01	Robinson Flat Campground	0.01		X			X	X	
43-24-01-02	Robinson Flat Campground	0.01		X			X	X	
96	Mosquito Ridge	2.7		X			X	X	
43	Robison Flat	5.7		X			X	X	
96-91	Ahart CG	0.4		X			X	X	
		Total	**0 miles**	**481.2 miles**	**0 miles**	**3.4 miles**	**481.2 miles**	**276.4 miles**	**3.4 miles**

Meeting Recreation Demand

If one considers purely numerical ratings, in this case, number of miles of available routes, demand can be potentially met by simply providing more miles for a type of use or by selecting the alternative that provides the most OHV opportunity. This approach, however does not take into account the type of experience a recreation user will have while participating in their activity. Factors to consider in the demand equation include setting, vegetation type, length of the route and therefore length of time for an experience, route design factors (width, steepness, etc), and opportunities for solitude, etc. Appendix F (Trail Use Survey) lists results of a 2006 survey of Tahoe National Forest trail users and demonstrates many of the characteristics that are important for a meaningful trail experience. Demand also needs to consider opportunities at all skill levels for all types of trail use for example; we need to provide easy trails for hikers/walkers as well as more challenging trails for more experienced users. The same is true for motorcycles, ATVs, 4x4s, mountain bikes and horses.

The Forest is also charged with meeting recreation demand for other motorized and non motorized uses while maintaining the trail and road system with a limited budget. This includes keeping the trails and roads in a sustainable condition; maintained for a specific type of recreation use and experience while minimizing resource damage. Another factor that needs to be considered is that many of the miles reported as unauthorized roads and trails, while used by OHVs, are not necessarily important OHV opportunities. Many of these unauthorized roads and trails were originally created by the Forest Service for assorted functional purposes such as timber sales. In many cases these roads do not provide important OHV opportunities because they are short, dead end roads that do not provide access to valued recreation opportunities such as loop trails, vistas, streams, lakes, or dispersed camping sites.

Per the National Visitor Use Monitoring report, approximately 26% of visitors use roads, trails (motorized and non-motorized) or designated OHV areas as one of their activities while visiting the Tahoe National Forest. Collectively, the overall mean satisfaction rating on a scale of 1-5 (with 1 being poor and 5 being very good) for trail condition is 4.3, for parking availability is 4.3 and for facility condition is 3.9. The satisfaction rating for roads was 4.5. Additionally, visitors generally do not feel that crowding is an issue for the majority of recreation site types. Trailheads and parking lots are generally classified as Developed Day Use sites. Trails fall in the Undeveloped Area category.

Table 3.07-16. Percent of Site Visits by Crowding Rating by Site Type for Tahoe National Forest (NVUM 2001 data)

Crowding Rating	Day Use Developed Sites	Overnight Use Developed Sites	Undeveloped Areas (GFA)	Designated Wilderness
10: Overcrowded	0.1	0.0	0.7	0.0
9	0.1	0.0	1.0	4.2
8	0.2	12.2	1.6	6.2
7	8.9	0.2	4.6	14.7
6	0.0	5.1	3.7	4.2
5	17.9	43.3	21.0	9.4
4	5.2	30.7	4.7	16.1
3	30.8	5.3	11.1	17.8
2	14.2	0.2	36.2	25.8
1: Hardly anyone there	22.7	3.1	15.4	1.7

In summary, trail users are generally satisfied with their experience both in terms of condition of roads, trails and facilities and in terms of availability and sense of crowdedness. We are meeting the current demand for road and trail opportunities.

Our approach in this analysis for meeting future demand for motorized use is to provide trail miles and quality opportunities per the final selected alternative and to provide additional sustainable opportunities, once the actions required prior to opening for each identified route are met (see Appendix A, Road Cards). The majority of the routes with listed required actions were submitted by members of the public who felt these were important routes to add because they provided a quality motorized experience. As a continuing means to meet future demand, user satisfaction will continue to be monitored as future "National Visitor Recreation Use Monitoring" surveys are completed.

All alternatives except 1and 3, have routes identified that could be open if actions required prior to opening are completed. With the limited dollars and volunteer time available, the trails that provide the best OHV opportunities will do the best job of meeting OHV recreation demand. Alternatives 5, 2, 6, and 7 in descending order do the best job at meeting OHV demand for the higher quality OHV opportunities while balancing other recreation demands and trail sustainability.

Trails Costs and Funding

The Forest maintains 1,312 miles of trails for motorized and non-motorized use. Non-motorized trails provide access to valued wild lands such as Granite Chief Wilderness, the North Fork American Wild River, and Grouse Lakes Non-motorized Area. The Pacific Crest National Scenic Trail provides hiking and equestrian opportunities over the entire length Sierra Crest portion of the Forest. Many of the Forest's trails are used by a variety of purposes, including hiking, biking, equestrian and several forms of motorized use. Other trails are designed and built primarily for motorcycles, ATVs, or four-wheel drive vehicles. OHV use on the Forest continues to grow and is an important program that overlaps with the trails and roads program on the Forest. The Off- Highway Vehicle Grant program funded by California State Parks, Off-Highway Motor Vehicle Recreation Division, has been an important partner with the Forest for many years, providing valuable OHV trail riding opportunities, as well as camping and trailhead facilities. Off-Highway Vehicle Grants fund salaries, contracts, materials and supplies that support the Forest OHV trail program.

In FY 2005 and 2006, the Forest spent an average of approximately $115,000 of appropriated money supported by 2.7 FTEs and numerous volunteers to maintain the trail system. We intend to continue our volunteer program and to improve its organization and efficiency by focusing on recruitment, training, and support for a sustainable volunteer corps which could provide maintenance for our entire system, while meeting Forest Service standards and resource concerns. In addition to Forest Service appropriated funds, $147,000 of funds from the 2005 California State Off-Highway Vehicle program were utilized to help maintain motorized portions of the system.

Table 3.07-17. Average Costs for Trail Maintenance on motorized trails, 2006

Trail Activity	Cost per Mile - Hand Labor	Cost per Mile - Machine Maintenance
4X4	$1,200	$1,500
ATV	$1,800	$750
Motorcycle	$1,500	N/A

Alternative 5 would require the most resources (money and volunteer labor) to implement followed by Alternatives 2, 6, 7, and 4.

Scenic Values

Existing OHV activities, i.e. trails and roads, have not generated strong concerns that specific land areas are not meeting their Visual Quality Objectives. This is due to the specific and small scale nature of most of the roads and trails with one or two exceptions. However, the general public has seen tracks in meadows, hill climbs, and “bogged out” areas that they find aesthetically objectionable and have complained to Forest Service staff about their visual impacts and the accompanying resource damage concerns. It is also fair to note that many of the impacts observed by the public are caused by people breaking the law and ignoring the rules for OHV use. The alternatives will be evaluated in terms of scenic viewing opportunities and potential for site specific aesthetic impacts from OHV use.

Alternative 1 would provide the most opportunities for scenic viewing because all of the unauthorized routes and cross-country travel would be available. At the same time, this alternative would have the highest potential for the most aesthetic impacts particularly because cross country travel would be allowed and the high number of miles of roads and trails would put OHVs in or near sensitive landscapes. **Alternative 5** would provide the next highest opportunity for scenic viewing because there are still a high number of unauthorized routes proposed for use. This alternative would have a fairly high potential for aesthetic impacts on the landscape from OHV use because of the relatively high number of unauthorized roads proposed, and many of these roads would be in or near sensitive landscapes. In descending order, **Alternatives 2, 6, 7 and 4** would provide moderate levels of viewing opportunities with Alt. 2 providing more and Alt. 4 providing less. These alternatives would have a moderate potential to see aesthetic impacts on the landscape. **Alternative 3** would provide no additional OHV opportunities for scenic viewing other than those that currently exist because no new routes are proposed. It would also provide the least potential for new aesthetic impacts since there would be no change to the route system. As mentioned earlier, many of the OHV aesthetic impacts are caused by illegal activity and therefore could occur at any time and may not be relevant to the alternative.

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. The Forest Plan transportation facilities direction was established under the implementing regulations of the National Forest Management Act (NFMA) and the National Forest Roads and Trails Act (FRTA). The National Forest Transportation System (NFTS) consists of roads, trails, airfields, and areas. 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 will be designated for public use. The analysis in this section primarily focuses on these two aspects of the NFTS.

Background

A majority of national forest visitors travel on national forest system roads. Roads have opened the Tahoe National Forest 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.

Roads in the National Forest Transportation System are not public roads in the same sense as roads that are under the jurisdiction of State and county road agencies. National forest system 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 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 Tahoe National Forest has approximately 2,800 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 (Part 3.07) of this Chapter.

Some roads and trails are present on the acres where the decision to prohibit cross-country travel will be made. These routes are not currently authorized for motor vehicle use by the public. These routes will continue experiencing use in the no-action alternative, while some will be added to the NFTS in the action alternatives as motorized trails.

NFTS roads are each managed in one of three ways: as closed long term to motor vehicles (closed roads), roads maintained for high-clearance vehicles only (high clearance roads), and roads maintained for standard four wheel passenger cars (passenger car roads). Those roads maintained for standard four-wheel 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

National forest transportation system roads must be maintained to avoid problems that can arise when they fall into disrepair. Each year, the Tahoe National Forest prepares a road maintenance plan, which lines out the road work for the year. Resource protection and public safety are the maintenance priorities.

Administration needs include data recording and updates 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. In past decades, commercial users (typically timber purchasers) maintained a substantial portion of the national forest road system on the Tahoe National Forest during timber sale activities. With the decrease in timber sales, however, fewer roads are being fully maintained (meaning deferred maintenance needs did not increase). An estimated 28 percent of the Tahoe National Forest road system was fully maintained in 2007. Table 3.08-1 presents average maintenance costs for the Tahoe National Forest.

Table 3.08-1. Average Costs for Annual Road and Trail Maintenance in the Tahoe National Forest

Maintenance Class	Cost per Mile
Closed Roads	$500
High Clearance Roads	$5,772
Passenger Car Roads	$26,081
Trail Open to All Trail Vehicles	$1,350
Trail Open to ATVs	$1,275
Trail Open to Motorcycles Only	$1,500

Sources: Open roads: Gary Lybrand, Transportation Specialist, Pacific Southwest Region. Trails: Bonnie Petitt, Tahoe Recreation Officer. Closed roads receive negligible maintenance.

Availability of Resources

While the federal budget currently exceeds revenues, it is not projected to do so after 2012. 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.

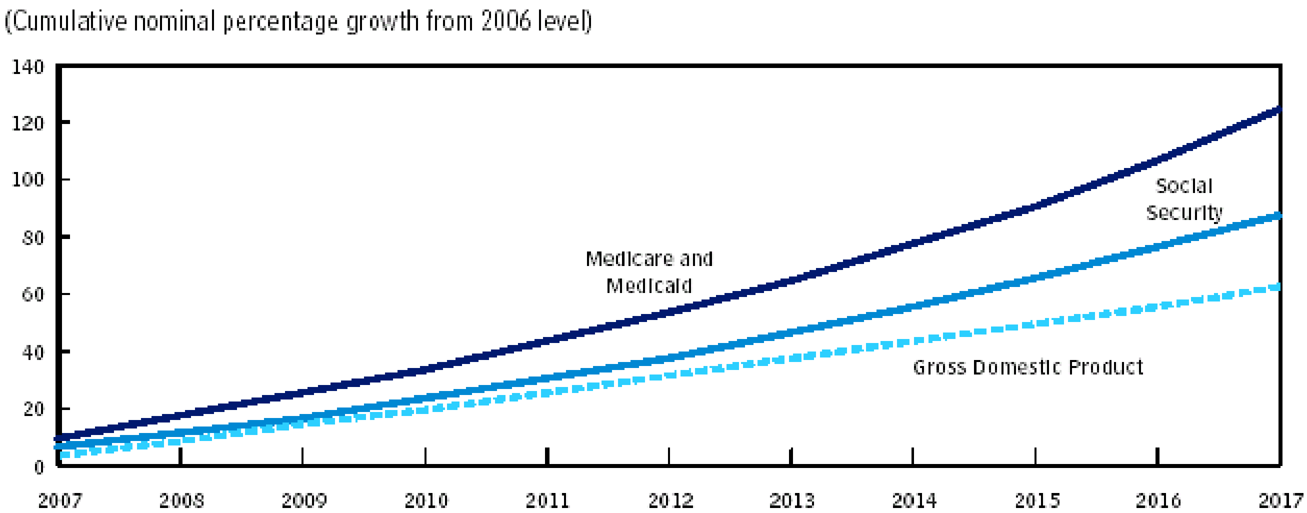

Figure 3.08-1. Congressional Budget Office's Projected Growth of the U.S. Economy and Federal Spending for Major Mandatory Programs, 2007-2017

Source: Congressional Budget Office. The Budget and Economic Outlook: Fiscal Years 2008-2017. January 2007.

Forest Service funding for road maintenance and administration has mostly 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.

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

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 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 will determine 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 Tahoe National Forest are used by a variety of vehicles, including logging trucks, chip vans, passenger cars, pick-up trucks, 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, 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, or 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, on the Tahoe National Forest, if a new road is planned for a fuels project, the design vehicle will be a 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 than those of highway-legal, the qualified engineer will consider how those different classes can be expected to function depending on the road characteristics.

Effects Analysis Methodology

Transportation Specific Assumptions

1. Any motor vehicle use authorized by state law is occurring on the NFTS unless there are Forest specific prohibitions.
2. Motor vehicle use by special use permit or other permitted activities is outside the scope of this proposal (for example, fuelwood gathering, motorized SUP events, recreation residences, etc.)
3. Eligible motorized trail vehicle classes are high clearance vehicles (4WD, etc.), ATVs, and motorcycles. Low clearance highway legal vehicles are not prohibited on trails but will not be found using trails.
4. There is some cost for maintenance that will have to be born by the Forest Service for any route open to motor vehicle use by the public.
5. 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, “Road Cards,” and Appendix S, “Mixed Use.” Additional information is part of the project record.

Required Considerations

Public Safety

36CFR212.55 requires public safety be considered when designating roads, trails, and areas for motor vehicle use. The proposed additions and changes to the NFTS have been evaluated for their effects on public safety. Refer to Appendix A for specific information on each road or trail considered to be added to the NFTS.

Affordability

36CFR212.55 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 Tahoe National Forest is $115,000,000. Note 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

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.

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 S – Mixed Use).

> **Transportation Rule (36 CFR 212, 251, 261 and 295)**: The alternatives in this EIS are designed specifically to implement the requirements of the November 5, 2005, rule for travel management; *Designated Routes and Areas for Motor Vehicle Use*. In particular, it addresses the requirements of *36 CFR § 212 Designation of roads, motorized trails, and motorized areas* which states in part "*Motor vehicle use on National Forest System roads, on National Forest System trails, and in areas on National Forest System lands shall be designated by vehicle class and, if appropriate, by time of year by the responsible official on administrative units or Ranger Districts of the National Forest System*."

Forest Plan Goals call for providing a broad spectrum of recreational opportunities in accordance with need, demand, and type of use (LMP page 97). Additionally, the Forest Plan calls for closures where obvious conflicts exist (LMP page 97). Furthermore, the Forest Plan calls for providing safe recreational access (LMP page 100).

Public Safety

Alternatives 2 and 5 present the greatest risks to public safety, as they contain the most miles where motorized mixed use would occur on roads with either high crash severities or high crash probabilities or both. Alternative 6 follows with some roads evaluated as having high crash severities and no roads with high probabilities. It also has less roads that are inconsistent with the 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."

Changing passenger car roads to high clearance roads does not present a safety risk in and of itself, but by changing these roads, motorized mixed use will be allowed where it previously was not. Therefore, these roads were also analyzed for motorized mixed use.

The new trails proposed in Alternatives 2, 4, 5, 6, and 7 were evaluated for safety and compliance with design standards (see Appendix A, Road Cards, for specific routes). None of the trails present an unacceptable safety risk.

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 changed to high clearance roads	0	285.6	0	3.4	285.6	285.6	3.4
Miles of routes unauthorized for motor vehicles added as trails	0	66.3	0	27.0	276.6	64.1	45.1
Miles of Passenger Car Road with Change in Allowed Classes of Vehicles from "Highway Legal Only" to "All Vehicles"	0	481.2	0	3.4	481.2	276.4	3.4
Miles of passenger car roads with high crash severity MMU	0	247.7	0	0	247.7	86.1	0
Miles of passenger car roads with high crash probability MMU	0	28.0	0	0	28.0	0	0
Number of MMU roads consistent with CVC	0	80	0	1	80	69	1
Number of MMU roads not consistent with CVC	0	12	0	0	12	9	0

Affordability

All alternatives require over $20 million annually to fully maintain. Alternatives 1, 3, 4, and 7 all cost the most at over $28 million because little or no roads will be downgraded from passenger car to high clearance. Continuing to maintain these roads for passenger cars presents a significant expense. Alternatives 2, 5, and 6 all cost approximately $23 million annually to maintain, or approximately $5 million less than the other alternatives.

Wet weather seasonal restrictions on roads will decrease road maintenance needs, but the amount is difficult to quantify. Based on the Tahoe National Forest road equipment operator's field experience, if a road is bladed in the fall and motorized vehicles do not use the road again until late spring, the road will not need to be bladed the following year. Therefore, under ideal conditions, the blading frequency could be increased from annually to once every two years.

Table 3.08-4. Summary comparison of alternatives with respect to affordability

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
NFTS roads (miles)	2529.0	2529.0	2529.0	2529.0	2529.0	2529.0	2529.0
High Clearance	1896.2	2181.8	1896.2	1899.6	2181.8	2181.8	1899.6
Passenger Car	632.8	347.2	632.8	629.4	347.2	347.2	629.4
Roads open seasonally	141.2	141.4	141.4	1,930.8	2,086.4	2,083.6	141.1
Trail Maintenance Needs (miles)	1,596.2	253.7	207.3	223.7	463.5	256.5	235.0
Annual Maintenance ($):							
Roads	27,698,123	21,897,873	27,698,123	27,629,073	21,897,873	21,897,873	27,629,073
Trails	469,643	570,765	469,643	512,865	854,970	566,970	532,770
Subtotal	**28,167,766**	**22,468,638**	**28,167,766**	**28,141,938**	**22,752,843**	**22,464,843**	**28,161,843**
Implementation Costs:							
Passenger car road changed to high clearance road	$0	$54,221	$0	$919	$54,221	$54,221	$919
MVUM	$0	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
MMU	$0	$143,500	$0	$0	$143,500	$82,500	$0
Subtotal	**$0**	**$297,721**	**$100,000**	**$100,000**	**$297,721**	**$236,721**	**$100,919**
Total estimated cost (millions)	**$28.2**	**$22.8**	**$28.3**	**$28.2**	**$23.1**	**$22.7**	**$28.3**

The key costs associated with changing passenger car roads to high clearance roads are signing and administrative costs. For this estimate, three signs were assumed to need replacing for every road; each sign costs about $300 to install. And ½ hour of the data steward's time will be needed to update the INFRA database, which costs about $19. In total, approximately $919 will be needed to make the change from passenger car to high clearance road for each road.

Costs associated with producing the Motor Vehicle Use Map (MVUM) are primarily labor, as the INFRA database will need to be updated and draft maps produced and edited. The Regional Office will pay for printing.

Most of the costs for allowing motorized mixed use on roads will be associated with signing. However, some roads would also require brushing and grading.

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 the Tahoe National Forest and the potential environmental consequences. Special Areas include Research Natural Areas (RNAs), Experimental Forests, Special Interest Areas, Wilderness Areas, and Wild and Scenic Rivers.

Roadless Areas: Affected Environment

The Tahoe National Forest has eleven inventoried roadless areas totaling 200,675 acres including private land in holdings. The names and gross acres are listed below:

North Fork of the Middle Fork American River	11,153
Duncan Canyon	9,403
Granite Chief (Granite Chief Wilderness within this)	35,572
North Fork American River (NFAR Wild River within)	50,669
Grouse Lakes (Grouse Lake vehicular closure within)	20,996
Castle Peak	17,251
Middle Yuba	13,273
Bald Mountain (Extends onto the Humboldt-Toiyabe NF)	6,545
West Yuba	16,639
East Yuba	18,623
Lakes (Basin) (Extends onto Plumas NF)	551

These inventoried roadless areas were identified in the late 1970s 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. Both Castle Peak and Duncan Canyon inherited roads through land purchase or exchange that were built while in private ownership. The Middle Yuba has a lot of private land and road access to private land. East and West Yuba have some primitive 4WD routes and several motorcycle system and non-system trails. The North Fork of the American has one private access road and two minor user created roads in the entire 50,669 acres. Each of the inventoried roadless areas are described in more detail below and displayed on maps.

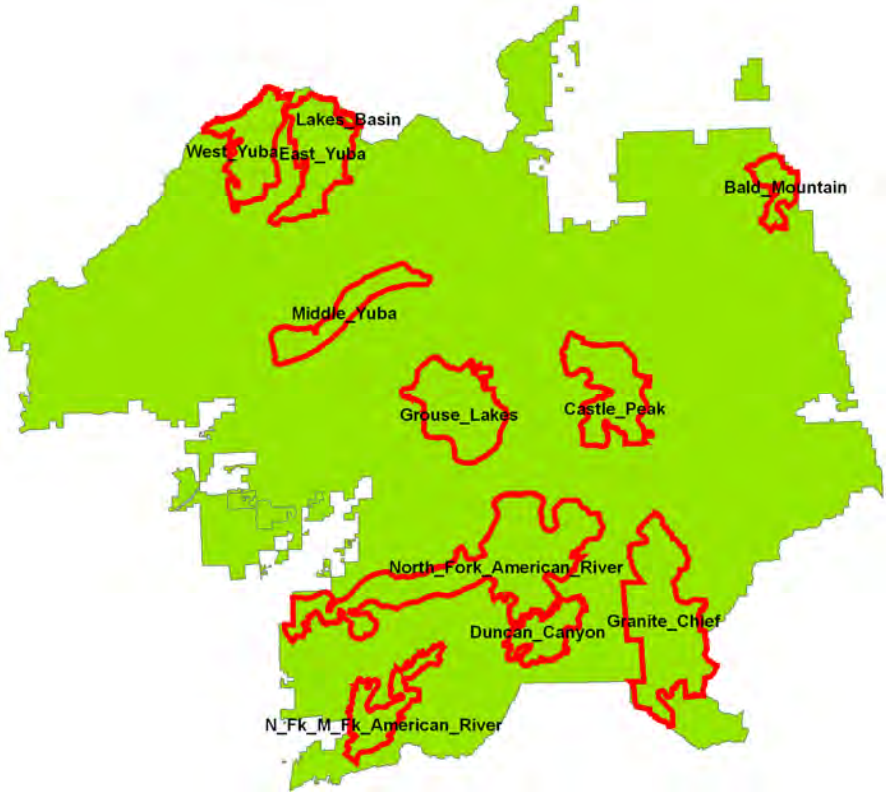

Figure 3.09-0. Roadless Areas on the Tahoe National Forest

West Yuba Inventoried Roadless Area

This area is situated north of Downieville and west of Craycroft Ridge in the Rattlesnake Creek drainage contiguous to the Plumas National Forest Roadless Area in the Table Rock and Skyhigh area.

The 6,347 acres (net and gross) that are on the Plumas National Forest are also described and displayed in this analysis.

A series of peaks (Fir Cap, Saddleback, Mt. Alma, Democrat Peak, and Deadwood Peak) form the western boundary of the area. Craycroft Ridge marks the eastern boundary. The southern boundary roughly follows a line drawn between the former town of Monte Cristo and Craycroft Diggins. The northern boundary encompasses the canyon lands (Canyon Creek drainage) in the vicinity of Table Rock, Skyhigh Peak, Stafford Mountain, Beartrap Mountain, and Gibraltar Peak.

Elevations range 3,600 to 6,800 feet. Sixty-four percent of the unit has slopes over 50 percent. Thirty percent of the area is within sensitive watershed lands. Annual precipitation averages about 75 inches; precipitation is primarily in the form of snow on the 78 percent of the area over 5,000 feet and primarily as rain below that elevation.

The Downie River, Rattlesnake Creek, and Canyon Creek are the major streams in the area. There is a total of 45 miles of perennial streams. Water quality is very high. The terrain is dissected with steep canyons and narrow sinuous ridges characterize most of the area.

The vegetation is representative of the Sierran Forest Province (Bailey classification M2610 with primarily a mixed conifer forest community (Kuchler Vegetation Type 005).

The area contains 9,671 acres of mixed conifer and 2,249 acres of red fir forest types. This forested land is scattered throughout the entire area. The remaining acres consist of hardwoods, brush, riparian vegetation, barren areas, and other non-forested land. There are 680 acres of wetlands, comprising four percent of the area.

The West Yuba area has high scenic quality throughout most of the area. Seventy seven percent of the area is in a variety class “A,” which is highly distinctive landscape. The remaining 23 percent is common variety class “B” landscape. (Most of the less scenic lands are in the southern portion of the area.)

The amount of alteration of the existing visual condition of the area varies. Less than 1 percent of EVC class I (untouched), 75 percent is class II (not noticeably altered), 14 percent is class III (alterations visible but not dominant), and 10 percent is class IV (dominated by alteration). Overall, a natural condition predominates.

There is much evidence of historic mining which has occurred during the past 100 years. Such evidence exists as roads, mine shafts, diggings, old buildings, and tailings. The historic town of Poker Flat, which Bret Harte wrote about in the “Outcast of Poker Flat,” is located in the northern portion of this area. There are numerous active mining claims throughout the area. Geological studies for this area indicate moderate to high potential for the discovery of valuable minerals.

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. There is OHV use associated with hunting throughout the area. The Poker Flat and Saddleback Ridge areas are also popular for summer OHV use. Annual recreation visitor days total 145,900 for the area. A portion of one cattle allotment is within the area.

National Forest Systems lands surrounding the West Yuba area are primarily managed for vegetation management, and heavily prospected and mined for valuable minerals.

In the 1990 Tahoe National Forest Land and Resource Management 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 3.09-1 shows the amount of roads and trails in the West Yuba Roadless Area by category.

Table 3.09-1. Roads and Trails in the West Yuba Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross Country Travel		
Acres	Not Applicable	16,057
Motorized trails un-authorized for motorized use	Not Applicable	11.3
Roads open to all vehicles	All Year	6.32
Trails open to high clearance trail vehicles	All Year	8.20
Trails open to motorcycles	All Year	9.58
Roads/trails on private land	All Year	0.26
Subtotal Motorized		**35.65**

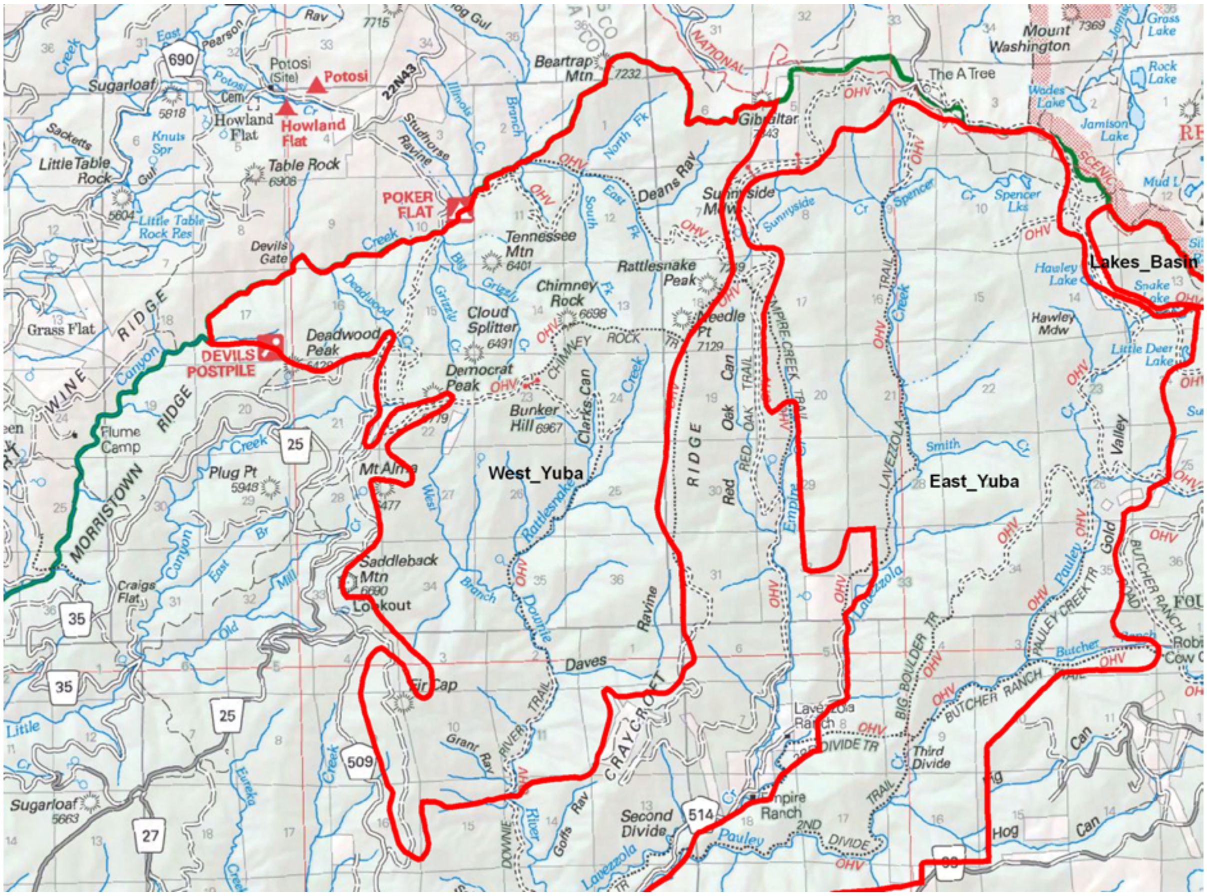

Figure 3.09-1. West Yuba Inventoried Roadless Area

Granite Chief Inventoried Roadless Area

Note: This section describes the entire roadless area, including the 18,750-acre portion designated the Granite Chief Wilderness in 1984.

This area is located adjacent to the western watershed boundary of Lake Tahoe on the Truckee and American River Ranger Districts. A small portion (1,243 acres) is located within the Lake Tahoe Basin Management Unit (LTBMU). The Wilderness Act of 1984 designated 18,705 acres to the Granite Chief Wilderness.

Elevations range from 5,000 to 8,000 feet. Twenty-seven percent of the unit has over 50 percent slopes. Forty percent of the area is within sensitive watershed lands. There are 49 miles of perennial streams. Precipitation averages 70 inches annually, the great majority occurring as snow. Water quality is very high.

The appearance of the Granite Chief area consists of a varied landscape of forest, meadows, and glacially exposed granitic landscapes. The area has high scenic value because of this variety. The major streams in the area are Five Lakes Creek and the headwaters of the North Fork and the Middle Fork of the American River. The topography varies from steep granitic cliffs interspersed with broad glaciated valleys in the north, to dissected landforms in the south. The most scenic class of landscapes, variety class A, comprises 98 percent of the northern part of the area with the remainder falling in variety class B (common landscapes). The southern portion has a slightly lower proportion of variety class A (83 percent) and more variety class B (17 percent). Granite Chief Unit 8 is 98 percent variety class A and 5 percent variety class B.

The existing visual condition of the area is predominately without visible alterations, although it is not totally pristine. In the north and in Unit 8 of the Truckee-Little Truckee Rivers Land Use Plan virtually all of the area still appears natural (EVC class II). In the southern part, 12 percent is EVC class I (untouched), 83 percent is class II (natural, no noticeable alterations), 4 percent is class III (visible alterations but still predominately natural), and, as in the north, there is a trace of class IV (alterations dominate).

The vegetation represents the Sierran Forest province (Bailey classification M2610), with primarily a coniferous forest community composed of deciduous and evergreen woodlands at lower elevations. The Kuchler vegetation type is Red fir forest (007). The area on the Tahoe NF contains 4,015 acres of mixed conifer, 12,425 acres of red fir, and 430 acres of lodge pole pine forest types. This forested land is concentrated in the southern portion of the area. The remaining 8,405 acres consist of aspen, riparian vegetation, brush, barren, and other non forested land, primarily north of Whiskey Creek Camp. There are 1,920 acres of wetlands comprising eight percent of the area. The area on the LTBMU contains 283 acres of mixed conifer, 111 acres of red fir, 153 acres of hemlock and lodge pole, and 696 acres of non-forested land. Most of the area was also included in the RARE I inventory. Sierra Pacific Industries is the major private landowner in this area. The company plans to intensively exchange their lands for vegetation management and have, in the past, received approved timber harvest plans from the State. They have also received non-cost share road easement for access to their lands in the Five Lakes Creek drainage.

The east side of the area is bordered by electronic sites, roads, ski areas (ski lift terminals), and logged over land. Portions of the west side are bordered by private lands logged in the past.

A majority of the area is unsuitable for OHV use due to steep topography and sensitive watershed lands. The Pacific Crest National Scenic Trail is located along the eastern boundary. A large sheep allotment is located in this area. There are no known mining claims in the area.

The southern portion of the area (south of Bear Pen Creek and the vehicle closure area) is "Designated Routes Only" for OHV use. The Powderhorn Trail has been used in the past by OHV enthusiasts. This area is an alternate ownership pattern, with the major private landowner being Sierra Pacific Industries. None of the private land is accessed or harvested. There are fences, some buildings and meadow restoration structures throughout the area. There is less landscape variety in this area than in the northern section. There are four power withdrawals in the Five Lakes Creek area and along the headwaters of the Middle Fork of the American River. Sheep and cattle grazing occur within portions of the area.

The portion of the LMTBU is in two equal-sized parcels. The northern parcel is in Ward Valley. Alpine Meadows Ski Area does avalanche control in this area. The southern parcel is at the headwall of Blackwood Canyon and shows signs of the overgrazing that occurred prior to 1950. Blackwood Creek does not meet water quality standards because of past logging, grazing, and quarry operations. The Forest Service is in the process of restoring the creek to a self-sustaining stream system meeting all applicable water quality goals.

Recreation use in the area totals approximately 65,500 RVDs per year. The area is used primarily by hikers, fishermen, and hunters, with some OVH use in the southern portion. Approximately 3.5 miles of trail is used for the annual Tevis Cup 100-Mile Endurance Ride. The Westerns States Endurance Run and the Capital-to-Capital Endurance Ride are within the roadless area boundaries. The Tevis Cup Ride has occurred traditionally every year since 1954.

The major attractions of this area are high, rugged granitic cliffs and broad glaciated valleys found in the northern portion. 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 1990 Tahoe National Forest Land and Resource Management 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 3.09-2 shows the amount of roads and trails in the Granite Chief Roadless Area by category.

Table 3.09-2. Roads and Trails in the Granite Chief Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross Country Travel		
Acres	Not Applicable	5,896
Motorized trails un-authorized for motorized use	Not Applicable	.34
Roads/trails on private land	All year	0.44
Trails open only to non-motorized users	All year	0.06
Trails open only to hikers and equestrians (No mountain bikes allowed)	All year	51.70

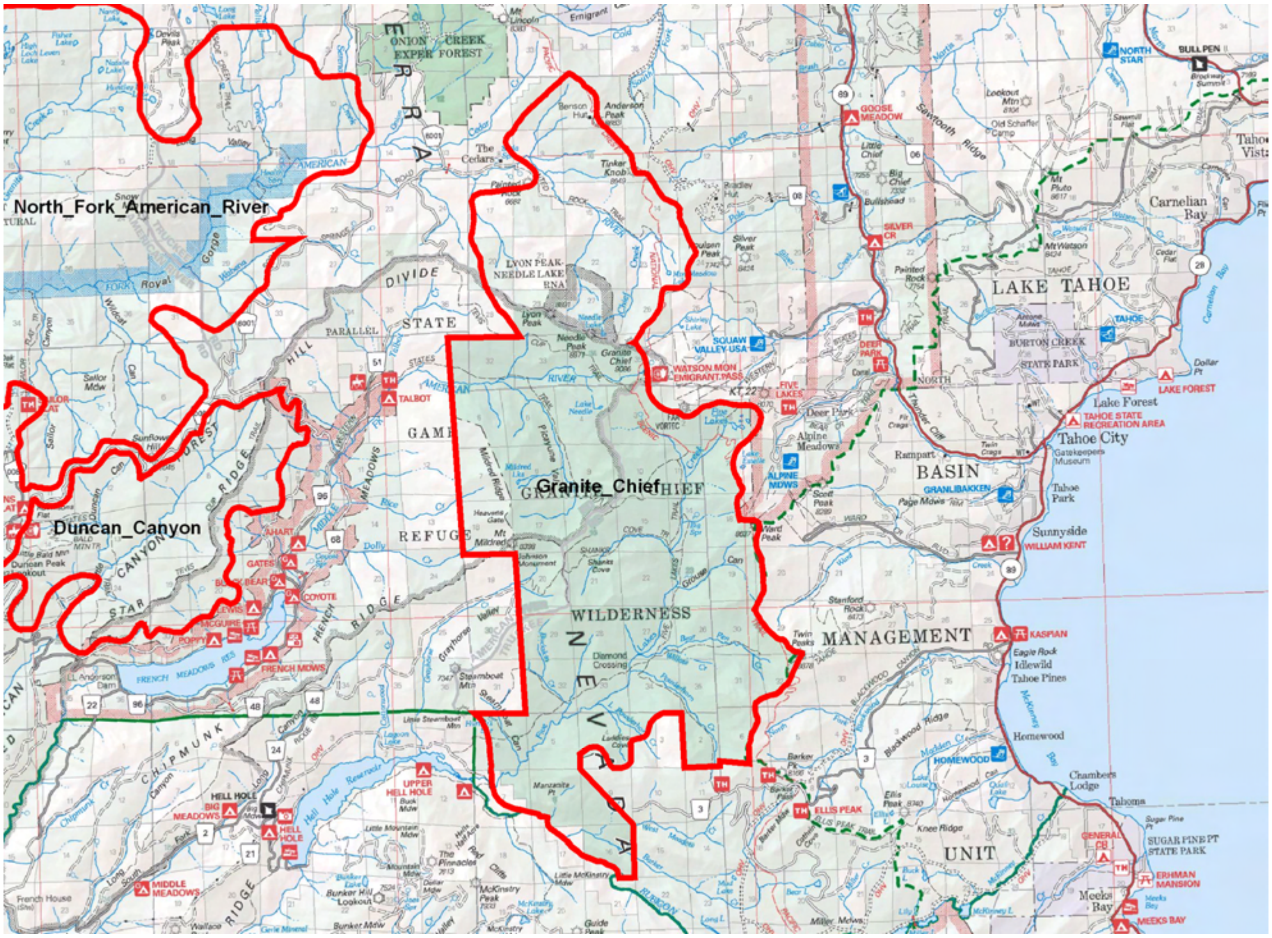

Figure 3.09-2. Granite Chief Inventoried Roadless Area

North Fork American River Inventoried Roadless Area

This area is situated on both sides of the North Fork of the American River. The North Fork of the American Wild River that was designated by Congress contains approximately 5,800 acres of National Forest System land and is included within and surround by the roadless area. 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.

Sixty-two percent of the unit has slopes over 50 percent. Twenty-seven percent of the area is composed of slopes greater that 70 percent. There are 84 miles of perennial streams. Water quality is very high. Annual precipitation ranges from 50 inches near Colfax to over 80 inches in the Cherry Point area; most of this occurs a rain below 5,000 feet and as snow above that elevation.

The area contains 14,831 acres of mixed conifer, 4,256 acres of red fir, and 555 acres of lodge pole pine forest types. The vegetation is representative of the Sierran Forest Province (Bailey Classification M2610) with both mixed conifer and red fir forest communities (Kuchler Vegetation Types 005 and 007). This forested land is concentrated in the southeastern and southwestern portions of the area around Sailor Meadow and Humbug Canyon. The remaining acres consist of hardwoods, brush, barren areas, riparian vegetation, and other non-forested land. There are 1,220 acres of wetlands, comprising four percent of the area. Some sheep graze in the eastern portion of the area. Livestock graze a portion of three grazing allotments. Elevation ranges from 2,100 feet in the Giant Gap–Green Valley area to 8,000 feet at Snow Mountain. The river is designated as a Wild Trout Stream by the California Department of Fish and Game.

The natural scenic quality (variety class) of the area (not including the designated Wild River) is predominately distinctive, although a large portion is common in nature. Sixty-seven percent of the area is highly scenic variety class “A” land, 33 percent is variety class “B” land with average scenic quality, and a trace is variety class “C” within minimal scenic quality.

The degree of current human-caused alterations of the natural landscape (existing visual condition) within the area covers a full range from pristine landscapes to those totally dominated by unnatural alterations. Nine percent pf the area is untouched in appearance (EVC class I), 78 percent had no noticeable alterations (EVC class II), and 11 percent is predominately natural (EVC class III), and 2 percent is dominated by alterations (EVC class V). Despite this range, the overall appearance of the area remains overwhelmingly natural in character.

The northern two-thirds of the area have an alternate ownership pattern. Sierra Pacific Industries is the major private landowner and plans to intensively manage some of their parcels for vegetation management.

There have been over 2,000 mining locations filed within this area over the years (Bureau of Mines study). Some of these locations are within the Wild River, which was withdrawn from mineral entry in 1975. There are 14 claims that pre-date the withdrawal.

Hiking, fishing, and hunting are the primary recreation uses for the area. Use totals 46,000 visitor days annually.

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 and Huysink 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 1990 Tahoe National Forest Land and Resource Management Plan this roadless area 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 an Range (16%).

Table 3.09-3 shows the amount of roads and trails in the Fork American River Roadless Area by category.

Table 3.09-3. Roads and Trails in the North Fork American River Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel		
Acres	Not Applicable	25,055
Motorized trails un-authorized for motorized use	Not Applicable	1.28
Roads open to highway legal vehicles only	All Year	0.04
Roads open to all vehicles	Seasonal Closure	0.31
Roads open to all vehicles	All Year	1.15
Trails open to high clearance trail vehicles	Seasonal Closure	2.89
Trails open to high clearance trail vehicles	All Year	0.60
Trails open to motorcycles	All Year	12.50
Trails open only to hikers and equestrians (No mountain bikes allowed)	All Year	0.02

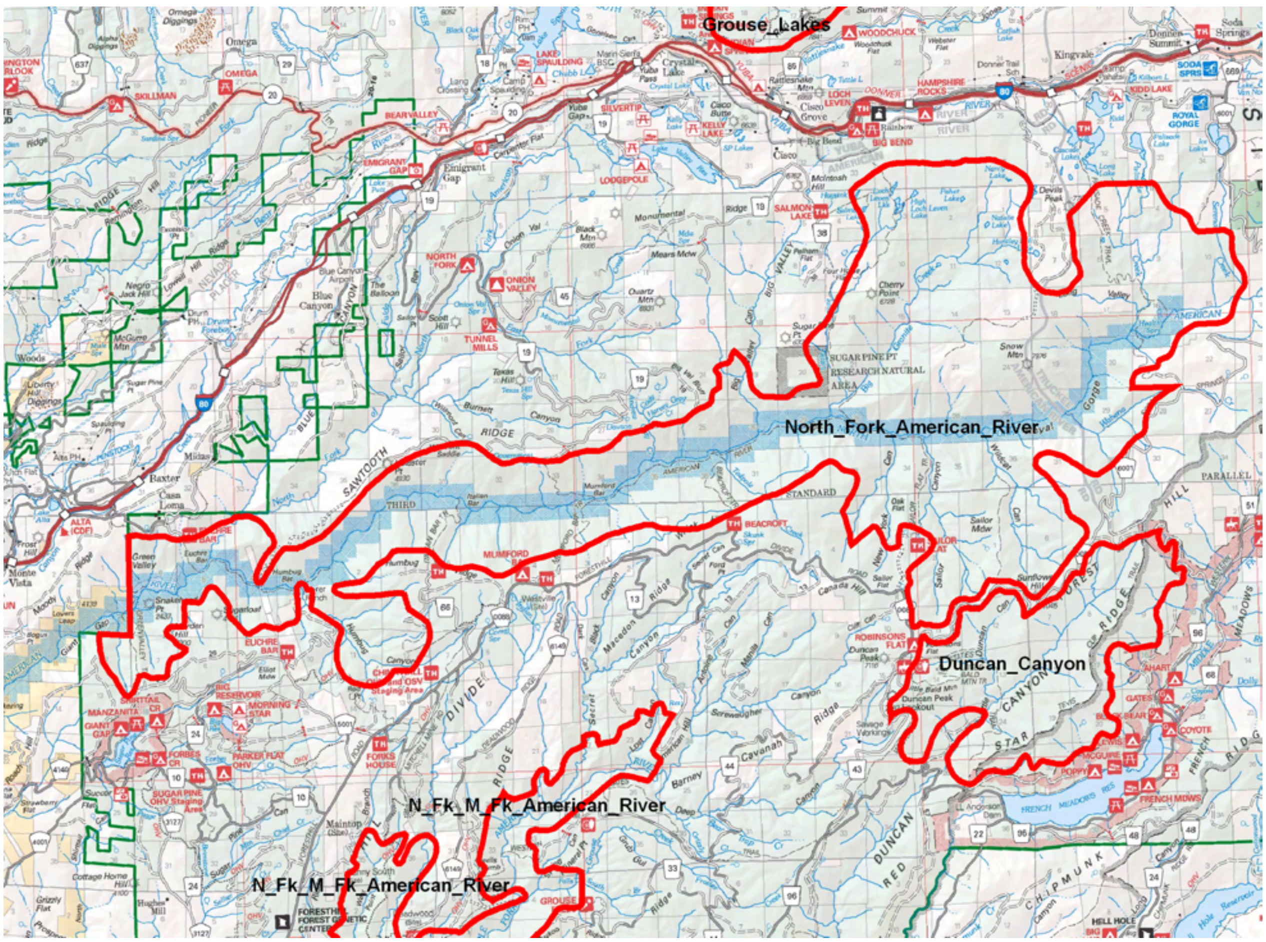

Figure 3.09-3. North Fork American River Inventoried Roadless Area

East Yuba Inventoried Roadless Area

This area is on the Yuba River Ranger District, bordered by the Plumas National Forest boundary in the Lavezzola Creek drainage. These are controversial travel ways to both OHV users and SPNM proponents.

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. Elevations range from 3,600 feet to 7,240 feet and about 78 percent of the area is over 5,000 feet in elevation. An average of 70 inches of precipitation falls annually, most of it as snow.

The topography of the area is similar to that found in the West Yuba area (steep canyons and narrow ridges) except for the eastern portion, which is an area of glacially scoured rock with small lakes and meadows interspersed. Forty-nine percent of the area has over 50 percent slopes. Lavezzola, Spencer, Pauley, and Smith Creeks are the major streams and are all tributaries to the North Yuba River. There area about 42 miles of perennial streams and lakeshore. Water quality is very high. There are no major peaks in the area. About 43 percent of the area has sensitive watershed lands, including 5 percent with slopes over 70 percent.

The vegetation of the area is representative of the Sierran Forest Province (Bailey Classification M2610), with both mixed conifer and red fir forest types present (Kuchler Vegetation Type 005 and 007). The area contains 10,674 acres of mixed conifer and 2,445 acres of red fir forest types. The forested land is scattered throughout the entire area. The remaining acres consist of riparian vegetation, hardwoods, brush, barren areas, and other non-forested land. There a 940 acres of wetland comprising five percent of the area.

A majority of the East Yuba is characterized by distinctive, highly scenic landscapes; but a significant portion, most in the south is fairly common in nature. There is 63 percent variety class “A,” and 37 percent in the less scenic variety class “B.” Over 98 percent of the areas retain a natural, unaltered appearance (EVC class I). Less than 1 percent of the area is in either class III or IV (areas with obvious human-made alterations). The attractiveness of the area is focused on the canyon bottoms such as those immediately adjacent to Lavezzola, Spencer, and Smith Creeks, and the high country around Spencer and Hawley Lakes.

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 roadless area, such as at the Four Hills Mine located in the northeast portion. The Boy Scouts of America acquired an 80-acre campsite on private land on the eastern boundary. To the east of the area is the Lakes Basin-Sierra Buttes area, which receives heavy recreation use.

Livestock grazing occurs in one allotment during the summer months; no structural improvements exist.

The area has been impacted by human beings over the past 100 years, primarily by the search for valuable minerals. There are many active mining claims and evidence of historic mining (primitive roads, buildings, mineshafts, diggings, and tailings) which exist throughout the area.

Adjacent TNF lands are primarily managed for recreation use with intensive timber management restricted to the northern and eastern regions. The West Yuba roadless area is located 1 to 2 miles to the west.

In the 1990 Tahoe National Forest Land and Resource Management Plan this roadless area was allocated to the following Management Prescriptions; #3 Dispersed Motorized Recreation (48%), #13 Timber and Range (20%), and #15 Visual and Timber.

Table 3.09-4 shows the amount of roads and trails in the Fork East Yuba Roadless Area by category.

Table 3.09-4. Roads and Trails in the East Yuba Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel		
Acres	Not Applicable	15,229
Motorized trails un-authorized for motorized use	Not Applicable	9.36
Roads open to highway legal vehicles only	Open Year Around	0.01
Trails open to high clearance trail vehicles	Open Year Around	19.60
Trails open to motorcycles	Open Year Around	13.44
Roads/trails on private land	Open Year Around	0.18
Trails open only to non-motorized users	Open Year Around	0.93
Trails open only to hikers and equestrians (No mountain bikes allowed)	Open Year Around	1.58
Previously decommissioned roads	Closed	1.02

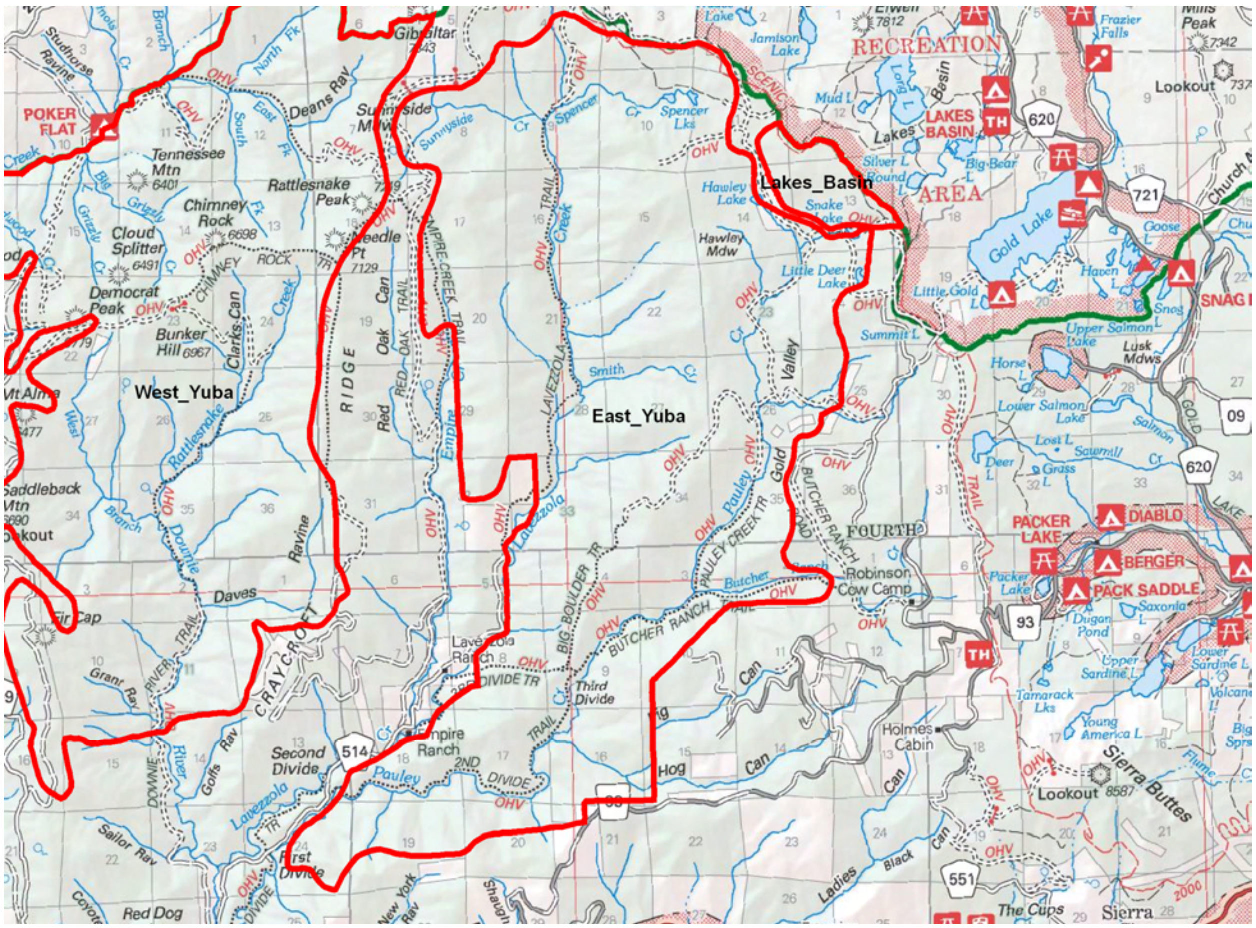

Figure 3.09-4. East Yuba Inventoried Roadless Area

Middle Yuba Inventoried Roadless Area

This area 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.

Elevations range from 3,200 to 6,800 feet. Precipitation ranges from 60 to 75 inches per year; this occurs mostly as rain on 57 percent of the area below 5,000 feet and primarily as snow above that elevation.

The entire area is an alternate land ownership pattern. Over 40 percent is privately owned. Most of the private land would be managed for intensive forest management. The area is also included in cost-share supplements. The river bottom and canyon slopes have been heavily mined, and the entire canyon bottom is encumbered by power withdrawals.

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 totals 1,000 visitor days, most of which is fishing and river use associated with suction dredging, sluicing, and panning for gold.

This area includes the slopes of the Middle Yuba River canyon, which is typically steep and inaccessible. One section is aptly named “Gates of the Antipodes.” Seventy-one percent of the unit has slopes over 50 percent, with 17 percent of this being slopes over 70 percent. Thirty percent of the area is within sensitive watershed lands. There are 18 miles of perennial streams. Water quality is very high. A portion of the area was proposed for evaluation as a wild and scenic river by the Department of the Interior’s Heritage Conservation and Recreation Service.

The majority if the Middle Yuba has high scenic quality. Sixty one percent of the acreage is categorized as variety class “A,” signifying distinctive landscape features and high level of variety. The sizeable acreage that remains is basically common in scenic nature. The remaining 37 percent variety class “B” (common scenic quality), and two percent variety class “C” (minimal scenic features).

Most of the area retains its natural appearance without noticeable signs of alteration. Seventy-seven percent is in existing visual condition II, which denotes natural appearance, 17 percent appears predominately natural but has visual alterations (EVC class III); and six percent is dominated by the effects of man (EVC class IV).

The vegetation is representative of the Sierran Forest Province (Bailey Classification M2610) with primarily a mixed coniferous forest community (Kuchler Vegetation type 005).

The area contains 5,348 acres of mixed conifer and 94 acres of red fir forest types. The forested land is located on the upper slopes above the Middle Yuba River canyon. A large portion of this area has been logged and roaded. The remaining 2,424 acres consists of hardwoods, brush, barren areas, riparian vegetation and other non-forested lands, which are located on the steep canyon slopes. This includes about 200 acres of wetlands, comprising less that three percent of this unit. The Gold Creek Fire burned over a large portion of the southeast end of this area. A portion of one cattle allotment is within this area although grazing is limited by terrain.

The main attractiveness of this area is the Middle Yuba River and canyon walls which are located in the center of the area. Other scenic attributes are the tributary creeks with their steep drainages and vegetated slopes. The area is popular for fishing.

National Forest System lands surrounding the area are managed primarily for vegetation management.

In the 1990 Tahoe National Forest Land and Resource Management Plan, this roadless area was allocated to the following Management Prescriptions; #3 Dispersed Motorized Recreation (76%) and #13 Timber an Range (24%).

Table 3.09-5 shows the amount of roads and trails in the Middle Yuba Roadless Area by category.

Table 3.09-5. Roads and Trails in the Middle Yuba Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel		
Acres	Not Applicable	7,382
Motorized trails un-authorized for motorized use	Not Applicable	5.95
Roads open to highway legal vehicles only	Open Year Around	0.60
Roads open to all vehicles	Open Year Around	7.08
Trails open to high clearance trail vehicles	Open Year Around	0.75
State, County or other jurisdiction roads	Open Year Around	0.32
Roads/trails on private land	Open Year Around	14.81

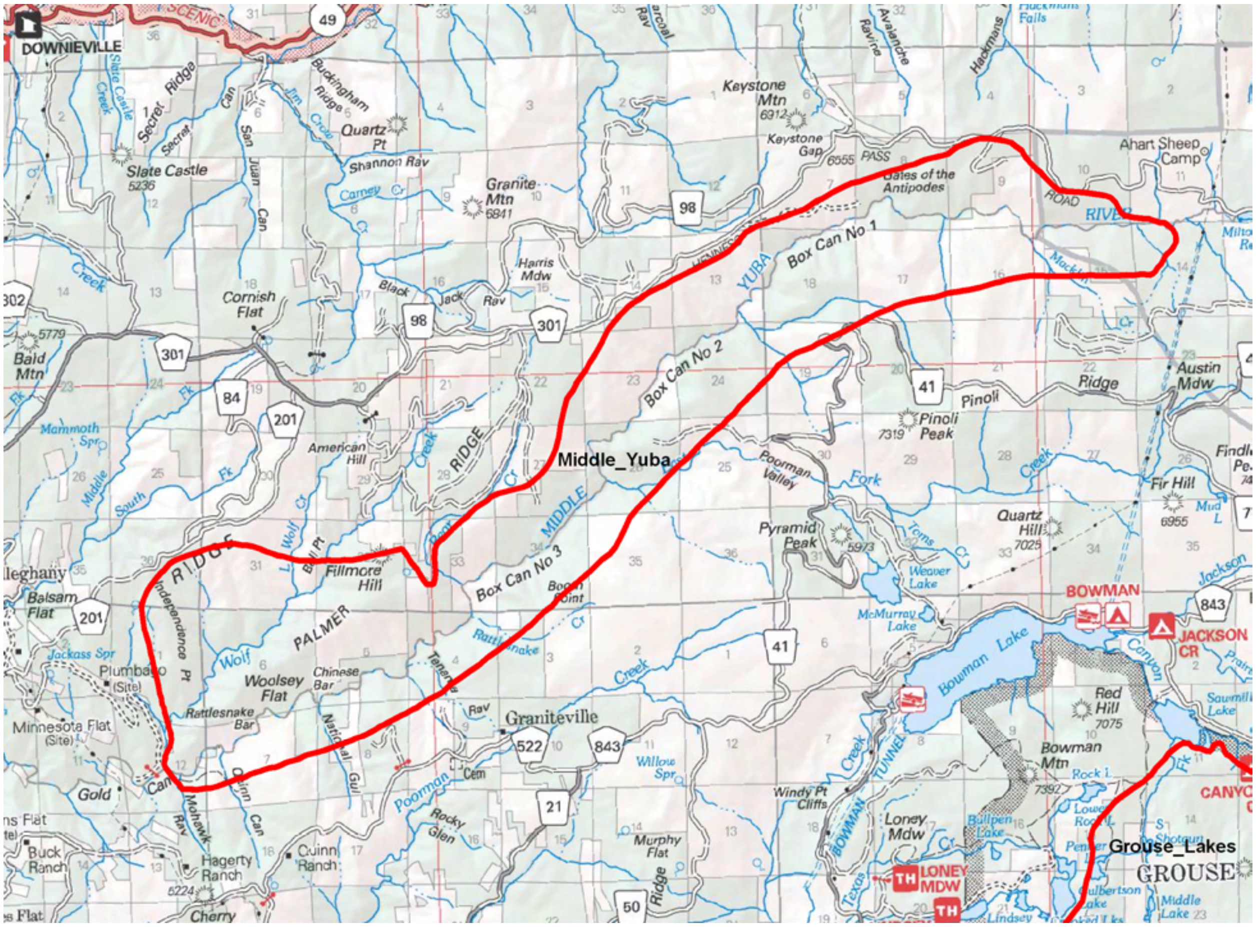

Figure 3.09-5. Middle Yuba Inventoried Roadless Area

Grouse Lakes Inventoried Roadless Area

The Grouse Lakes area is located in western Nevada County on the Yuba River Ranger District. The area includes numerous lakes and streams that are the focus of much recreation use. It includes about 17 miles of perennial streams and lakeshore. Water quality is high.

Annual precipitation averages 70 inches, largely falling as snow.

The landscape is broken, with much of the area characterized by glaciated granitic landforms. Elevations in the area range from 5500 feet near Eagle Lakes near the southwestern boundary to over 8000 feet in the Black Buttes region. Signal Peak and Old Man Mountain, near the southeastern boundary, both rise above 7700 feet in elevation.

About 21 percent of the area has over 50 percent slopes. Fifty-seven percent of the watershed lands are sensitive.

The vegetation is representative of the Sierran Forest Province (Bailey Classification M2610) with both red fir and mixed conifer forest communities. (Kuchler vegetation type 045 predominates according to the RARE II analysis. This determination is erroneous, however, as red fir (007) and mixed conifer (005) is the correct types for this area.) The remaining acres consist of riparian vegetation, hardwoods, barren ground, brush, and water. There are 550 acres of wetlands, comprising five percent of the area.

The high natural scenic quality if the area is underscored by the fact that 99 percent is variety class "A," highly scenic.

The degree of current man-caused alterations of the landscape (existing visual condition) is minimal within the area. Approximately 99 percent of the area shows no evident change to the natural condition (EVC classes I and II).

Over one-half of the Grouse Lakes is in Private ownership. The primary owner is Sierra Pacific Industries. The company manages most of their forested land for vegetation management.

There was a great deal of mining activity in the eastern and southern portions of the area during the late 19th century and the early 20th century, but little gold was recovered due to the nature of the ore. The granitic nature of most of the area makes for an overall low mineral potential.

Dispersed recreation (hunting, fishing and hiking) is the primary use of the area. The majority of the area is prohibited to OHV use, with several exceptions. One 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.

There are a number of heavily used trails within the area. Many of these allow hiker access to the lakes in the region. Recreation use is concentrated around these lakes and totals 26,100 visitor days.

Grazing use occurs within the area during the summer months. Portions of two allotments are within the Grouse Lakes area. There are no fences or other range structural improvements. The main attractiveness of the area is the many lakes and highly scenic quality of the area.

Interstate 80, which has a heavy volume of traffic and noise, is adjacent to the southern edge of the area. Most of the surrounding area contains heavily used recreation complexes.

In the 1990 Tahoe National Forest Land and Resource Management 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 3.09-6 shows the amount of roads and trails in the Grouse Lakes Roadless Area by category.

Table 3.09-6. Roads and Trails in the Grouse Lakes Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel		
Acres	Not Applicable	6,150
Motorized trails un-authorized for motorized use	Not Applicable	3.28
Roads open to all vehicles	Open Year Around	5.31
Trails open to high clearance trail vehicles	Open Year Around	8.77
Roads/trails closed to motorized users	Seasonal Closure	0.17
Roads/trails on private land	Open Year Around	1.12
Trails open only to non-motorized users	Open Year Around	27.15

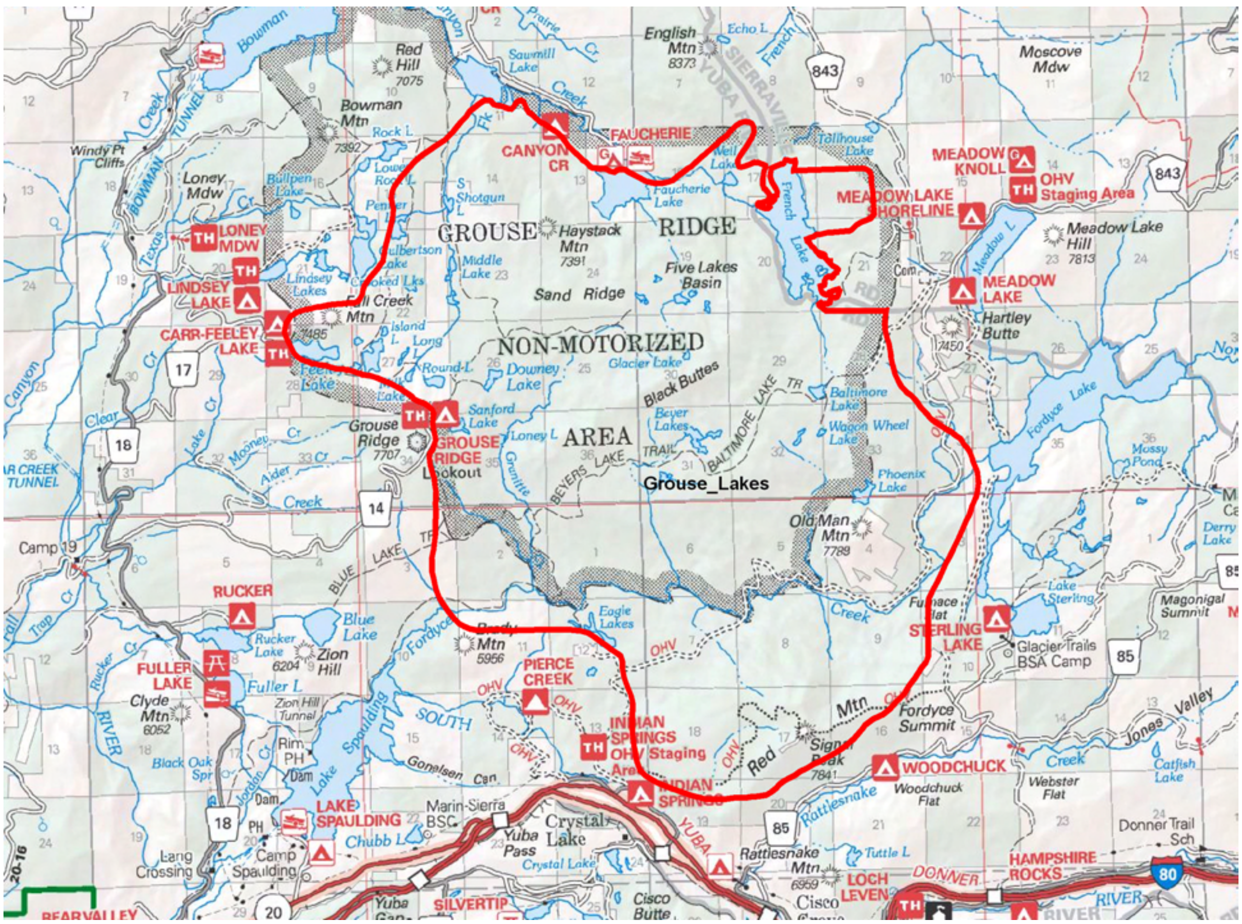

Figure 3.09-6. Grouse Lakes Inventoried Roadless Area

Bald Mountain Inventoried Roadless Area

The Bald Mountain area is located east of the Sierra Nevada range on the Sierraville Ranger District. Approximately 960 acres are located within the Toiyabe NF.

The area is characterized by dry, rugged canyons and forested ridges. The landscape is rocky and soils are often poor. Elevations range from 8,760 feet at Babbitt Peak on the eastern boundary to 6,300 feet on Rock Creek near the western boundary.

About three percent of the unit has over 50 percent slopes. Twenty-three percent of the area is within sensitive watershed lands. There are eight miles of perennial streams. Precipitation averages about 25 inches annually, largely as snow. Water quality is very high.

The vegetation is representative of the Sierra Forest Province (Bailey Classification M2610) with primarily an eastside pine forest type (Kuchler vegetation type 005). There are 4,866 acres of eastside (primarily Jeffrey) pine, about 350 acres of Washoe pine, juniper, and pinyon pine. The remaining acres are brush, grass, barren areas, or riparian vegetation. There are 300 acres of wetlands, comprising 5 percent of the area.

The majority (77 percent) of the area is of average scenic quality (variety class “B”), with only 22 percent classed as being highly scenic (variety class “A”). The degree of human-caused alterations of the natural landscape (existing visual condition) ranges from no evident ecological change (EVC II) to moderate change (EVC V). The areas of moderate change are those which have been logged in the past few years. Timber harvesting has occurred in the past in an area covering approximately 200 acres in the central portion of the area. An additional 480 acres was logged in 1983.

A small portion of the Bald Mountain area is in private ownership. The private land is near the northern boundary. Recreation use is low; averaging around 6,100 RVDs each year. Most of this is hunting, hiking, and OHV use. There are a number of unimproved roads, trails, and dispersed camping locations within the area. There are some rock exposures and steep terrain which provide some challenge for recreationists. The primary attractiveness of the area is the good hunting which may be found there.

Approximately 1,061 acres have been established as a Research Natural Area (RNA). A portion of a cattle grazing allotment is also located within the Bald Mountain area.

In the 1990 Tahoe National Forest Land and Resource Management Plan this roadless area was allocated to the following Management Prescriptions; #5 Research and Botanical (15%) and #13 Timber an Range (85%).

Table 3.09-7 shows the amount of roads and trails in the Bald Mountain Roadless Area by category.

Table 3.09-7. Roads and Trails in the Bald Mountain Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel		
Acres	Not Applicable	4,769
Motorized trails un-authorized for motorized use	Not Applicable	3.39
Roads open to all vehicles	Seasonal Closure	0.80
Roads open to all vehicles	Open Year Around	3.41
Roads/trails closed to motorized users	Seasonal Closure	1.88
State, County or other jurisdiction roads	Open Year Around	0.05
Trails open only to non-motorized users	Open Year Around	1.79

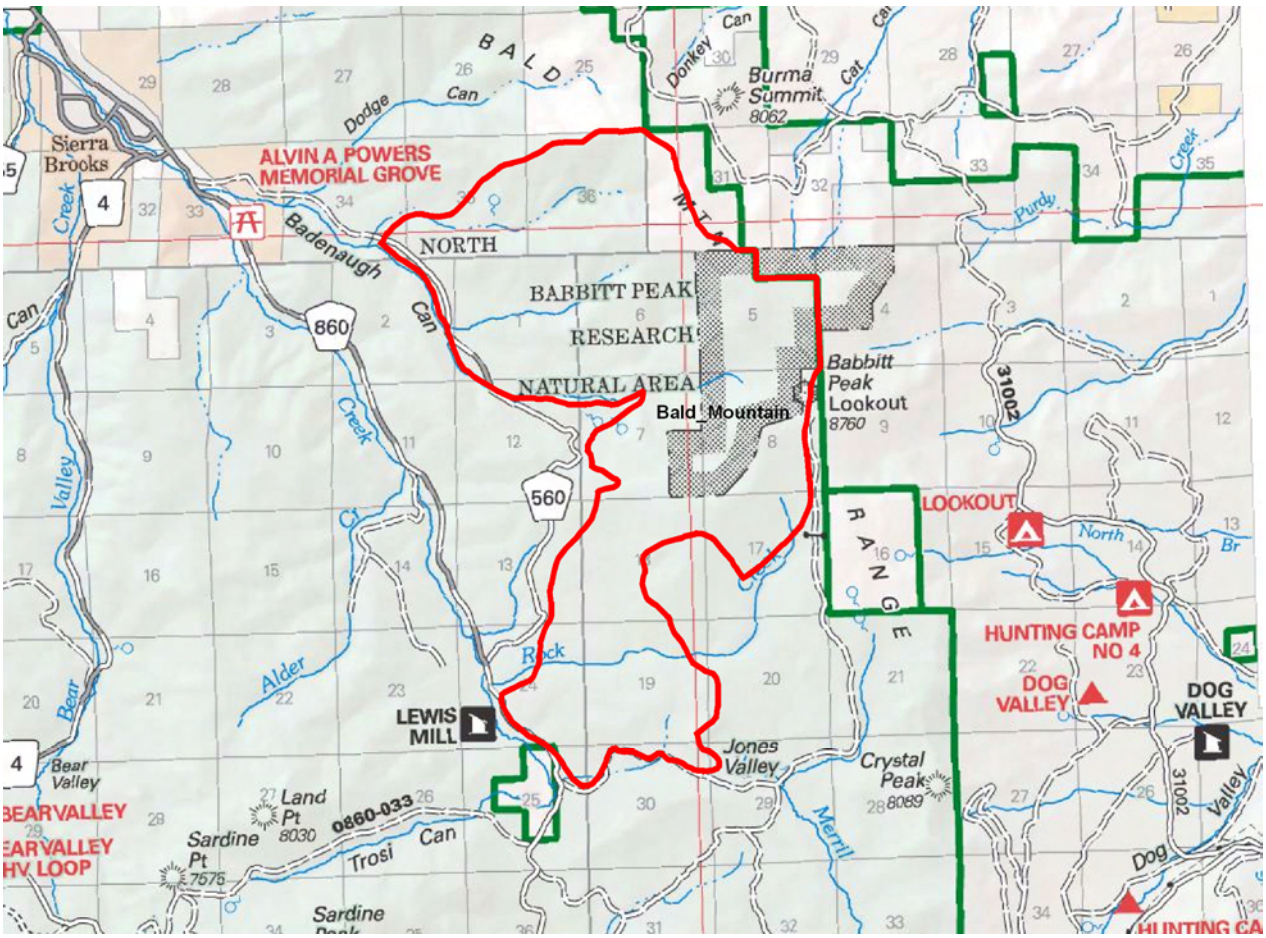

Figure 3.09-7. Bald Mountain Inventoried Roadless Area

Duncan Canyon Inventoried Roadless Area

This area is situated in eastern Placer County on the American River Ranger District. It includes portions of the State Game Refuge encompassing the French Meadows Reservoir recreation area.

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.

About seven percent of this unit has over 50 percent slopes. Twenty percent of the area is within sensitive watershed lands. There are about 13 miles of perennial streams. Precipitation averages about 70 inches annually, most of it as snow. Water quality is very high.

The vegetation is representative of the Sierran Forest Province (Bailey Classification (M2610) with both red fir and mixed conifer forest communities (Kuchler Vegetation types 005 and 007). The area contains 3,448 acres of mixed conifer and 4,536 acres of red fir. The remaining acres consist of riparian vegetation, hardwoods, brush, barren areas, and other non-forested land. There are 400 acres of wetlands, comprising 5 percent of the area.

Elevations within the area range from 5,100 feet along Duncan Creek to 7,182 feet at Little Bald Mountain.

The natural scenic quality (variety class) of the area is predominantly lands with average scenic potential. As inventoried by the TNF Landscape Architect, the area is 34 percent highly scenic variety class “A” and 66 percent of the area is variety class “B,” average scenic quality land. The degree of current human-caused alterations of the natural landscape (existing visual condition) within the area is minimal with most of the area appearing natural. Approximately 91 percent of the area has no noticeable alterations (EVC class II), 8 percent is predominantly natural (EVC class III), and one percent is dominated by alterations (EVC class IV).

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 manage their land for vegetation management.

There are several unpatented mining claims within the area. The overall mineral potential is not considered significant.

Portions of two grazing allotments are located within the Duncan Canyon area. There are no range improvements.

Hunting, fishing, hiking, and plant study are the principal recreation uses, totaling 2,300 visitor days annually. 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 in this area is Little Robinson Valley in the western portion of the area. TNF lands surrounding the roadless area are managed primarily for vegetation management.

In the 1990 Tahoe National Forest Land and Resource Management Plan this roadless area was allocated to the following Management Prescriptions; #2 Dispersed Non-Motorized Recreation (7%) and #15 Visual and Timber and (93%).

Table 3.09-8 shows the amount of roads and trails in the Duncan Canyon Roadless Area by category.

Table 3.09-8. Roads and Trails in the Duncan Canyon Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel		
Acres	Not Applicable	9,253
Motorized trails un-authorized for motorized use	Not Applicable	7.85
Roads open to all vehicles	Open Year Around	1.30
Trails open to high clearance trail vehicles	Open Year Around	4.96
Trails open to motorcycles	Seasonal Closure	0.51
Trails open to motorcycles	Open Year Around	8.04
State, County or other jurisdiction roads	Open Year Around	0.02
Trails open only to non-motorized users	Open Year Around	2.45

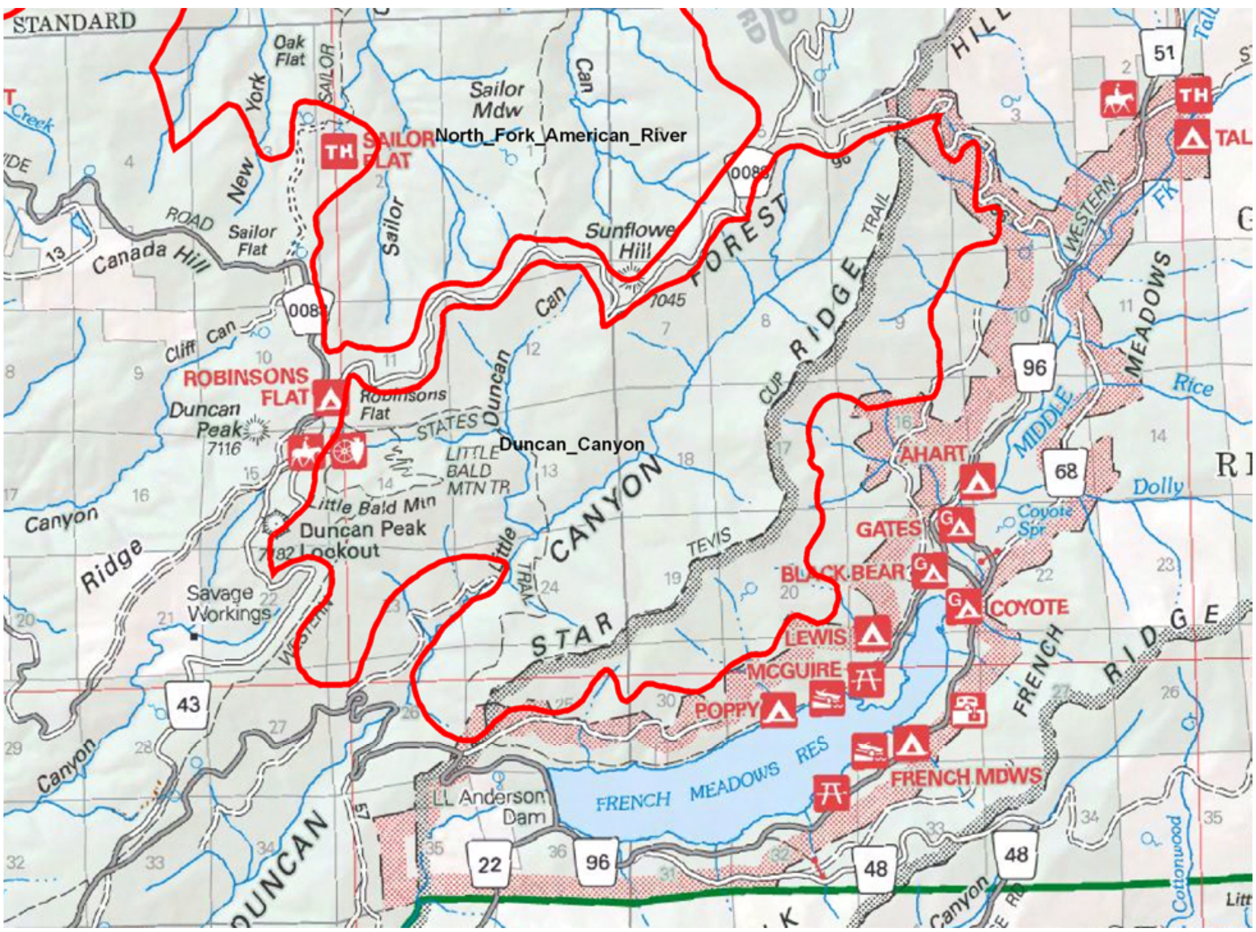

Figure 3.09-8. Duncan Canyon Inventoried Roadless Area

North Fork of the Middle Fork of the American River Inventoried Roadless Area

This area 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. Ninety-seven percent of the area has over 50 percent slopes. The major attraction is the North Fork of the Middle Fork of the

American River. There is a total of about 41 miles of perennial streams. Water quality is very high. Elevations in the area range from around 4800 feet near the eastern boundary to 1600 feet along the river at the western boundary.

The area receives an average of 50 inches of precipitation annually, nearly all of it in the form of rain; snow accumulation is rare.

The scenic quality of the area is characteristic of most of the western Sierra Nevada intermediate elevation areas. Over 50 percent of the area is classed as highly scenic with 44 percent of the area having only average scenic quality. Four percent of the area has low scenic quality.

The degree of human-caused alterations of the natural landscape (existing visual condition) ranges from no apparent ecological change to moderate change to the natural condition. A total of 9,461 acres show no evident change (EVC II), 336 acres show little change (EVC III), 850 acres exhibit noticeable change (EVC IV), and six acres show moderate change to the natural condition.

About 57 percent of the area is described as being sensitive watershed lands; virtually all of this is on slopes over 70 percent.

The vegetation of the area is representative of the Sierran Forest Province (Bailey Classification M2610) with a mixed conifer forest community (Kuchler Vegetation Type 005). There are 6,374 acres of mixed conifer, 3,723 acres of commercial and noncommercial hardwoods, and most of the remaining acres are California gray pine, brush, or barren. Only about two percent of the area is wetlands.

Only 500 acres are in private ownership. Mining has been an important activity in the area since the early days of the Gold Rush. Numerous active mines occur in the area. Recreation use is low (2,700 visitor days) and primarily involves hunting, fishing, and hiking.

The remains of former mine structures and cabins are numerous and there are two standing structures.

Virtually all of the area is open to OHV use but the steep topography and lack of many roads limits use. There are several trails through the area which have a long history of use. Two annual competitive events use the trail system. Portions of three grazing allotments occur in the area. Use in the area by cattle is light due to terrain and lack of forage.

In the 1990 Tahoe National Forest Land and Resource Management Plan, this roadless area 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 3.09-9 shows the amount of roads and trails in the North Fork of the Middle Fork American River Roadless Area by category.

Table 3.09-9. Roads and Trails in the North Fork of the Middle Fork American River Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel		
Acres	Not Applicable	11,191
Motorized trails un-authorized for motorized use	Npt Applicable	1.28
Roads open to highway legal vehicles only	Open Year Around	0.04
Roads open to all vehicles	Seasonal Closure	0.31
Roads open to all vehicles	Open Year Around	1.15
Trails open to high clearance trail vehicles	Seasonal Closure	2.89
Trails open to high clearance trail vehicles	Open Year Around	0.60
Trails open to motorcycles	Open Year Around	12.50
Trails open only to hikers and equestrians (No mountain bikes allowed)	Open Year Around	0.02

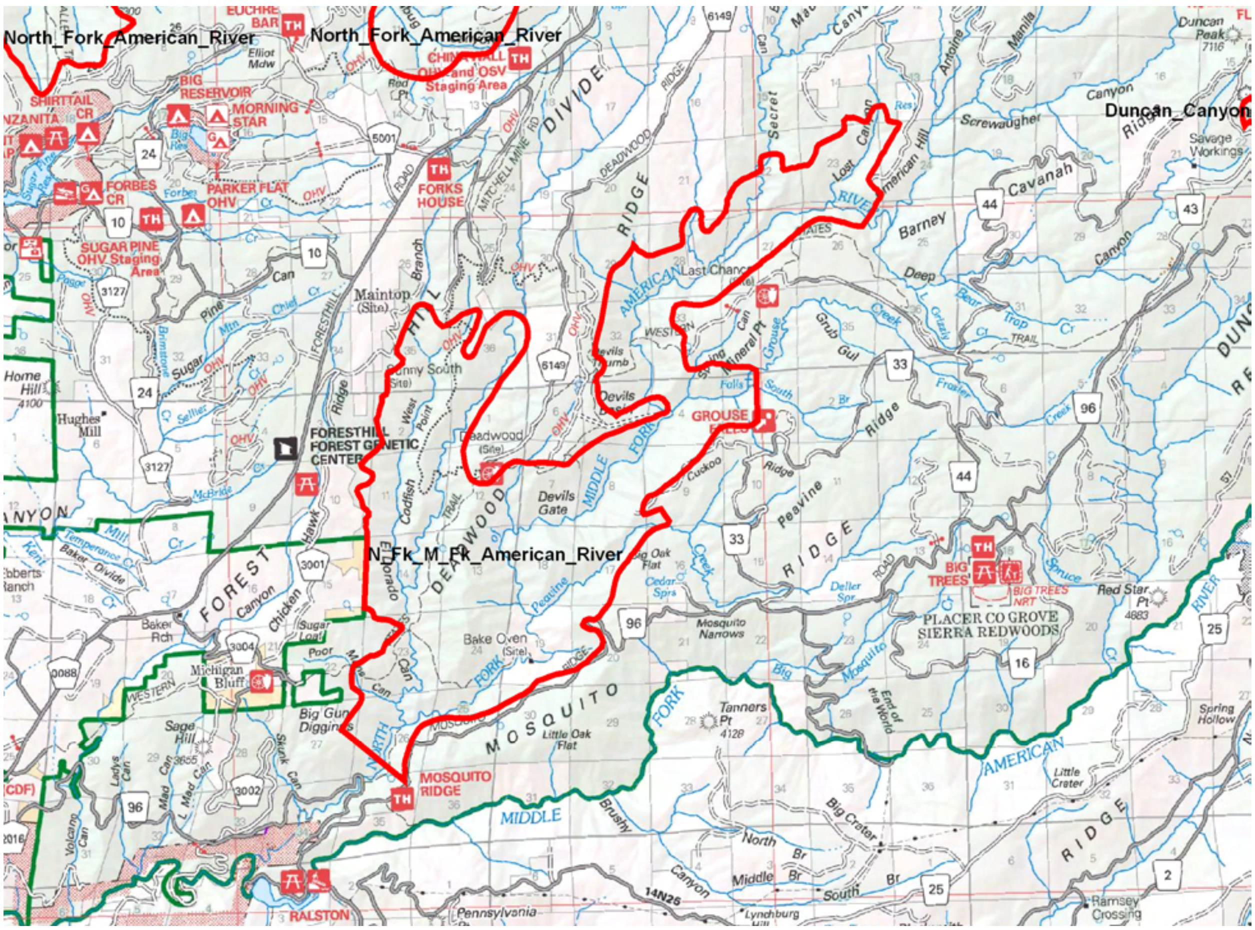

Figure 3.09-9. North Fork of the Middle Fork American River Inventoried Roadless Area

Castle Peak Inventoried Roadless Area

This area 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. About 21 percent of the area has over 50 percent slopes. Forty-one percent of the area is within sensitive watershed lands. Mt. Lola and Basin Peak, both over 9,000 feet, are the highest peaks in the area. The lowest point within the area is along Lower Castle Creek near the southwestern boundary where the elevation drops to 6,900 feet. Precipitation averages about 65 inches annually, an estimated 90 percent of it as snow.

There are several lakes within the area; White Rock and Warren are the largest. Prosser, White Rock, and Lower Castle Creek are the principal streams. There are over 12 miles of perennial streams and lakeshore in this area. Water quality is high.

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. Nearly the entire area (99 percent) is variety class “A,” highly scenic. The degree of human-caused alterations of the natural landscape (existing visual condition) within the area is minimal.

Approximately 97 percent of the area shows no evident change to the natural condition (EVC classes I and II). The remaining 3 percent shows little change to the natural condition.

The vegetation of the area is representative of the Sierran Forest Province (Bailey Classification M2610) with both red fir and mixed conifer forest communities (Kuchler Vegetation Type 007, red fir forest). The area contains 5,206 acres of red fir, 468 acres of mixed conifer, and 469 acres of lodge pole pine. The remaining acres consist of grass, riparian vegetation, brush, or are barren. There are 960 acres of wetlands comprising ten percent of the area.

Nearly one-half of the area is in private ownership. The primary land owner manages its’ land for vegetation management. Logging has occurred on their land in the White Rock area.

The Castle Peak area has been used primarily for recreation over the last 100 years. No major mining activity has occurred in the area and there is little mineral potential. Several timber sales have been completed in the area.

There is no accurate information on the amount of recreation use but the area is popular for hiking in the summer and sees heavy cross-country skiing and snowmobile use in the winter. The Sierra Club maintains a cabin (Peter Grubb Hut) for recreation users in the Round Valley area.

Most of the area 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 trails through the area, including a portion of the Pacific Crest Trail, but few roads. Through cooperative agreement a road has been constructed through Sections 3 and 9, T.18N. R.14E., MDM.

Portions of three grazing allotments are located within the area. Most of the grazing is by sheep. The White Rock allotment is currently closed.

The main attractiveness of this area is its’ highly scenic character and the lakes and streams.

In the 1990 Tahoe National Forest Land and Resource Management Plan this roadless area was allocated to the following Management Prescriptions; #3 Dispersed Motorized Recreation (93%) and #11 Winter Recreation (7%).

Table 3.09-10 shows the amount of roads and trails in the Castle Peak Roadless Area by category.

Table 3.09-10. Roads and Trails in the Castle Peak Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel		
Acres	Not Applicable	12,918
Motorized trails un-authorized for motorized use	Not Applicable	10.07
Roads open to all vehicles	Open Year Around	5.04
Trails open to high clearance trail vehicles	Open Year Around	1.07
Roads/trails on private land	Open Year Around	2.83
Trails open only to non-motorized users	Open Year Around	14.78
Trails open only to hikers and equestrians (No mountain bikes allowed)	Open Year Around	6.85

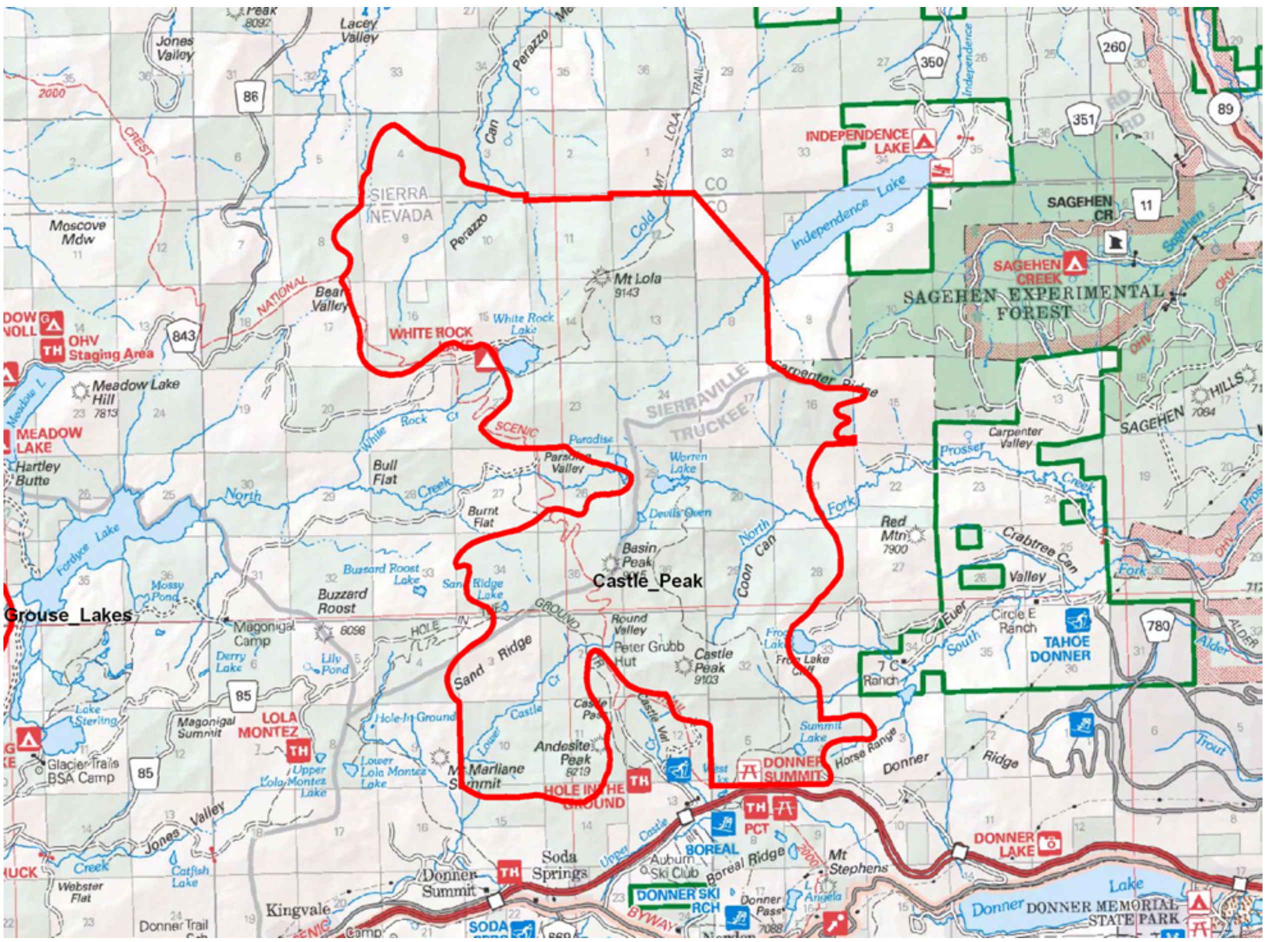

Figure 3.09-10. Castle Peak Inventoried Roadless Area

Lakes Basin Inventoried Roadless Area

This area is situated on both the Plumas and Tahoe National Forests. It is about seven miles south of Blairsden and Plumas Eureka State Park. Principal access is via the Gold Lake Highway or the State Park. Access from the TNF is via a jeep road through Gold Valley. The portion of the area 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 Tahoe portion ranges in elevation from 6,640 feet to 7,440 feet. About 3 percent of this area has over 50 percent slopes. Twenty-five percent of the watershed lands are sensitive. There are no perennial streams or lakes on the Tahoe portion. Precipitation averages 60 inches annually, nearly all of it as snow. Wetlands are negligible.

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.

The TNF portion is highly mineralized, and mining has occurred in the vicinity since the 1850's. The Four Hills Mine is located just west of the roadless area boundary.

There is a portion of one grazing allotment in the Lakes Basin area.

The entire roadless area contains 7,140 acres (gross and net); the remainder of the acreage (6,939 acres) is on the Plumas NF.

In the 1990 Tahoe National Forest Land and Resource Management Plan this roadless area was allocated to the Management Prescriptions #3 Dispersed Motorized Recreation (100%).

Table 3.09-11 shows the amount of roads and trails in the Lakes Basin Roadless Area by category.

Table 3.09-11. Roads and Trails in the Lakes Basin Inventoried Roadless Area

Road and Trail Category	Season of Use	Miles
Cross country travel		
Acres	Not Applicable	557
Motorized trails un-authorized for motorized use	Not Applicable	.07
Trails open to high clearance trail vehicles	Open Year Around	0.40
Trails open only to hikers and equestrians (No mountain bikes allowed)	Open Year Around	2.00
Previously decommissioned roads	Closed	1.79

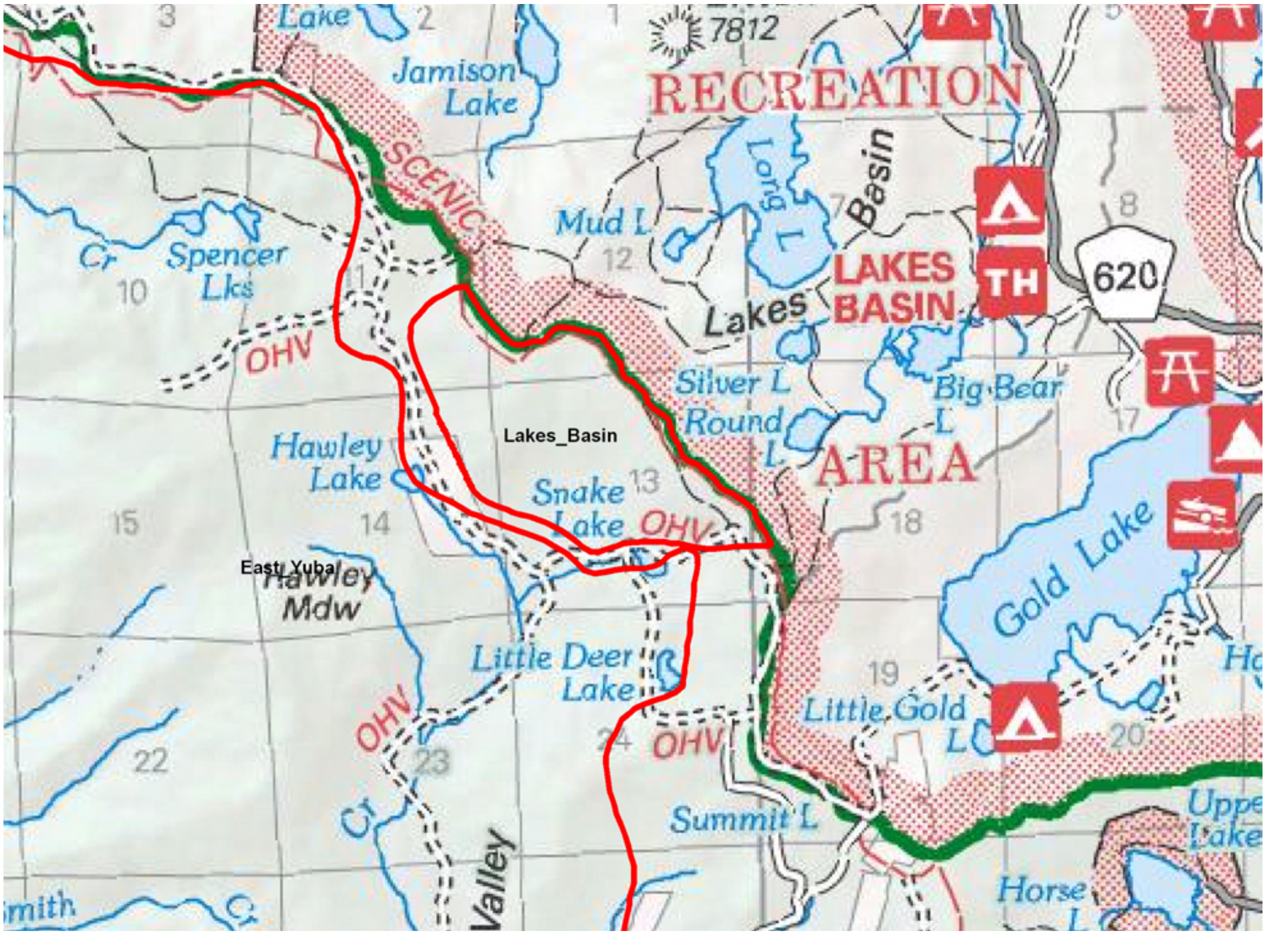

Figure 3.09-11. Lakes Basin Inventoried Roadless Area

Regulatory Framework and Roadless Area Characteristics

The Forest Service issued the Roadless Area Conservation rule in 2001. This rule was replaced by the State Petitions for Inventoried Roadless Management rule in 2005 (referred to as the State Petitions rule; Source 70 FR25661, May 13, 2005). Subsequently the State Petitions rule was set aside on September 20, 2006 by Judge Elizabeth LaPorte of the U.S. District Court of Northern California. Based on this injunction, the regulation for Roadless Areas reverted to the 2001 Roadless Area Conservation Rule (referred to as the 2001 Roadless Rule; Source 66 Federal Register 3272, January 12, 2001).

The Code of Federal Regulations (36 CFR Part 294, Subpart B – Protection of Inventoried Roadless Areas, 294.11) describes nine *Roadless area characteristics*. Roadless area characteristics are described as “resources or features that are often present in and characterize inventoried roadless areas.”

1. High quality or undisturbed soil, water, and air;
2. Sources of public drinking water;
3. Diversity of plant and animal communities;
4. Habitat for threatened and endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land;

5. Primitive, semi-primitive non-motorized and semi-primitive motorized classes of dispersed recreation;
6. Reference landscapes;
7. Natural appearing landscapes with high scenic quality
8. traditional cultural properties and sacred sites; and
9. Other locally identified unique characteristics - solitude

To discuss these effects, this analysis will focus on

1. Primitive/semi-primitive recreation opportunities,
2. Reference landscapes, and
3. Natural appearing landscapes with high scenic quality, and
4. Other locally identified unique characteristics including opportunities for solitude.

The other criteria will be addressed in a summary fashion and readers will be asked to refer to other resource areas in the EIS to see more detail.

Roadless Areas: Environmental Consequences

Each roadless area will be listed and environmental consequences described for the alternatives where relevant. The no action alternative will be described first for all roadless areas.

Alternative 1 (no action) has a high potential to reduce roadless character in all roadless areas because the no action allows for cross country travel where not currently prohibited. Cross Country travel would have the potential to significantly reduce:

1. The high quality and undisturbed soil, water, and air resources;
2. The quality of water resources in the upper watersheds that all become sources of public drinking water;
3. The diversity of plant and animal communities due to physical disturbance and possible noxious weed introduction;
4. The habitat for sensitive species and species dependent on large, undisturbed areas of land;
5. Opportunities for semi-primitive non-motorized and primitive recreation opportunities;
6. Possible deterioration of reference landscapes;
7. Reduction of Natural appearing landscapes of high scenic quality due to the introduction of multiple site specific aesthetic impacts to the landscape;
8. Impacts to traditional cultural properties; and
9. Reduction of opportunities for solitude due to the increase in noise by motorized vehicles and more evidence of human activity due to more and more trails being created by the cross country travel as well as multiple aesthetic impacts listed under item 7.

The following describes how proposed motorized routes could affect roadless character. Motorized use in generally has an adverse effect on roadless character. Conversely, reducing the amount of motorized use within a roadless area has a positive effect on roadless character. All of the routes currently being considered for motorized use already are available motorized use. The effect of this motorized use is already part of the existing situation. Prohibiting motorized use on these routes will improve the roadless character within the inventoried roadless areas (IRA). All of the action alternatives improve the roadless character of Inventoried Roadless Areas (IRAs) by reducing the amount of roads and trails available for motorized use. Routes prohibited to motorized use will be available for non-motorized use. This non-motorized use, especially by mountain bikes and equestrians, can also adversely affect roadless character, but to a significantly lesser degree than motorized use.

Table 3.09-12 shows the total effects on all roadless areas cumulatively.

- **Cross Country Travel**: Cross country travel is prohibited 109,103 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless areas. The prohibition of cross country will also reduce the total amount of roads and trails available for motorized vehicle use. Alternatives 3 and 4 reduce the amount of roads and trails available for motorized use from 206.4 to 152.3 miles. Alternatives 2, 5, 6 and reduce the amount of motorized roads and trails from 206.4 miles to 160.9, 167.5, 160.0 and 159.4 miles respectively. The prohibition of cross country travel will benefit the roadless area characteristics of each IRA by stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.
- **Additions to the National Forest System**: There are no roads added to the National Forest Transportation System in roadless areas in any of the alternatives. Alternatives 3 and 4 add no motorized trails to the National Forest Transportation System. Alternative 5 has the largest increase in motorized trails increasing the mileage from 95.6 to 111 (+16%). Alternatives 2, 6, and 7 increase the mileage of motorized trails from 95.6 to 104.4 (+9%), 103.5 (+8%), and 109.9 (+8%) respectively. The impact these additions have on roadless area characteristics are described below for each individual roadless area.
- **Changes in class of vehicle and season of use**: Alternatives 2 and 5 change the class of vehicles allowed on all existing National Forest System roads in roadless areas from highway legal vehicles only to open to all vehicles. Alternative 6 changes the class of vehicles allowed on .6 of the .7 miles of existing National Forest System roads in roadless areas from highway legal vehicles only to open to all vehicles. This change in class of vehicles will not impact the roadless area characteristics of the inventoried roadless areas.

  Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions increase the roadless areas values for; 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 and 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period.
- **Cumulative Effects**: All of the action alternatives improve the character of roadless areas by allowing motorized use on fewer miles of roads and trails as well as prohibiting cross country travel. There are currently 209 miles open for motorized use in the no-action alternative. The action alternatives all reduce this number. The action alternatives range from 178 miles open for motorized use in Alternative 5, to 153 miles in Alternatives 3 and 4. The following sections describe the effects on each individual inventoried roadless area separately.

Table 3.09-12. Total Roads/Trails/Areas in Inventoried Roadless Areas by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	109,103	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	54.1	0	0	0	0	0	0
Roads open to highway legal vehicles only	**Open Year Around**	0.7	0.0	0.7	0.7	0.0	0.1	0.7
Roads open to all vehicles	**Seasonal Closure**	1.3	1.5	1.5	33.0	33.0	33.0	1.3
Roads open to all vehicles	**Open Year Around**	31.7	32.2	31.5	0.0	0.6	0.6	31.7
	Subtotal NFS Roads	**33.7**	**33.7**	**33.7**	**33.7**	**33.7**	**33.7**	**33.7**
Trails open to high clearance trail vehicles	**Seasonal Closure**	2.9	2.9	2.9	51.5	63.6	56.8	2.9
Trails open to high clearance trail vehicles	**Open Year Around**	48.6	54.1	48.6	0.0	0.0	0.0	53.3
Trails open to motorcycles	**Seasonal Closure**	0.5	0.5	0.5	44.1	47.4	46.7	0.5
Trails open to motorcycles	**Open Year Around**	43.6	46.9	43.6	0.0	0.0	0.0	46.2
	Subtotal NFS Motorized Trails	**95.6**	**104.4**	**95.6**	**95.6**	**111**	**103.5**	**102.9**
State, County or other jurisdiction roads	**Open Year Around**	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Roads/trails on private land	**Open Year Around**	22.6	22.3	22.6	22.6	22.3	22.3	22.3
	Total Motorized	**206.4**	**160.9**	**152.3**	**152.3**	**167.5**	**160.0**	**159.4**
Roads/trails closed to motorized users	**Closed to motorized**	2.1	47.5	56.2	56.2	40.9	48.5	49.1
Trails open only to non-motorized users	**Closed to motorized**	88.0	88.0	88.0	88.0	88.0	88.0	88.0
Trails open only to hikers and equestrians (No mountain bikes allowed)	**Closed to motorized**	62.2	62.2	62.2	62.2	62.2	62.2	62.2
	Subtotal Non-Motorized	**152.3**	**197.7**	**206.4**	**206.4**	**191.1**	**198.7**	**199.3**
Previously decommissioned roads	**Closed to motorized**	2.8	2.8	2.8	2.8	2.8	2.8	2.8

Bald Mountain Inventoried Roadless Area

Cross Country Travel: Cross country travel is prohibited on 4,769 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless areas. The prohibition of cross country use will also reduce the total amount of roads and trails available for motorized use. Alternatives 3, 4 and 7 reduce the amount of roads and trails available for motorized use from 7.7 to 4.3 miles. Alternatives 2, 5, 6 and reduce the amount of motorized roads and trails from 7.7 to 5.2 miles. The prohibition of cross country travel will benefit the roadless area characteristics of the Bald Mountain roadless area by stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the National Forest System: There are no roads added to the National Forest Transportation System in roadless areas in any of the alternatives. Alternatives 3, 4 and 7 also add no motorized trails to the National Forest Transportation System. Alternatives 2, 5 and 6 add one trail (SV-P13) totaling .9 miles which will be open to high clearance trail vehicles. This route would have a minor effect on the naturalness of the immediate area and little effect on the character of the IRA overall due to past wildfire and logging activities. Use of this motorized trail would be prohibited during the wet season in Alternatives 5 and 6.

Changes in class of vehicle and season of use: There are no changes to the class of vehicles allowed on existing National Forest System roads in any of the alternatives.

Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions increase the roadless areas values for; 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 and 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period.

Cumulative Effects: All of the action alternatives improve the roadless character of the Bald Mountain IRA by prohibiting motorized cross country travel on 4,769 acres and reducing the amount of motorized access. Alternatives 2, 5, and 6 reduce the miles available for motorized use from 7.7 to 5.2 miles. Alternatives 3, 4 and 7 reduce the miles available for motorized use to 4.3. Alternatives 2, 5 and 6 add one motorized trail (SV-P13) to the National Forest System of the less than one mile in length within the Bald Mountain IRA. This route would have a minor effect on the naturalness of the immediate area and little effect on the character of the IRA overall due to past wildfire and logging activities. Use of this route would be prohibited during the wet season in Alternatives 5 and 6. The number of miles available for non-motorized uses goes up in all of the action alternatives which could have an adverse impact upon the roadless area character, however to a lesser degree than motorized access. Table 3.09-13 displays the miles of roads and trails within the Bald Mountain IRA by alternative.

Table 3.09-13. Miles of Roads/Trails/Areas in Bald Mountain Inventoried Roadless Area by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	4,769	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	3.4	0	0	0	0	0	0
Roads open to all vehicles	**Seasonal Closure**	0.8	0.8	0.8	4.2	4.2	4.2	0.8
Roads open to all vehicles	**Open Year Around**	3.4	3.4	3.4	0	0	0	3.4
	Subtotal NFS Roads	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	0.0	0.9	0.9	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	0.0	0.9	0.0	0.0	0.0	0.0	0.0
	Subtotal NFS Motorized Trails	**0**	**0.9**	**0**	**0**	**0.9**	**0.9**	**0**
State, County or other jurisdiction roads	**Open Year Around**	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Total Motorized	**7.7**	**5.2**	**4.3**	**4.3**	**5.2**	**5.2**	**4.3**
Roads/trails closed to motorized users	**Closed to motorized**	1.9	4.4	5.3	5.3	4.4	4.4	5.3
Trails open only to non-motorized users	**Closed to motorized**	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	Subtotal Non-Motorized	**3.7**	**6.2**	**7.1**	**7.1**	**6.2**	**6.2**	**7.1**

Castle Peak Inventoried Roadless Area

Cross Country Travel: Cross country travel is prohibited on 12,918 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless areas. The prohibition of cross country will also 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 19.0 to 8.9 miles. Alternatives 2, 5, 6 and reduce the amount of motorized roads and trails from 19.0 to 9.9 miles. The prohibition of cross country travel will benefit the roadless area characteristics of the Castle Peak roadless area by stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the National Forest System: There are no roads added to the National Forest Transportation System in roadless areas in any of the alternatives. Alternatives 3 and 4 also add no motorized trails to the National Forest Transportation System. Alternatives 2, 5, 6 and 7 add three motorized trails (TKN-J4, TKN-J5 and TKN-J6) to the National Forest Transportation System totaling one mile within the boundary of the roadless area. TKN J5 is a route located in Castle Valley with a short distance (several hundred yards) of the route within the roadless area terminating at “Slab Rock.” TKN J4 is west of Andesite Peak totaling around 2 miles in distance of which about half the distance is within the roadless area. The third route, TKN J6 enters the eastern side of the roadless area for about a quarter mile and provides access to the eastside of Summit Lake. All three of these routes enter the edges of Castle Peak IRA. All three routes are close enough to Interstate 80 that traffic noise is still noticeable. All three routes are presently used for motorized vehicle use. All three of these routes 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. These three routes would continue to keep a zone of influence that would be considered semi-primitive. There would continue to be a minor impact to the natural appearing high scenic quality landscape due to disturbance to vegetation, compaction to vegetation at turnaround points and occasional route changes due to fallen trees. The majority of the Castle Peak IRA would remain a good candidate as a reference landscape because the changes to the natural landscape are on the periphery of the roadless area. Sensitive plants would be affected based on surveys identifying specific plants and locations. See the Chapter 3.06 for more details.

Changes in class of vehicle and season of use: There are no changes to the class of vehicles allowed on existing National Forest System roads in any of the alternatives. Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions increase the roadless areas values for; 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 and 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period.

Cumulative Effects: All of the action alternatives improve the roadless character of the Castle Peak IRA by prohibiting cross country motorized travel on 12,918 acres and thereby reducing the number of miles available for motorized use by approximately 50 percent. Alternatives 2, 5, 6, and 7 reduce the number miles open for motorized vehicles from 19 to 9.9. Alternatives 3 and 4 close all of the trails un-authorized for motorized use in this roadless area to motorized use.

There are three separate motorized trails in alternatives 2, 5, 6 and 7 which would be added to the National Forest Transportation System (TKN J4, TKN J5, and TKN J6). TKN J5 is a route located in Castle Valley with a short distance (several hundred yards) of the route within the roadless area terminating at “Slab Rock.” TKN J4 is west of Andesite Peak totaling around 2 miles in distance of which about half the distance is within the roadless area. The third route, TKN J6 enters the eastern side of the roadless area for about a quarter mile and provides access to the eastside of Summit Lake. All three of these routes enter the edges of Castle Peak IRA. All three routes are close enough to Interstate 80 that traffic noise is still noticeable. All three routes are presently used for OHV use. All three of these routes have a minor impact on solitude because the noise of OHV vehicles would not be louder than the background noise from the freeway in the immediate vicinity. These three routes would continue to keep a zone of influence that would be considered semi-primitive. There would continue to be a minor impact to the natural appearing high scenic quality landscape due to disturbance to vegetation, compaction to vegetation at turnaround points and occasional route changes due to fallen trees. The majority of the Castle Peak IRA would remain a good candidate as a reference landscape because the changes to the natural landscape are on the periphery of the roadless area. There is the potential for effects on sensitive plants based on surveys identifying specific plants and locations. See the Chapter 3.08 for more details. Cumulatively each additional route that allows motorized use effectively reduces the acres for semi-primitive non-motorized recreation opportunities.

Table 3.09-14. Miles of Roads/Trails/Areas in Castle Peak Inventoried Roadless Area by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	12,918	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	10.1	0	0	0	0	0	0
Roads open to all vehicles	**Seasonal Closure**	0.0	0.0	0.0	5.0	5.0	5.0	0.0
Roads open to all vehicles	**Open Year Around**	5.0	5.0	5.0	0.0	0.0	0.0	5.0
	Subtotal NFS Roads	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**	**5.0**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	1.1	2.1	2.1	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	1.1	2.1	1.1	0.0	0.0	0.0	2.1
	Subtotal NFS Motorized Trails	**1.1**	**2.1**	**1.1**	**1.1**	**2.1**	**2.1**	**2.1**
Roads/trails on private land	**Open Year Around**	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	Total Motorized	**19.0**	**9.9**	**8.9**	**8.9**	**9.9**	**9.9**	**9.9**
Roads/trails closed to motorized users	**Closed to motorized**	0.0	9.1	10.1	10.1	9.1	9.1	9.1
Trails open only to non-motorized users	**Closed to motorized**	14.8	14.8	14.8	14.8	14.8	14.8	14.8
Trails open only to hikers and equestrians (No mountain bikes allowed)	**Closed to motorized**	6.9	6.9	6.9	6.9	6.9	6.9	6.9
	Subtotal Non-Motorized	**21.7**	**30.8**	**31.8**	**31.8**	**30.8**	**30.8**	**30.8**

Duncan Canyon Inventoried Roadless Area

Cross Country Travel: Cross country travel is prohibited on 9,253 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless areas. The prohibition of cross country will also reduce the total amount of roads and trails available for motorized use. Alternatives 2, 3, 4, 6 and 7 reduce the amount of roads and trails available for motorized use from 22.7 to 14.8 miles. Alternative 5 reduces the amount of motorized roads and trails from 22.7 to 17.8 miles. The prohibition of cross country travel will benefit the roadless area characteristics of each area by stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the National Forest System: There are no roads added to the National Forest Transportation System in roadless areas in any of the alternatives. Alternatives 2, 3, 4, 6 and 7 also add no motorized trails to the National Forest Transportation System. Only Alternative 5 increases the amount of motorized trails in the roadless area from 13.5 to 16.5 miles (+22%). These routes were originally created for timber sales in the mid 1980's. Continuing use on these routes would have some effect on;

1. High quality or undisturbed soil, water, and air;
2. Sources of public drinking water;
3. Diversity of plant and animal communities; and
4. Habitat for sensitive species and those species dependent on large, undisturbed areas of land.

This effect would be somewhat limited in that the proposed routes add up to 3 miles. Effects on this area as a reference landscape would also be limited because this area was already roaded and logged in the past and would not significantly increase the impact beyond the existing effects. In addition these proposed routes are all on the south side of red star ridge and therefore these impacts would be blocked by the ridge and would not affect the heart of Duncan IRA. This same logic would apply to the Natural appearing landscapes with high scenic quality. The existing road system and logging has already diminished the natural appearing landscape and the proposed OHV use will not introduce additional change to the Natural appearing landscape. Red Star Ridge once again blocks the effects on the Natural landscape to the areas south of the ridge.

Changes in class of vehicle and season of use: There are no changes to the class of vehicles allowed on existing National Forest System roads in the Duncan Canyon roadless area in any of the alternatives Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions increase the roadless areas values for; 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 and 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period.

Cumulative Effects: All of the action alternatives improve the roadless character of the Duncan Canyon IRA. Alternative 5 proposes motorized trail additions to the National Forest Transportation System allowing use to continue on three miles of old logging roads within Duncan Roadless area south and east of Red Star Ridge. These routes were originally created for timber sales in the mid 1980's. Continuing use on these routes would have some effect on;

1. High quality or undisturbed soil, water, and air;
2. Sources of public drinking water;
3. Diversity of plant and animal communities; and
4. Habitat for sensitive species and those species dependent on large, undisturbed areas of land.

This effect would be somewhat limited in that the proposed trails add up to 3 miles. Effects on this area as a reference landscape would also be limited because this area was roaded and logged in the past. and would not significantly increase the impact beyond the existing effects. In addition these proposed routes are all on the south side of red star ridge and therefore these impacts would be blocked by the ridge and would not affect the heart of Duncan IRA. This same logic would apply to the Natural appearing landscapes with high scenic quality. The existing road system and logging has already diminished the natural appearing landscape and the proposed OHV use will not introduce much change to the Natural appearing landscape. Red Star Ridge once again blocks the effects on the Natural landscape to the areas south of the ridge.

The heart of Duncan IRA would remain mostly semi-primitive non motorized in character with the exception of motorized use on the Western States Trail and the motorized use continuing in Alternative 5 in the areas south and east of Red Star Ridge where the area would tend towards the roaded natural ROS class. Opportunities for solitude would continue unchanged in the heart of Duncan IRA where the sights and sounds of human activity are fairly limited with the exception of the occasional motorized use on the Western States Trail. The Star Fire burned through part of the IRA in recent years and reduced solitude by eliminating vegetative screening in the areas that burned with intensity. There would be far less opportunity for solitude in the area south and east of Red Star Ridge due to sounds from OHV use in Alternative 5 and the evidence of logging and roads within that area.

The other action alternatives would improve the existing opportunities for solitude; opportunities for semi-primitive recreation, natural appearing landscape, reference landscape because the miles available for motorized use are reduced from 22.7 to 14.8. Table 3.09-15 displays the miles open for motorized use within the Duncan Canyon IRA.

Table 3.09-15. Miles of Roads/Trails/Areas in Duncan Canyon Inventoried Roadless Area by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	9,253	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	7.9	0	0	0	0	0	0
Roads open to all vehicles	**Seasonal Closure**	0.0	0.0	0.0	1.3	1.3	1.3	0.0
Roads open to all vehicles	**Open Year Around**	1.3	1.3	1.3	0.0	0.0	0.0	1.3
	Subtotal NFS Roads	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	5.0	7.9	5.0	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	5.0	5.0	5.0	0.0	0.0	0.0	5.0
Trails open to motorcycles	**Seasonal Closure**	0.5	0.5	0.5	0.5	8.6	0.5	0.5
Trails open to motorcycles	**Open Year Around**	8.0	8.0	8.0	8.0	0.0	8.0	8.0
	Subtotal NFS Motorized Trails	**13.5**	**13.5**	**13.5**	**13.5**	**16.5**	**13.5**	**13.5**
State, County or other jurisdiction roads	**Open Year Around**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total Motorized	**22.7**	**14.8**	**14.8**	**14.8**	**17.8**	**14.8**	**14.8**
Roads/trails closed to motorized users	**Closed to motorized**	0.0	7.9	7.9	7.9	4.9	7.9	7.9
Trails open only to non-motorized users	**Closed to motorized**	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	Subtotal Non-Motorized	**2.5**	**10.4**	**10.4**	**10.4**	**7.4**	**10.4**	**10.4**

East Yuba Inventoried Roadless Area

Cross Country Travel: Cross country travel is prohibited on 15,229 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless areas. The prohibition of cross country will also 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 42.6 to 33.2 miles. Alternatives 2, 5, 6 and 7 reduce the amount of motorized roads and trails from 42.6 to 35.1, 36.6, 34.8 and 34.3 miles respectively. The prohibition of cross country travel will benefit the roadless area characteristics of the East Yuba roadless area by stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the National Forest System: There are no roads added to the National Forest Transportation System in roadless areas in any of the alternatives. Alternatives 3 and 4 also add no motorized trails to the National Forest Transportation System. Alternative 5 has the largest increase in motorized trails increasing the mileage from 33 to 36.3 miles (+10%). Alternatives 2, 6, and 7 increase the mileage of motorized trails from 33 to 34.8 (+5%), 34.6 (+5%), and 34.1 (+3%) respectively.

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 dispersed camping near Spencer Lake. This trail would have a slight effect on the roadless character because it is short segments which access a dispersed camp site. This trail stays relatively close to an existing motorized system route so there is already some reduction to roadless character.

Routes YRN-5a and YRN-5b would be added as motorized trail open to high clearance trail vehicles in alternatives 2, 5, 6 and 7. These trails provide access to a remote, well-defined dispersed camping spot off the Gold Valley four-wheel drive trail. Vehicle access tends to be by motorcycles and jeeps used by anglers, jeepers, and hunters. Closing this dispersed camping site could force individuals to utilize less desirable locations along the trail in the event they are forced to stay overnight. These trails would have slight effects on the roadless character because they are short segments which access dispersed camping sites. Both of these trails stay relatively close to an existing motorized system route so there is already some reduction to roadless character.

Route YRN-4 is added as motorized trail open to high clearance trail vehicles in alternatives 2, 5, 6 and 7. This trail, which comes off the Big Boulder four-wheel drive trail, is an historic mining route. The trail provides a vista into Gold Valley. It receives heavy motorcycle use and has received motorized use for a long time. This trail is also popular with mountain bikes. This trail would have a slight effect on the roadless character because it is a short segment which accesses a vista. This trail stays relatively close to an existing motorized system route so there is already some reduction to roadless character.

Route YRN-007 would be added as a motorized trail open to high clearance trail vehicles in Alternatives 2, 5 and 6. This trail provides access to an old mine used for dispersed camping and exploration. YRN 007 is a longer route but only the very end of the route enters East Yuba IRA along the eastern boundary. Since only the very end of the route is within the roadless area boundary there would be a slight effect on the roadless area character.

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 has more effect on roadless character because it is in the heart of the roadless area 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 roadless area. The effect on the natural landscape with high scenic quality would be slight due to the low key nature of the trail. Likewise the ability for the area to be a reference landscape would remain due to the low key nature of the trail.

Changes in class of vehicle and season of use: There are no changes in the class of vehicles allowed on all existing National Forest System roads in any of the alternatives. Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions increase the roadless areas values for; 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 and 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period.

Cumulative Effects: All of the action alternatives improve the roadless character of the East Yuba IRA by prohibiting cross country motorized travel on 15,229 acres and reducing the number of trails with motorized use. Alternatives 2, 5, 6 and 7 add motorized trails YRN 11, YRN 5a, YRN 5c, andYRN-4 to the National Forest Transportation System. All of these motorized trails would continue their slight effects on the roadless character because they are short segments of motorized trails which primarily access dispersed camping sites. All of these routes stay relatively close to an existing motorized system route so there is already some reduction to roadless character. YRN 007 is added to National Forest Transportation System as a motorized trail in alternatives 2, 5 and 6. This is a longer route but only the very end of the route enters East Yuba IRA along the eastern boundary. YRN-9 would also be added as a motorized trail to the National Forest Transportation System in Alternatives 2 and 5. This motorized trail is longer and has more effect on roadless character because it is in the heart of the roadless area and ventures farther from existing motorized system trails. The effect on the natural landscape with high scenic quality would be slight due to the low key nature of the trail. Likewise the ability for the area to be a reference landscape would remain due to the low key nature of the trail. Alternative 5 would have the least improvement on roadless character because this motorized trail has some effects to roadless character. Alternative 6 would have the next higher benefit to roadless character. None of the motorized trails added to the National Forest Transportation System in Alternative 6 have significant effects, but in a cumulative fashion they add to the reduction in roadless character. Alternative 7 is similar to Alternative 6 but with a slightly greater improvement in roadless character because motorized trail YRN 007 is not included. Alternatives 3 and 4 have the greatest improvement in roadless character because no motorized trails are proposed to be added to the National Forest Transportation System in these alternatives in Inventoried Roadless Areas.

For the resource criteria, the effects to roadless character would be similar to the above assessment in that Alternative 5 would have the least benefit, followed by greater improvement in Alt. 6 and even greater improvement in Alternatives 7. Alternatives 3 and 4 have the greatest improvement in roadless character because no motorized trails proposed as additions to the National Forest Transportation System in Inventoried Roadless Areas. Table 3.09-16 displays the acres available for cross country travel and miles of roads and trails available for motorized use in the East Yuba IRA.

Table 3.09-16. Miles of Roads/Trails/Areas in East Yuba Inventoried Roadless Area by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not applicable**	15,229	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	9.4	0	0	0	0	0	0
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	19.6	22.9	21.2	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	19.6	21.4	19.6	0.0	0.0	0.0	20.7
Trails open to motorcycles	**Seasonal Closure**	0.0	0.0	0.0	13.4	13.4	13.4	13.4
Trails open to motorcycles	**Open Year Around**	13.4	13.4	13.4	0.0	0.0	0.0	0.0
	Subtotal NFS Motorized Trails	**33**	**34.8**	**33**	**33**	**36.3**	**34.6**	**34.1**
Roads/trails on private land	**Open Year Around**	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	Total Motorized	**42.6**	**35.1**	**33.2**	**33.2**	**36.6**	**34.8**	**34.3**
Roads/trails closed to motorized users	**Closed to motorized**	0.0	7.5	9.4	9.4	6.0	7.8	8.3
Trails open only to non-motorized users	**Closed to motorized**	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Trails open only to hikers and equestrians (No mountain bikes allowed)	**Closed to motorized**	1.6	1.6	1.6	1.6	1.6	1.6	1.6
	Subtotal Non-Motorized	**2.5**	**10**	**11.9**	**11.9**	**8.5**	**10.3**	**10.8**
Previously decommissioned roads	**Closed to motorized**	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Granite Chief Inventoried Roadless Area

Cross Country Travel: Cross country travel is prohibited on 5,896 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless areas. The prohibition of cross country will also reduce the total amount of roads and trails available for motorized use. All of the action alternatives reduce the amount of roads and trails available for motorized use from .8 to .4 miles. The prohibition of cross country travel will benefit the roadless area characteristics of the Granite Chief roadless area by stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the National Forest System: There are no roads or trails added to the National Forest Transportation System in roadless areas in any of the alternatives.

Changes in class of vehicle and season of use: There are no existing changes in class of vehicle or season of use on National Forest System roads or trails in any alternatives.

Cumulative Effects: All of the action alternatives improve the roadless character of the Granite Chief IRA. The heart of Granite Chief IRA is a congressionally designated wilderness that precludes motorized use. The only possible impacts to roadless characteristics would be if cross country travel is allowed in the no action alternative in the parts of the IRA that are not wilderness and not part of the old Foresthill District. Cross country travel in the Truckee District areas that are still part of the IRA could have significant impact to all 9 criteria.

Table 3.09-17. Miles of Roads/Trails/Areas in Granite Chief Inventoried Roadless Area by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	5,896	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	.3	0	0	0	0	0	0
Roads/trails on private land	**Open Year Around**	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	Total Motorized	**0.8**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**
Roads/trails closed to motorized users	**Closed to motorized**	0.0	0.3	0.3	0.3	0.3	0.3	0.3
Trails open only to non-motorized users	**Closed to motorized**	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Trails open only to hikers and equestrians (No mountain bikes allowed)	**Closed to motorized**	51.7	51.7	51.7	51.7	51.7	51.7	51.7
	Subtotal Non-Motorized	**51.8**	**52.1**	**52.1**	**52.1**	**52.1**	**52.1**	**52.1**

Grouse Lakes Inventoried Roadless Area

Cross Country Travel: Cross country travel is prohibited on 6,150 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless areas. The prohibition of cross country will also 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 18.5 to 15.2 miles. Alternatives 2, 5, 6 and 7 reduce the amount of motorized roads and trails from 18.5 to 16.4 miles. The prohibition of cross country travel will benefit the roadless area characteristics of the Grouse Lakes roadless area by stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the National Forest System: There are no roads added to the National Forest Transportation System in roadless areas in any of the alternatives. Alternatives 3 and 4 also add no motorized trails to the National Forest Transportation System. Alternatives 2, 5, 6, and 7 increase the mileage of motorized trails from 8.8 to 10.0 miles (+14%).

Route YRS-F1 consists of several small spur routes roads to dispersed camping sites on the Fordyce Jeep Trail that is within the Grouse Lakes IRA. The Fordyce Jeep trail is an existing National Forest Transportation System motorized trail that receives moderate to light use in general because Fordyce Creek limits crossing for most vehicles for most of the year. However the trail then receives very high use during the two week window of the Sierra Trek. Hundreds of 4x4's use the trail during this two week window while the water flow is reduced. The potential effects to roadless character are 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 results in slightly more impact on opportunities for solitude, creates a wider zone of influence for semi-primitive motorized activities and therefore affecting the area available for semi-primitive non-motorized recreation. These impacts would slightly affect the character of the landscape that would make it a good reference landscape.

One additional motorized trail (YRS-G3), about a mile in length will also be added to the National Forest Transportation System north and east of Baltimore Lake in Alternatives 2, 5, 6, and 7. This motorized trail has more effect to roadless character because it is separate from and beyond the Fordyce Jeep Trail. This motorized trail affects opportunities for solitude because of motorized vehicle noise. Since noise travels, there is a band of influence of a mile or two where opportunities for solitude would be less. 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. Continuing use of this motorized trail has some effect on the ability of the area to be a reference landscape, but due to the length of the trail is slight. The natural appearing landscape and high scenic quality is only slightly affected due to the continuing existence of the motorized trail. The other resource values effects are proportional to the less than one mile length.

Changes in class of vehicle and season of use: There are no changes to the class of vehicles allowed on all existing National Forest System roads in any of the alternatives. Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions increase the roadless areas values for; 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 and 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period.

Cumulative Effects: All of the action alternatives improve the roadless character of the Grouse Lakes IRA by prohibiting cross country travel on 6,150 acres and reducing the amount of roads and trails available for motorized use. Alternatives 2, 5, 6, and 7 would allow use to continue on several short motorized trail spurs to dispersed camping sites along the Fordyce Jeep Trail. The Fordyce Jeep trail is an existing National Forest Transportation System motorized trail that receives moderate to light use in general because Fordyce Creek precludes crossing for most of the year but then receives very high use during the two week window of the Sierra Trek. Hundreds of 4x4's use the trail during this two week window while the water flow is reduced. The potential effects to roadless character are limited due to the short length of the motorized trails and their close proximity to the Fordyce trail. The motorized trails do extend the motorized influence into a wider band along the Fordyce Jeep trail. This results in slightly more impact on opportunities for solitude, creates a wider zone of influence for semi-primitive motorized activities and therefore affecting the area available for semi-primitive non-motorized recreation. These impacts would slightly affect the character of the landscape that would make it a good reference landscape. One additional motorized trail, about a mile in length will also be added to the National Forest Transportation System north and east of Baltimore Lake in Alternatives 2, 5, 6, and 7. This motorized trail has more effect to roadless character because it is separate from and beyond the Fordyce Jeep trail. Adding this motorized trail to the National Forest Transportation System affects opportunities for solitude because of OHV use noise. Since noise travels, there is a band of influence of a mile or two where opportunities for solitude would be less. Likewise there is a band of influence along the route where the ROS opportunities would be semi-primitive motorized rather than semi-primitive non-motorized. Continuing use of this motorized trail has some effect on the ability of the area to be a reference landscape, but due to the length of the route is slight. The natural appearing landscape and high scenic quality is only slightly affected due to the continuing existence of the route. The other resource values effects are proportional to the less than one mile length.

Table 3.09-18. Miles of Roads/Trails/Areas in Grouse Lakes Inventoried Roadless Area by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	6,150	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	3.3	0	0	0	0	0	0
Roads open to all vehicles	**Seasonal Closure**	0.0	0.0	0.0	5.3	5.3	5.3	0.0
Roads open to all vehicles	**Open Year Around**	5.3	5.3	5.3	0.0	0.0	0.0	5.3
Subtotal NFS Roads		**5.3**	**5.3**	**5.3**	**5.3**	**5.3**	**5.3**	**5.3**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	8.8	10.0	10.0	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	8.8	10.0	8.8	0.0	0.0	0.0	10.0
Subtotal NFS Motorized Trails		**8.8**	**10**	**8.8**	**8.8**	**10**	**10**	**10**
Roads/trails on private land	**Open Year Around**	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Total Motorized		**18.5**	**16.4**	**15.2**	**15.2**	**16.4**	**16.4**	**16.4**
Roads/trails closed to motorized users	**Closed to motorized**	0.2	2.2	3.5	3.5	2.2	2.2	2.3
Trails open only to non-motorized users	**Closed to motorized**	27.2	27.2	27.2	27.2	27.2	27.2	27.2
Subtotal Non-Motorized		**27.4**	**29.4**	**30.7**	**30.7**	**29.4**	**29.4**	**29.5**

Lakes Basin Inventoried Roadless Area

Cross Country Travel: Cross country travel is prohibited on 557 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless areas. The prohibition of cross country will also reduce the total amount of roads and trails available for motorized use. All of the action alternatives reduce the amount of roads and trails available for motorized use from

.5 to .4 miles. The prohibition of cross country travel will benefit the roadless area characteristics of the Lakes Basin roadless area by stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the National Forest System: There are no roads or motorized trails added to the National Forest Transportation System in roadless areas in any of the alternatives.

Changes in class of vehicle and season of use: There are no changes to the class of vehicles allowed on all existing National Forest System roads in any of the alternatives. Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions increase the roadless areas values for; 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 and 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period.

Cumulative Effects: All of the action alternatives improve the roadless character of the Lakes Basin IRA by prohibiting cross country travel on 557 acres a reducing the amount of roads and trails available for motorized use. No trails un-authorized for motorized use would be added to the National Forest Transportation System within the IRA and the existing motorized system trail that forms the west boundary gets infrequent use.

Table 3.09-19. Miles of Roads/Trails/Areas in Lakes Basin Inventoried Roadless Area by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	557	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	.1	0	0	0	0	0	0
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	0.4	0.4	0.4	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	0.4	0.4	0.4	0.0	0.0	0.0	0.4
	Subtotal NFS Motorized Trails	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**
Un-authorized trails open to motorized and non-motorized users	**Open Year Around**	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	Total Motorized	**0.5**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**
Roads/trails closed to motorized users	**Closed to motorized**	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Trails open only to hikers and equestrians (No mountain bikes allowed)	**Closed to motorized**	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Subtotal Non-Motorized	**2**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**	**2.1**
Previously decommissioned roads	**Closed to motorized**	1.8	1.8	1.8	1.8	1.8	1.8	1.8

Middle Yuba Inventoried Roadless Area

Cross Country Travel: Cross country travel is prohibited on 7,382 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless area. The prohibition of cross country will also reduce the total amount of roads and trails available for motorized use. All of the action alternatives reduce the amount of roads and trails available for motorized use from 29.5 to 23.6 miles. The prohibition of cross country travel will benefit the roadless area characteristics of the Middle Yuba roadless area by stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the National Forest System: There are no roads or motorized trails added to the National Forest Transportation System in roadless areas in any of the alternatives.

Changes in class of vehicle and season of use: Alternatives 2 5 and 6 change the class of vehicles allowed on all existing National Forest System roads in roadless areas from highway legal vehicles only to open to all vehicles. This change in class of vehicles will not impact the roadless area characteristics of the inventoried roadless areas. Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions increase the roadless areas values for; 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 and 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period.

Cumulative Effects: All of the action alternatives improve the roadless character of the Middle Yuba IRA by prohibiting cross country travel on 7,382 acres and reducing the amount of roads and trails available for motorized use. No motorized trails would be added to the National Forest Transportation System within the IRA. The existing motorized system trail that forms the west boundary gets infrequent use.

Table 3.09-20. Miles of Roads/Trails/Areas in Middle Yuba Inventoried Roadless Area by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	7,382	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	6.0	0	0	0	0	0	0
Roads open to highway legal vehicles only	**Open Year Around**	0.6	0.0	0.6	0.6	0.0	0.0	0.6
Roads open to all vehicles	**Seasonal Closure**	0.0	0.0	0.0	7.1	7.7	7.7	0.0
Roads open to all vehicles	**Open Year Around**	7.1	7.7	7.1	0.0	0.0	0.0	7.1
	Subtotal NFS Roads	**7.7**	**7.7**	**7.7**	**7.7**	**7.7**	**7.7**	**7.7**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	0.8	0.8	0.8	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	0.8	0.8	0.8	0.0	0.0	0.0	0.8
	Subtotal NFS Motorized Trails	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**
Roads/trails on private land	**Open Year Around**	14.8	14.8	14.8	14.8	14.8	14.8	14.8
State, County or other jurisdiction roads	**Open Year Around**	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	Total Motorized	**29.5**	**23.6**	**23.6**	**23.6**	**23.6**	**23.6**	**23.6**
Roads/trails closed to motorized users	**Closed to motorized**	0.0	6.0	6.0	6.0	6.0	6.0	6.0

North Fork of the Middle Fork American River Inventoried Roadless Area

Cross Country Travel: Cross country travel is prohibited on 11,191 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless areas. The prohibition of cross country will also reduce the total amount of roads and trails available for motorized use. All of the action alternatives reduce the amount of roads and trails available for motorized use from 18.8 to 17.5 miles. The prohibition of cross country travel will benefit the roadless area characteristics of the North Fork of the Middle Fork American River roadless area by stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the National Forest System: There are no roads or motorized trails added to the National Forest Transportation System in roadless areas in any of the alternatives.

Changes in class of vehicle and season of use: There are no changes to the class of vehicles allowed on all existing National Forest System roads in any of the alternatives. Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions increase the roadless areas values for; 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 and 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period.

Cumulative Effects: Due to the very steep canyon walls in this IRA there are only 1.3 miles of motorized trails un-authorized for motorized use. Use of all of these motorized trails is prohibited to motorized vehicles in all of the action alternatives. Therefore there are no expected changes to roadless characteristics for any of the action alternatives.

Table 3.09-21. Miles of Roads/Trails/Areas in North Fork Middle Fork American River Inventoried Roadless Area by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	11,191	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	1.3	0	0	0	0	0	0
Roads open to all vehicles	**Seasonal Closure**	0.3	0.3	0.3	1.5	1.5	1.5	0.3
Roads open to all vehicles	**Open Year Around**	1.2	1.2	1.2	0.0	0.0	0.0	1.2
	Subtotal NFS Roads	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Trails open to high clearance trail vehicles	**Seasonal Closure**	2.9	2.9	2.9	16.0	16.0	16.0	2.9
Trails open to high clearance trail vehicles	**Open Year Around**	0.6	0.6	0.6	0.0	0.0	0.0	0.6
Trails open to motorcycles	**Open Year Around**	12.5	12.5	12.5	0.0	0.0	0.0	12.5
	Subtotal NFS Motorized Trails	**16.0**	**16.0**	**16.0**	**16.0**	**16.0**	**16.0**	**16.0**
Un-authorized trails open to motorized and non-motorized users	**Open Year Around**	1.3	0.0	0.0	0.0	0.0	0.0	0.0
	Total Motorized	**18.8**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**	**17.5**
Roads/trails closed to motorized users	**Closed to motorized**	0.0	1.3	1.3	1.3	1.3	1.3	1.3
Trails open only to hikers and equestrians (No mountain bikes allowed)	**Closed to motorized**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal Non-Motorized	**0**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**

North Fork American River Inventoried Roadless Area

Cross Country Travel: Cross country travel is prohibited on 25,055 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless area. The prohibition of cross country will also reduce the total amount of roads and trails available for motorized use. All of the action alternatives reduce the amount of roads and trails available for motorized use from 10.8 to 9.5 miles. The prohibition of cross country travel will benefit the roadless area characteristics of the North Fork American River by stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the National Forest System: There are no roads or motorized trails added to the National Forest Transportation System in roadless areas in any of the alternatives.

Changes in class of vehicle and season of use: Alternatives 2, 5 and 6 change the class of vehicles allowed on all existing National Forest System roads in roadless areas from highway legal vehicles only to open to all vehicles. This change in class of vehicles will not impact the roadless area characteristics of the inventoried roadless areas.

Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions increase the roadless areas values for; 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 and 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period.

Cumulative Effects: All of the action alternatives improve the roadless character of the Middle Yuba IRA by prohibiting cross country travel on 25,055 acres and reducing the amount of roads and trails available for motorized use. The North Fork American River remains intact with high levels of primitive to semi-primitive non-motorized recreation opportunities that maintain the high quality roadless characteristics in all the action alternatives.

Table 3.09-22. Miles of Roads/Trails/Areas in North Fork American River Inventoried Roadless Area by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	25,055	0	0	0	0	0	0
Motorized trails un-authroized for motorized use	**Not Applicable**	1.3	0	0	0	0	0	0
Roads open to highway legal vehicles only	**Open Year Around**	0.1	0.0	0.1	0.1	0.0	0.0	0.1
Roads open to all vehicles	**Seasonal Closure**	0.2	0.4	0.4	2.2	2.3	2.3	0.4
Roads open to all vehicles	**Open Year Around**	2.1	1.9	1.9	0.0	0.0	0.0	1.9
	Subtotal NFS Roads	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**
Trails open to high clearance trail vehicles	**Seasonal Closure**				4.2	4.2	4.2	
Trails open to high clearance trail vehicles	**Open Year Around**	4.2	4.2	4.2				4.2
	Subtotal NFS Motorized Trails	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**
State, County or other jurisdiction roads	**Open Year Around**	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Roads/trails on private land	**Open Year Around**	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	Total Motorized	**10.8**	**9.5**	**9.5**	**9.5**	**9.5**	**9.5**	**9.5**
Roads/trails closed to motorized users	**Closed to motorized**	0.0	1.2	1.2	1.2	1.2	1.2	1.2
Trails open only to non-motorized users	**Closed to motorized**	40.8	40.8	40.8	40.8	40.8	40.8	40.8
	Subtotal Non-Motorized	**0**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**

West Yuba Inventoried Roadless Area

Cross Country Travel: Cross country travel is prohibited on 16,057 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the roadless area. The prohibition of cross country will also 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 35.7 to 24.4 miles. Alternatives 2, 5, 6 and 7 reduce the amount of motorized roads and trails from 35.7 to 28.0, 30.2, 27.3 and 27.3 miles respectively. The prohibition of cross country travel will benefit the roadless area characteristics of the West Yuba roadless area stopping the proliferation of un-authorized routes and reducing the amount of roads and trails available for motorized use.

Additions to the National Forest System: There are no roads added to the National Forest Transportation System in roadless areas in any of the alternatives. Alternatives 3 and 4 also add no motorized trails to the National Forest Transportation System. Alternative 5 has the largest increase in National Forest Transportation System motorized trails increasing the mileage from 17.8 to 23.9 (+34%). Alternatives 2, 6, and 7 increase the mileage of National Forest Transportation System motorized trails from 17.8 to 21.7 (+22%), 21 (+18%), and 21 (+18%) respectively.

Route YRN-M2 would be added to the National Forest Transportation System 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 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. The main effect this trail has is in solitude from motorcycle noise. Due to the low numbers of users this effect is primarily on the weekends and somewhat sporadic. The motorized use of this trail is consistent with semi-primitive motorized standards in the Forest Plan. The low key nature of this trail has a very slight effect on the overall natural appearing landscape and high scenic quality of the area. This motorized trail affects the naturalness for a reference landscape in a very slight way.

Route YRN-M3b would be added as motorized motorcycle trail in alternatives 2, 5, 6 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. It comes off of the Downie River single track system trail. It is a little known trail which requires a high skill level. It provides loop connection from Downie River to Castle Rock trails. The main effect this trail has is in solitude from motorcycle noise. Due to the low numbers of users this effect is primarily on the weekends and somewhat sporadic. The motorized use of this trail is consistent with semi-primitive motorized standards in the Forest Plan. The low key nature of this trail has a very slight effect on the overall natural appearing landscape and high scenic quality of the area. This trail affects the naturalness for a reference landscape in a very slight way.

Route YRN-7 would be added to the National Forest Transportation System as a motorized trail open to high clearance trail vehicles in Alternatives 2, 5, 6 and 7. Use of this motorized trail would be seasonally prohibited for wet weather in Alternatives 5 and 6. This motorized trail is a short ¼-mile spur off 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 motorized trail continues to a high quality vista point. Current use is low. This motorized trail is in the north east corner of roadless area. It has similar effects as described above with the motorcycle trails with there being a slightly higher impact because the width of the trail is greater.

Changes in class of vehicle and season of use: There are no changes to the class of vehicles allowed on existing National Forest System roads in any of the alternatives. Alternatives 4, 5 and 6 impose wet weather seasonal restrictions on all native surface roads and motorized trails. These seasonal restrictions increase the roadless areas values for; 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 and 3) Opportunities for semi-primitive non-motorized and primitive recreation opportunities during the closure period.

Cumulative Effects: All of the action alternatives improve the roadless character of the Middle Yuba IRA by prohibiting cross country travel on 16,057 acres and reducing the amount of roads and trails available for motorized use. YRN-M3b, and YRN-M2 if added to the National Forest Transportation System would have slight effects to roadless character as difficult relatively low use motorcycle trails. The main effect these motorized trails have is in solitude from motorcycle noise. Due to the low numbers of users this effect is primarily on the weekends and somewhat sporadic. The motorized use of these trails is consistent with semi-primitive motorized standards in the Forest Plan. The low key nature of these trails has a very slight effect on the overall natural appearing landscape and high scenic quality of the area. These motorized trails affect the naturalness for a reference landscape in a very slight way. YRN 7 is an jeep route in the north east corner of West Yuba which would be added to the National Forest Transportation System in Alternatives 2, 5, 6 and 7. It has similar effects as described above with the motorcycle trails with there being a slightly higher impact because the width of the trail is greater. Alternative 5 would have the least improvement in roadless character because four motorized trails would added to the National Forest Transportation System. While the effects from any one trail to roadless character are not great, the cumulative effects are greater particularly because all these motorized trails are within the heart of the roadless area. Alternatives 2, 6, and 7 have greater benefit to roadless character than Alternative 5 and each of the alternatives would be similar with just 2 motorized trails being added to the National Forest Transportation System. Alternatives 3 and 4 would have no motorized trails added to the National Forest Transportation System in roadless areas and therefore would have the most positive effect for maintaining roadless character.

For the resource criteria the benefits would be lesser with Alternative 5 greater with Alternatives 2,6, and 7 because of fewer motorized trails being added to the National Forest Transportation System and Alternative 3 and 4 would greatest benefit to roadless character because no motorized trails are added to the National Forest Transportation System in these alternatives.

Table 3.09-23. Miles of Roads/Trails/Areas in West Yuba Inventoried Roadless Area by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	16,057	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	11.3	0	0	0	0	0	0
Roads open to all vehicles	**Seasonal Closure**	0.0	0.0	0.0	6.3	6.3	6.3	6.3
Roads open to all vehicles	**Open Year Around**	6.3	6.3	6.3	0.0	0.0	0.0	0.0
	Subtotal NFS Roads	**6.3**	**6.3**	**6.3**	**6.3**	**6.3**	**6.3**	**6.3**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	8.2	11.0	8.8	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	8.2	8.8	8.2	0.0	0.0	0.0	8.8
Trails open to motorcycles	**Seasonal Closure**	0.0	0.0	0.0	9.6	12.9	12.2	0.0
Trails open to motorcycles	**Open Year Around**	9.6	12.9	9.6	0.0	0.0	0.0	12.2
	Subtotal NFS Motorized Trails	**17.8**	**21.7**	**17.8**	**17.8**	**23.9**	**21**	**21**
Roads/trails on private land	**Open Year Around**	0.3	0.0	0.3	0.3	0.0	0.0	0.0
	Total Motorized	**35.7**	**28.0**	**24.4**	**24.4**	**30.2**	**27.3**	**27.3**
Roads/trails closed to motorized users	**Closed to motorized**	0.0	7.6	11.3	11.3	5.4	8.3	8.4

Wilderness: Affected Environment & Environmental Consequences

The Tahoe National Forest has one wilderness named Granite Chief Wilderness. It is about 24,864 acres and was carved out of the Granite Chief roadless area. The area is managed for primitive ROS recreation opportunities. Motorized vehicle use is prohibited. No changes to the Designated Wilderness Area will occur in any of the alternatives.

Experimental Forests: Affected Environment

The Onion Creek Experimental Forest, 2,846 acres, is located just south of Mt. Disney and the Sugar Bowl Ski Area. Roads are allowed within the experimental Forest but recreation and OHV use is not encouraged. The Sagehen Experimental Forest, 7552 acres, is located just west of State Highway 89 and about six miles north of the town of Truckee. Sagehen Experimental Forest 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 already prohibited in the Onion Creek Experimental Forest preventing the proliferation of additional un-authorized routes and associated resource damage.

Additions to the National Forest Transportation System: In Onion Creek Experimental Forest one motorized trail which provides access to a dispersed site immediately adjacent to the County Road will be added to the National Forest Transportation System in Alternatives 2, 5 and 6. This route is less than 2 tenths of a mile in length. OHV use of this 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.

Changes to Class of Vehicle and/or Season of Use on the existing National Forest Transportation System: No changes in class of vehicles are proposed in any alternative. Seasonal restrictions would be placed on all native surface roads and motorized trails during the wet periods of the year. These seasonal restrictions would be consistent with Experimental Forest management objectives.

Sagehen Experimental Forest

Cross Country Travel: Cross country travel is prohibited on 7,149 acres in all of the action alternatives. This prohibition stops the proliferation of new un-authorized routes within the experimental forest. The prohibition of cross country will also reduce the total amount of roads and trails available for motorized use.

Additions to the National Forest Transportation System: In the Sagehen Experimental Forest there is one motorized trail being considered for addition to the National Forest Transportation System. TKN 001 is included in Alternatives 2 and 5. This motorized trail is about a quarter mile in length and connects 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. However there is the possibility that it would be inconsistent with the Sagehen Experimental Forest management objectives.

Alternatives 3, 4, 6 and 7 would have no effects since no motorized trails are proposed for addition to the national Forest Transportation System within the Sagehen Experimental Forest. Alternatives 2 and 5 have the potential for some effects to Sagehen Experimental.

Tables 3.09-24 through 3.09-26 display the miles of roads and trails within Experimental Forests by Alternative.

Table 3.09-24. Miles of Roads/Trails/Areas in All Experimental Forests by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	7,149	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	11.0	0	0	0	0	0	0
Roads open to highway legal vehicles only	**Seasonal Closure**	5.1	0.0	5.1	5.1	0.0	0.0	5.1
Roads open to highway legal vehicles only	**Open Year Around**	0.1	0.0	0.1	0.1	0.0	0.0	0.1
Roads open to all vehicles	**Seasonal Closure**	0.0	5.1	0.0	20.3	25.6	25.6	0.0
Roads open to all vehicles	**Open Year Around**	20.3	20.5	20.3	0.0	0.0	0.0	20.3
	Subtotal NFS Roads	**25.5**	**25.6**	**25.5**	**25.5**	**25.6**	**25.6**	**25.5**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	2.2	2.8	2.4	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	2.2	2.8	2.2	0.0	0.0	0.0	2.2
	Subtotal Motorized NFS Trails	**2.2**	**2.8**	**2.2**	**2.2**	**2.8**	**2.4**	**2.2**
State, County or other jurisdiction roads	**Open Year Around**	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Roads/trails on private land	**Open Year Around**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total Motorized	**41.5**	**31.2**	**30.5**	**30.5**	**31.2**	**30.8**	**30.5**
Roads/trails closed to motorized users	**Closed to motorized**	0.2	10.7	11.2	11.2	10.7	11.0	11.2
Trails open only to non-motorized users	**Closed to motorized**	1.7	1.7	1.7	1.7	1.7	1.7	1.7

Table 3.09-25. Miles of Roads/Trails/Areas in the Onion Creek Experimental Forests by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	0	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	2.3	0	0	0	0	0	0
Roads open to all vehicles	**Seasonal Closure**	0.0	0.0	0.0	1.8	1.8	1.8	0.0
Roads open to all vehicles	**Open Year Around**	1.8	1.8	1.8	0.0	0.0	0.0	1.8
	Subtotal NFS Roads	**1.8**	**1.8**	**1.8**	**1.8**	**1.8**	**1.8**	**1.8**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	0.0	0.2	0.2	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	0.0	0.2	0.0	0.0	0.0	0.0	0.0
	Subtotal Motorized NFS Trails	**0**	**0.2**	**0**	**0**	**0.2**	**0.2**	**0**
State, County or other jurisdiction roads	**Open Year Around**	1.8	1.8	1.8	1.8	1.8	1.8	1.8
	Total Motorized	**5.9**	**3.8**	**3.6**	**3.6**	**3.8**	**3.8**	**3.6**
Roads/trails closed to motorized users	**Closed to motorized**	0.0	2.1	2.3	2.3	2.1	2.1	2.3
	Total Non-Motorized	**0**	**2.1**	**2.3**	**2.3**	**2.1**	**2.1**	**2.3**

Table 3.09-26. Miles of Roads/Trails/Areas in the Sagehen Creek Experimental Forests by Alternative

Road and Trail Category	Season Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres	**Not Applicable**	7,149	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	**Not Applicable**	8.8	0	0	0	0	0	0
Roads open to highway legal vehicles only	**Seasonal Closure**	5.1	0.0	5.1	5.1	0.0	0.0	5.1
Roads open to highway legal vehicles only	**Open Year Around**	0.1	0.0	0.1	0.1	0.0	0.0	0.1
Roads open to all vehicles	**Seasonal Closure**	0.0	5.1	0.0	18.6	23.8	23.8	0.0
Roads open to all vehicles	**Open Year Around**	18.6	18.7	18.6	0.0	0.0	0.0	18.6
	Subtotal NFS Roads	**23.8**	**23.8**	**23.8**	**23.8**	**23.8**	**23.8**	**23.8**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	2.2	2.6	2.2	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	2.2	2.6	2.2	0.0	0.0	0.0	2.2
	Subtotal Motorized NFS Trails	**2.2**	**2.6**	**2.2**	**2.2**	**2.6**	**2.2**	**2.2**
State, County or other jurisdiction roads	**Open Year Around**	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Total Motorized	**35.9**	**27.4**	**27.1**	**27.1**	**27.4**	**27.1**	**27.1**
Roads/trails closed to motorized users	**Seasonal Closure**	0.2	8.6	8.9	8.9	8.6	8.9	8.9
Trails open only to non-motorized users	**Open Year Around**	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	Total Non-Motorized	**1.9**	**10.3**	**10.7**	**10.7**	**10.3**	**10.7**	**10.7**

Wild and Scenic Rivers: Affected Environment

The North Fork of the American Wild River is a federally designated Wild and Scenic River. With a Wild classification it excludes motorized vehicle use. The South Yuba River is recommended for federal designation with a recreation and scenic classification. The South Yuba River is presently a State designated river with recreation and scenic classification. The interagency South Yuba River Management Plan directs that motorized use remain on designated routes and precludes cross country travel. The North Yuba River, its tributary Canyon Creek, and Sagehen are recommended for federal designation. Motorized trails are not automatically excluded from these river corridors but effects to outstandingly remarkable values and river classifications need to be evaluated. The following displays the management guidelines for motorized travel within the different classes of wild and scenic rivers.

1. **Wild River**: Motorized travel on land or water could be permitted, but is generally not compatible with this classification
2. **Scenic River**: Motorized travel on land or water may be permitted, prohibited or restricted to protect river values.
3. **Recreation Rivers**: Motorized travel on land or water may be permitted, prohibited or restricted. Controls will usually be similar to surrounding lands and waters.

The following describes each of the rivers in more detail.

North Yuba River

Description: The North Yuba River is located in the northern portion of the Tahoe National Forest. The river flows for approximately forty-five miles from its headwaters at Yuba Pass to New Bullards Bar Reservoir. There are a total of 14,228 acres within the river corridor. The watershed is highly mineralized and characterized by large rock outcrops in the upper reaches with high gradient riffles and frequent deep pools with boulder substrate. The river is easily accessible as Highway 49 parallels 90 percent of the river. The segment above New Bullards Bar is accessible by rough foot trail. Virtually all of the open land along the river is covered by mining claims. Some existing power and telephone lines parallel the highway. There are numerous public campgrounds and picnic sites (some with toilet facilities) along the river corridor. A historic driving tour and six interpretive stops are located along Highway 49 between Oregon Creek and the top of Yuba Pass. The towns of Goodyear's Bar, Downieville, and Sierra City are located adjacent the river. Numerous special use permits have been issued along the river corridor including recreation summer homes north of Downieville, water system permits, and commercial rafting permits. There is a seasonal mining camp located at Shenanigan Flat.

Vegetation within the corridor includes riparian, foothill woodland, mixed conifer, and subalpine. Riparian vegetation grows along the creek banks and contains deciduous trees and shrubs that give way to lodgepole pine and red fir at the higher elevations. Riparian vegetation is also found in other areas of the corridor primarily in areas where the terrain is moist and shaded. There are known occurrences of *Lewisia cantelovii* (a sensitive plant) within the corridor. There are no other known occurrences of sensitive or watchlist plants or plant communities. There is potential habitat for *Botrychium ascendens, B. crenulatum, B. lineare, B. montanum, Clarkia biloba* ssp. *brandegeae, Clarkia stellata, Cypripedium fasiculatum, C. montanum, Erigeron miser, Epilobium howellii, Fritillaria eastwoodiae, Lewisia cantelovii, Lewisia serrata, Lupinus dalesiae, Meesia triquetra, M. uliginosa, Monardella follettii, Penstemon personatus, Phacelia stebbinsii, Scheuchzeria palustris* var. *americana* and *Vaccinium coccinium* within the study corridor.

The North Yuba River provides habitat for a variety of sensitive wildlife species. The federally listed endangered bald eagle uses the river corridor. California spotted owls and the northern goshawk also share the corridor. There are PACs (protected activity centers) within the area to provide for the spotted owls. The river environment is also potential habitat for Pacific fisher and marten. There are healthy populations of rainbow, brown, and eastern brook trout throughout the corridor. There are no other known federally listed threatened and endangered wildlife or fishery species within the area.

Eligibility: The North Yuba River is eligible for its fisheries, heritage resource values, vegetation, scenic, and recreation values. The fishery values were considered of Statewide significance in terms of fish diversity, quality of habitat and trophy fishery. The cultural values were considered to have high regional significance and probable national significance for the extent and complexity of the gold mining history and the existing and potential interpretive opportunities available along the North Yuba River. The recreation values are considered to be regionally significant due to the diversity of river associated recreation activities. The recreation activities range from whitewater rafting and kayaking to a whole range of day use and overnight camping opportunities as well as the recreation opportunities offered by the local communities and their overnight accommodations and eating establishments. The scenic values were identified as regionally significant due to the dramatic spatial definition of the river canyon, the lush quality of vegetation, and the diversity of scenic opportunities from the landmark Sierra Buttes, to the waterfalls, rapids, and cultural landscapes of the local towns. The vegetation values were considered of regional significance due to the rare nature of *Lewisia* and the likelihood that they are genetically different than other *Lewisia cantelovii* populations because of geographic isolation.

Classification: During the eligibility phase of the study the North Yuba River was classified as wild, scenic, and recreation. The longest segment from the Yuba Pass area to Shenanigan Flat is classified as recreation due to the level of development along the corridor including towns, roads, and mining claims. The segment from Shenanigan Flat to Race Track Point is classified as wild due to the primitive setting and distinct lack of human development other than some mining claims. The final segment from Race Track Point to Wambo Bar is classified as scenic due to the existence of a Penstock at Wambo Bar that is clearly visible from the river for over a mile of its length.

Recommendation: The North Yuba River was considered to be a worthy addition into 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, higher scenic quality, and plant values.

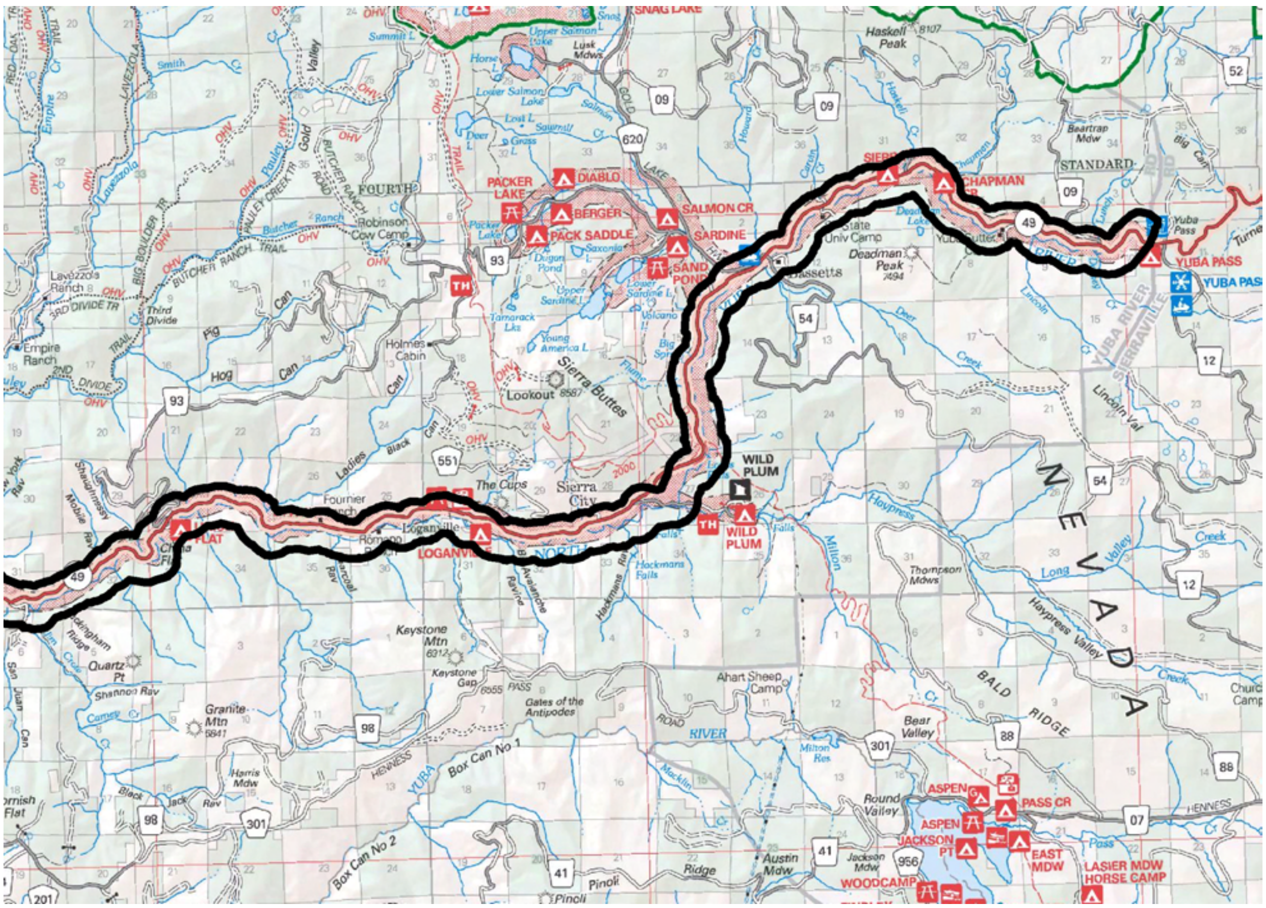

Figure 3.09-12. Upper North Yuba Wild & Scenic River

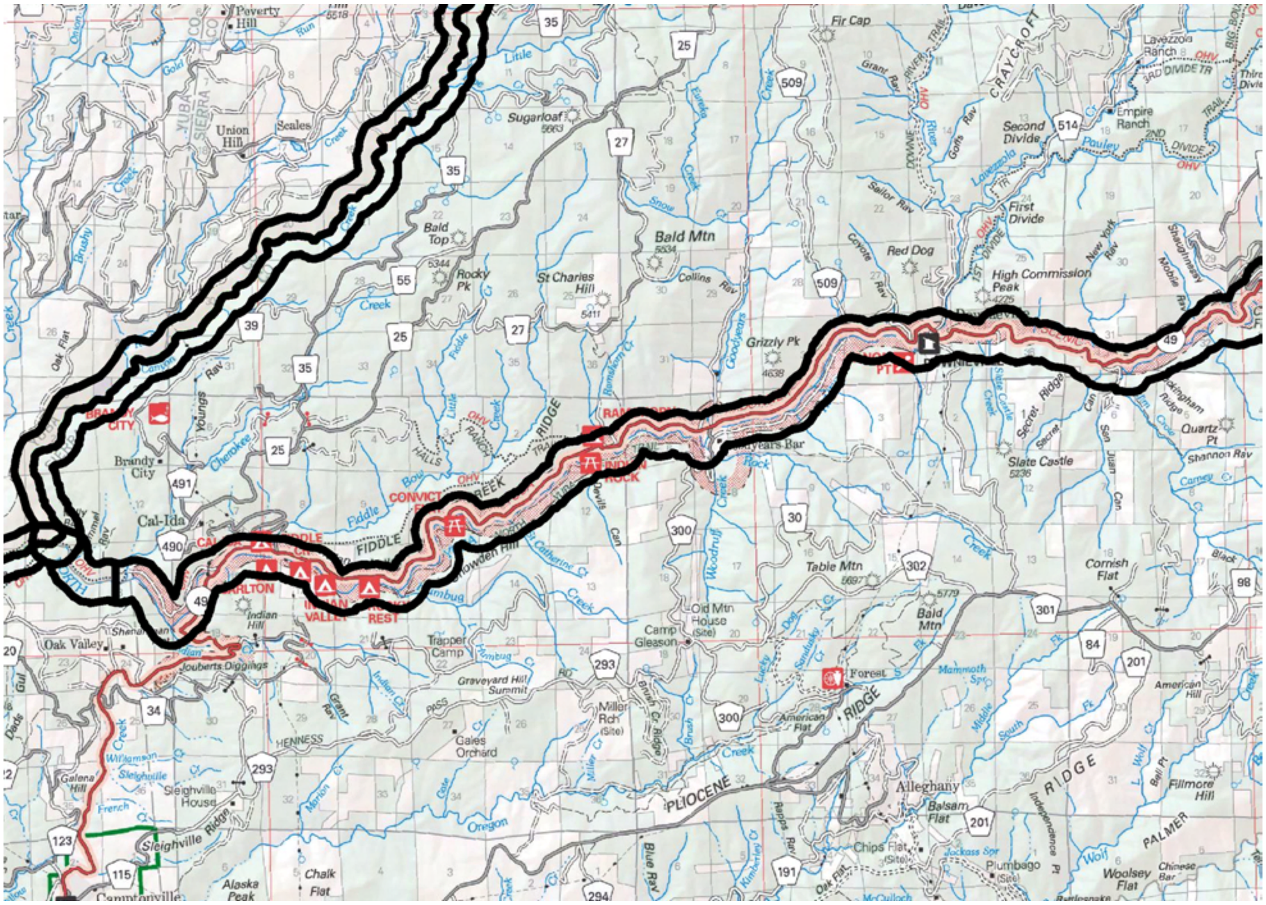

Figure 3.09-13. Lower North Yuba Wild & Scenic River

Canyon Creek

Description: Canyon Creek is located along the border between the Tahoe National Forest and the Plumas National Forest. The creek flows for approximately thirty miles from its headwaters to the confluence with the North Yuba River. The watershed is characterized by canyons surrounded by steep hills. There are a total of 8,945 acres within the river corridor. The study corridor is characterized by alders and willows which line the stream channel. The upper banks and ridges are densely covered by conifers. The stream channel is characterized by deep pools, riffles, cascades and bedrock chutes. The Creek flows through a highly mineralized area. Access into the corridor can be obtained at the North Yuba confluence by walking a trail from Shenanigan Flat or along the upper reaches at Poker Flat via two rough dirt roads. There are also several roads and primitive trails which follow old roads into the canyon. Primitive seasonal mining cabins are located near the creek in the Poker Flat area. There are no utility corridors, public facilities, or special use permits within the corridor.

Vegetation within the corridor includes riparian, mixed conifer, and subalpine. The corridor and surrounding ridges contain some large blocks of old-growth forest. Riparian vegetation grows along the creek banks and contains deciduous trees and shrubs that give way to conifers and shrubs at the higher elevations. Riparian vegetation is also found in moist areas of the Canyon Creek corridor. There is a known occurrence of *Lewisia cantelovii* within the study corridor. There are no other known occurrences of sensitive or watchlist plants or plant communities. There is potential habitat for *Botrychium ascendens, B. crenulatum, B. lineare, B. montanum, Clarkia biloba* ssp. *brandegeae, Clarkia stellata, Cypripedium fasiculatum, C. montanum, Fritillaria eastwoodiae*, *Lewisia cantelovii*, *Lewisia serrata*, *Lupinus dalesiae, Meesia triquetra, M. uliginosa, Monardella follettii, Penstemon personatus, Phacelia stebbinsii, Scheuchzeria palustris* var. *americana* and *Vaccinium coccinium* within the study corridor.

The canyon is a major wildlife corridor. There are five PACs (protected activity centers) and two Home Range Core Areas (HRCAs) for the California spotted owl within the study area. The northern goshawk also occurs within the corridor. The canyon is potential habitat for the Pacific fisher. The creek supports a healthy, native population of Rainbow Trout. Fry are common in shallow, gravel-covered areas, and larger individuals are found in riffles and pools. Boulders, deep pools, and whitewater provide excellent cover. There are no known federally listed threatened or endangered wildlife / fishery species within the area.

Eligibility: Canyon Creek is outstanding for its heritage resources, scenic resources, and primitive recreation values. The remote canyon contains numerous historic mining sites. These sites include intact mining equipment, town sites, and their associated structures, a whole range of mining activities, and transportation routes. Steep rocky cliffs, deep plunge pools, dramatic waterfalls, and large boulders include some of the scenic values that extend for miles. There is very limited access to Canyon Creek which allows for primitive recreation opportunities providing solitude from human development.

Classification: During the eligibility phase of the study, Canyon Creek was classified as a wild river with the exception of about two miles of stream centered on the Poker Flat area. This area has been classified as scenic due to the mining camps, roads, and associated structures. The remainder of the river was classified wild due to the lack of roads, human development, lack of evidence of land management activities, and the overall primitive character. There are some mining claims in the corridor but their physical presence remains relatively low key.

Recommendation: Canyon Creek was considered to be a worthy addition into the National Wild and Scenic River System because of its semi-primitive and primitive recreation and scenic values as well as its historic mining values.

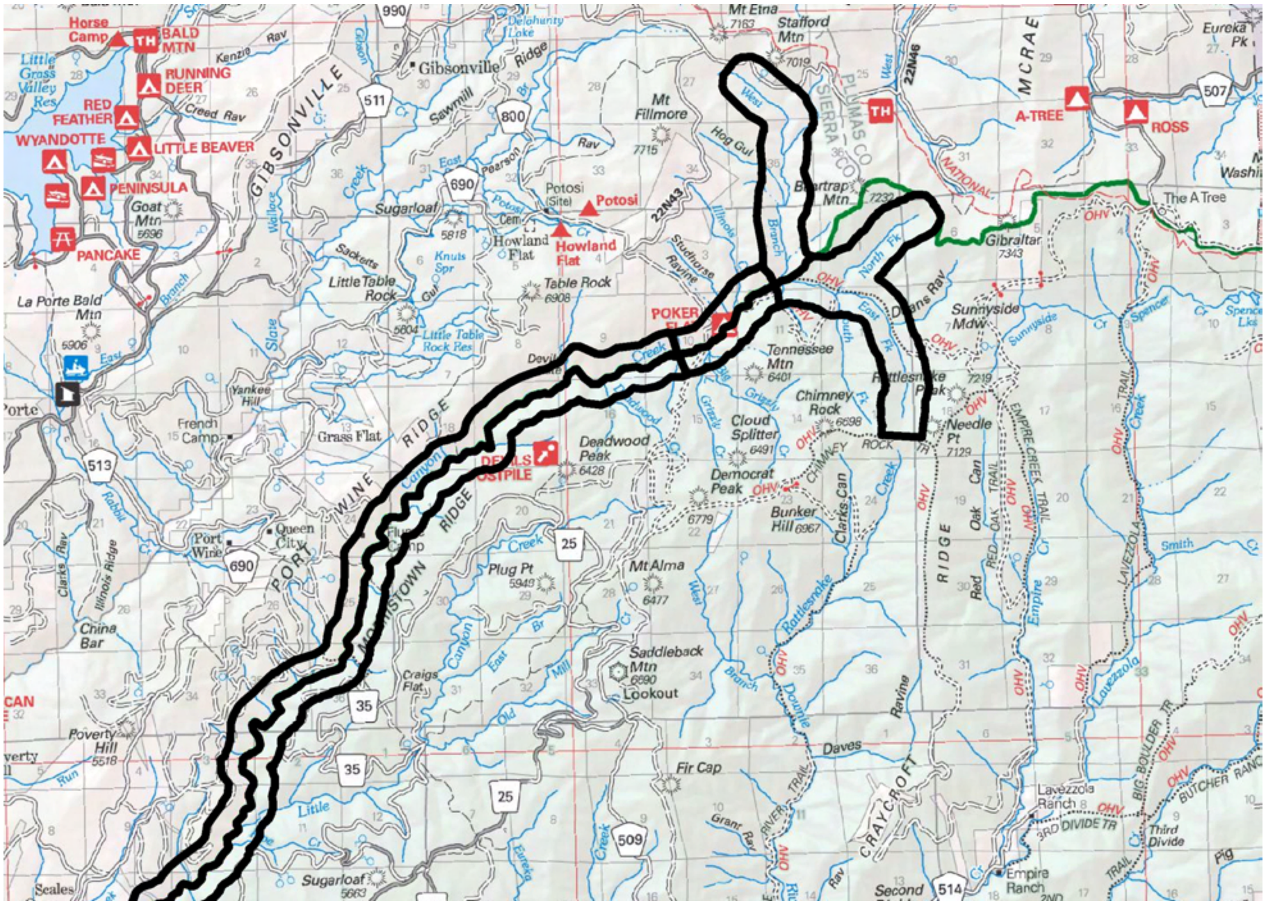

Figure 3.09-14. Upper Canyon Creek Wild & Scenic River

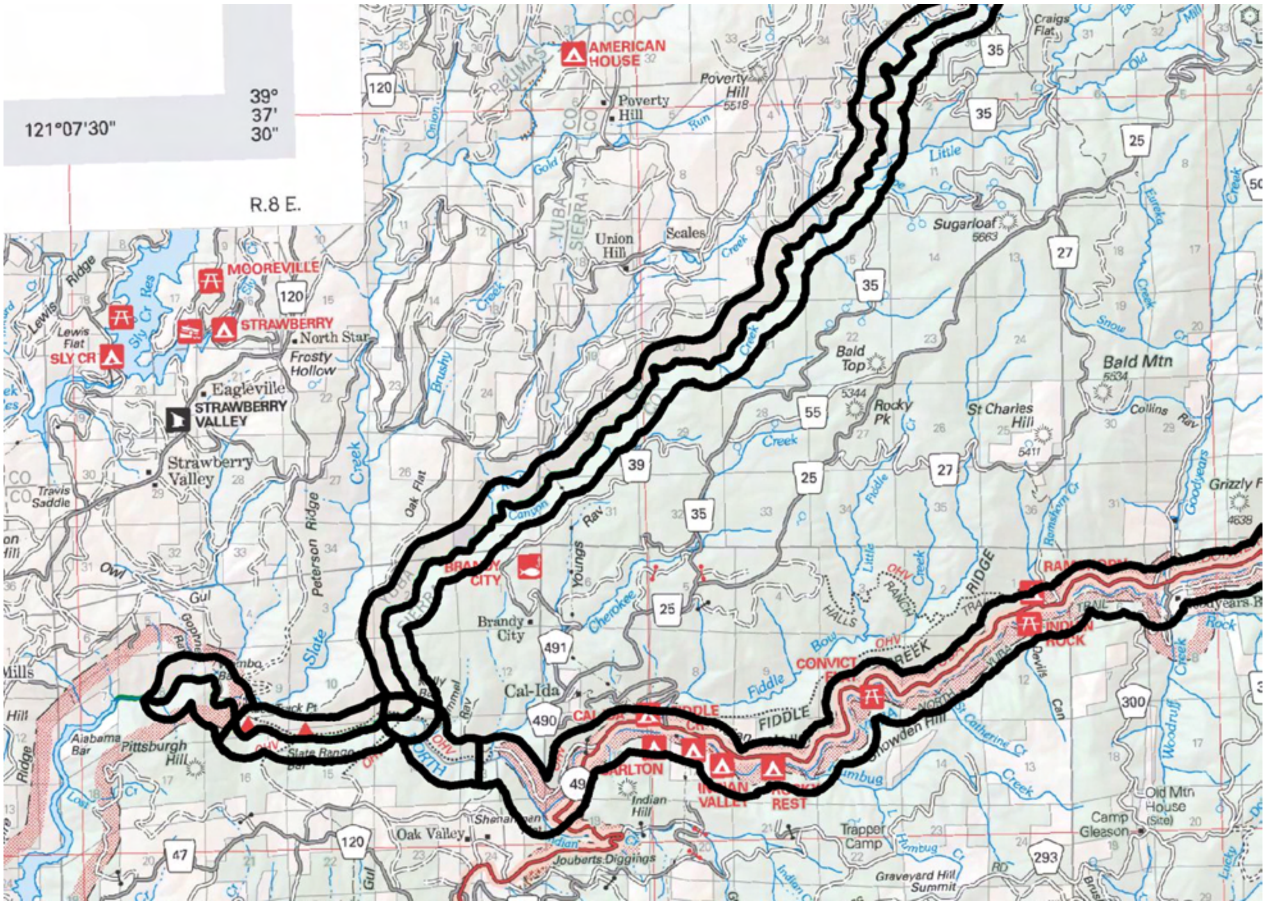

Figure 3.09-15. Lower Canyon Creek Wild & Scenic River

Lower South Yuba River (below Spaulding)

Description: This section of the South Yuba River flows for approximately thirty nine miles from the Langs Crossing area to Bridgeport. The end point of the river is located just below Bridgeport at the confluence of Kentucky Creek. There are approximately 12,609 acres within the river corridor. Half of the river flows through the Tahoe National Forest while the lower half of the river flows through Bureau of Land Management and the South Yuba River State Park. Nevada County has jurisdiction over the river corridor's private lands. The river is characterized by deep pools, cascades, waterfalls, and exposed worn rock outcroppings. The tertiary gravels of the ancient Yuba River have supplied gold to the river over time. The study area is within the Western Metamorphic Belt of the Sierra Nevada. The higher elevations of the river are covered with mixed conifer and oak woodlands.

The river is subject to both commercial and recreational placer and quartz mining. There are no utility corridors within the corridor. Langs Crossing, Edwards Crossing, Purdon Crossing, Highway 49, and Bridgeport are the major access points to the river. The South Yuba Trail along the north side of the river extends from the western Forest boundary to Poorman Creek near the town of Washington. The Bureau of Land Management lands along the South Yuba River Area east of the Forest boundary to Edwards Crossing has been withdrawn from mineral entry for many years. All mining is authorized through a permit system. Private and public lands are dispersed in a checkerboard pattern throughout the river corridor. Large acreages of the private land are owned by large timber/land companies and intensively managed for forest products. The balance of the private lands is in patented claims or tract parcels. There are picnic areas at Keleher and Golden Quartz along the river. These areas have toilet facilities and picnic tables. The portion of river from the town of Washington up to Fall Creek is closed to overnight camping due to high fire hazards. The Lake Spaulding Dam, a major facility owned by PG&E, is located one mile upstream from Langs Crossing. The Spaulding dam is up for relicensing in the year 2013. there are also plans to improve the structure in the future. Bridgeport is the focus for the South Yuba River State Park which has toilet, picnic, and visitors' facilities. The majority of human activity revolves around the major access points mentioned in the beginning of this section. There are many private homes within the river corridor. Some are within remote sections of the river corridor and many are clustered within and near the town of Washington.

Vegetation within the corridor includes riparian, chaparral, foothill woodland, and mixed conifer. Riparian vegetation grows along the creek banks and contains deciduous trees and shrubs. Riparian vegetation is also found in other areas of the corridor were the terrain is moist and shaded. There are patches of mixed conifer old growth within the corridor. There are also known occurrences of *Lewisia cantelovii* within the study corridor. There are no other known occurrences of sensitive or watchlist plants or plant communities within the area. There is potential habitat for *Botrychium ascendens, B. crenulatum, B. lineare, B. montanum, Clarkia biloba* ssp. *brandegeae, Clarkia stellata, Cypripedium fasiculatum, C. montanum, Fritillaria eastwoodiae, Lewisia cantelovii, Lewisia serrata, Meesia triquetra, M. uliginosa, Monardella follettii, Penstemon personatus, Phacelia stebbinsii, Scheuchzeria palustris* var. *americana* and *Vaccinium coccinium* within the study corridor.

The river corridor provides an important wildlife migration corridor for a variety of raptors and other species including the federally endangered species bald eagle and the California spotted owl. The corridor also is potential habitat for northern goshawk, Pacific fisher, and Sierra Nevada Red Fox. The lower river supports warm water and cold water fisheries, as well as native and introduced species. There are no known federally listed threatened or endangered aquatic species known.

Eligibility: The Lower South Yuba River was found eligible because of the scenic, recreational, and historical values. The recreation use displays a wide variety of activities mostly associated with water oriented day use or appreciation of the historic values. Recreation activities include swimming, floating, sun bathing, picnicing, hiking, and nature appreciation. Whitewater boating occurs during a short spring seasonal flow. There are high levels of day use and users are from local as well as regional and out of State locations. The South Yuba trail is a National Recreation Trail and the Independence Trail is a unique almost one of a kind wheelchair accessible trail of regional and State significance. The scenic values are of particular note because of the wide variety of high quality features over the 39 mile length of river. Large sculptural smooth boulders and bedrock are one of the major attractions both for scenic and recreation values. Other water features such as pools and falls along with the steep canyon walls are the other scenic values. The cultural values are also dispersed along the entire length of the river featuring gold rush era history. Of particular note is the Bridgeport Covered Bridge (1862) which is on the National Register of Historic Places. It is designated as a California State Historic Landmark (#390), as well as being listed as a Registered Civil Engineering Landmark (ASCE. The bridge is the longest single span wooden bridge in the West. For a time, all freight shipped to Virginia City (Comstock Silver Rush was transported across this bridge. Other eligible lists to the National Register of Historic Places are: Virginia Turnpike (1853-1901), Bridgeport Townsite (1849-1940's), Excelsior Mining Ditch (1855-1961), Miner's Tunnel (Circa 1872), Purdon Crossing Bridge (1895), Edwards Crossing Bridge (1904), and Highway 49Bridge No. 17-07 (1921). In addition further upstream there are several early gold mining sites with high potential historic value because the sites were not destroyed by subsequent mining activities. The town of Washington is also an historic town developed during the gold rush.

Classification: During the eligibility phase of the study the lower South Yuba River was classified as wild, scenic, and recreation. The segment from Jordan creek confluence to 0.3 mile below Langs crossing is classified Recreation because of roads, a canal, and a bridge in the corridor. The next segment starts below Langs Crossing and ends approximately one half mile downstream from Fall Creek and is classified as Wild due to the unroaded and primitive character of the corridor. The next segment continues down past the town of Washington to Jefferson Creek and is classified recreation due to roads, logging, housing, and various forms of human development. The last segment continues from Jefferson Creek to just below Bridgeport at the confluence of Kentucky Creek and is classified scenic due to a combination of roads and past logging activities within the half mile corridor.

Recommendation: The South Yuba River below Spaulding was considered to be a worthy 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.

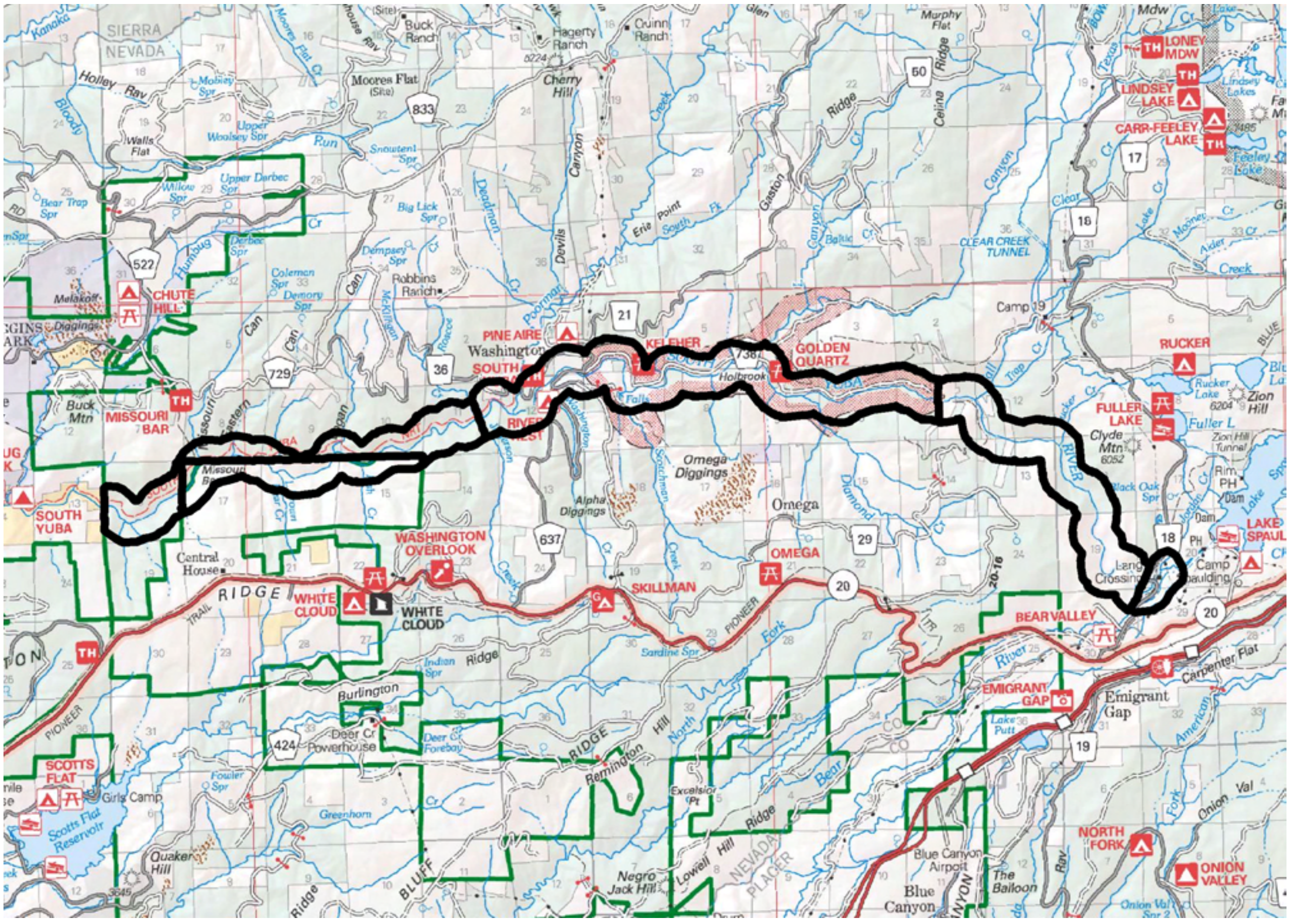

Figure 3.09-16. South Yuba River Wild & Scenic River

Sagehen Creek

Description: Sagehen Creek is an eight mile segment which flows from its headwaters to Stampede Reservoir. The lands adjacent to the stream are entirely National Forest System lands and are managed by the TNF. The University of California at Berkeley has conducted a variety of research activities on National Forest lands within the Sagehen Basin since 1951. There have been over 130 research publications, films, and thesis conducted in the area. Sagehen Creek is entirely within Nevada County, California.

The following is quoted from the Annual Report, Sagehen Creek Field Station (1990) produced by the Department of Forestry and Resource Management, University of California, Berkeley. “The Sagehen Creek Field Station (operated by the University of California at Berkeley) is devoted primarily to natural history research, secondarily to teaching at the university level. Some principal objectives of the research program are:

1. To determine the species composition, spatial distribution, and functional interrelationships of the various ecological communities in Sagehen Basin.
2. To understand the natural history of as many as possible of the individual species of plants and animals that constitute the ecological communities.

3. To study the stream and its tributaries, fens and riparian vegetation with a view to understanding the food chains that support aquatic life.
4. To follow the processes of plant succession following fire and other forms of vegetation disturbance, and to measure the effects on animal populations.
5. To determine the influence of weather, soils, competition, predation, and food and cover needs as they govern trends in animal populations.

The Station encourages basic biological and ecological studies and applied research directed towards solving current problems in the management of wildland resources. One such applied problem is to assess the interrelationships of timber management practices and wildlife and fisheries resources. Long-term experiments are given special consideration."

The Sagehen headwaters are an intact glacial cirque and part of a highly complex ecosystem. The glacial cirque gives rise to fens and bogs which are part of a complex hydrological system and are considered to have significant value for research purposes. The fens and bogs support a unique vegetative community and support over 40 different plant species, including two sundews, *Drosera rotundifolia* and *Drosera angelica*. Some of the largest and best studied fens in the entire Sierra Nevada occur in the Sagehen Creek Basin. There are known occurrences of *Ivesia Sericoleuca* and *Silene invisa* in the Basin. Sagehen Creek also provides numerous habitats for wildlife and an endemic Lahontan Basin native fish community.

There are 2,451 acres of National Forest System lands and no acres of private lands with the river corridor.

Flows are unregulated in Sagehen Creek and daily average flow is 12.3 cfs based on about 40 years of data. Sagehen has a large number of small springs that flow yearlong throughout the basin.

Recreation use is dispersed throughout the area and most of the recreation use results from deer hunting during the fall. There is one small campground within view of the stream.

The Visual Quality Objectives for the majority of Sagehen Creek is Partial Retention with the emphasis on views from US Highway 89. The overall visual quality is mostly low or moderate. The main visual interest in the corridor would be the stream itself and some of the associated bogs and fens.

Logging operations along Sagehen Creek began in 1874. Martin and Leach operated the Banner Mill eight miles from Truckee on Sagehen Creek until 1882. Lonkey and E.R. Smith operated this same mill from 1882 until 1889. A cordwood producer, Abner Week, was also operating in the headwaters of Sagehen Creek.

The primary lumber company which operated in the Sagehen Creek drainage was the Sierra Nevada Wood and Lumber Company (SNW&L) whose operations were centered at Hobart Mills. The SNW&L Company was in operation from 1896 until 1917, at which time the company's assets were turned over to the Hobart Estate. The mill at Hobart Mills continued to operate until 1936.

The historic sites associated with the Sierra Nevada Wood and Lumber Company within the Sagehen Creek basin are eligible for listing on the National Register of Historic Places as a historic district. The majority of these sites and associated features represent an intact railroad-based logging system. Additionally, the Banner Mill and associated animal-based transportation system are also represented as well as depression-era sites, which have received very little research to date.

Eligibility: Sagehen Creek hosts numerous interrelated outstandingly remarkable values that are best identified as ecosystem values. The stream is also considered highly representative of eastside Sierra Nevada stream ecology for native fisheries. The interdependence of values increases its level of significance including the broader hydrology. This ecological significance supports the stream being outstandingly remarkable and supports the hydrology, geology, wildlife, fisheries, and plants being considered outstandingly remarkable. This is the best ecological/botanical value of the Eastside Rivers. A fishery by itself is considered unique and outstandingly remarkable due to the natural assemblage of native fish. The University of California Research Station has provided extensive and professional reports and papers on the natural resources in and around Sagehen Creek over many years. These research values are considered a complimentary outstandingly remarkable value. In addition the cultural value of the often intact steam engine logging technology remnants is also considered regionally significant and therefore outstandingly remarkable.

Recommendation: Sagehen Creek was considered to be a worthy 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. The stream posses the best ecological/botanical value of the Eastside Rivers considered. These values are further enhanced by a University of California research station that has provided extensive documentation of their natural values existing in and along this stream. This stream is clearly the best candidate as a representative stream for the eastside Sierra Nevada.

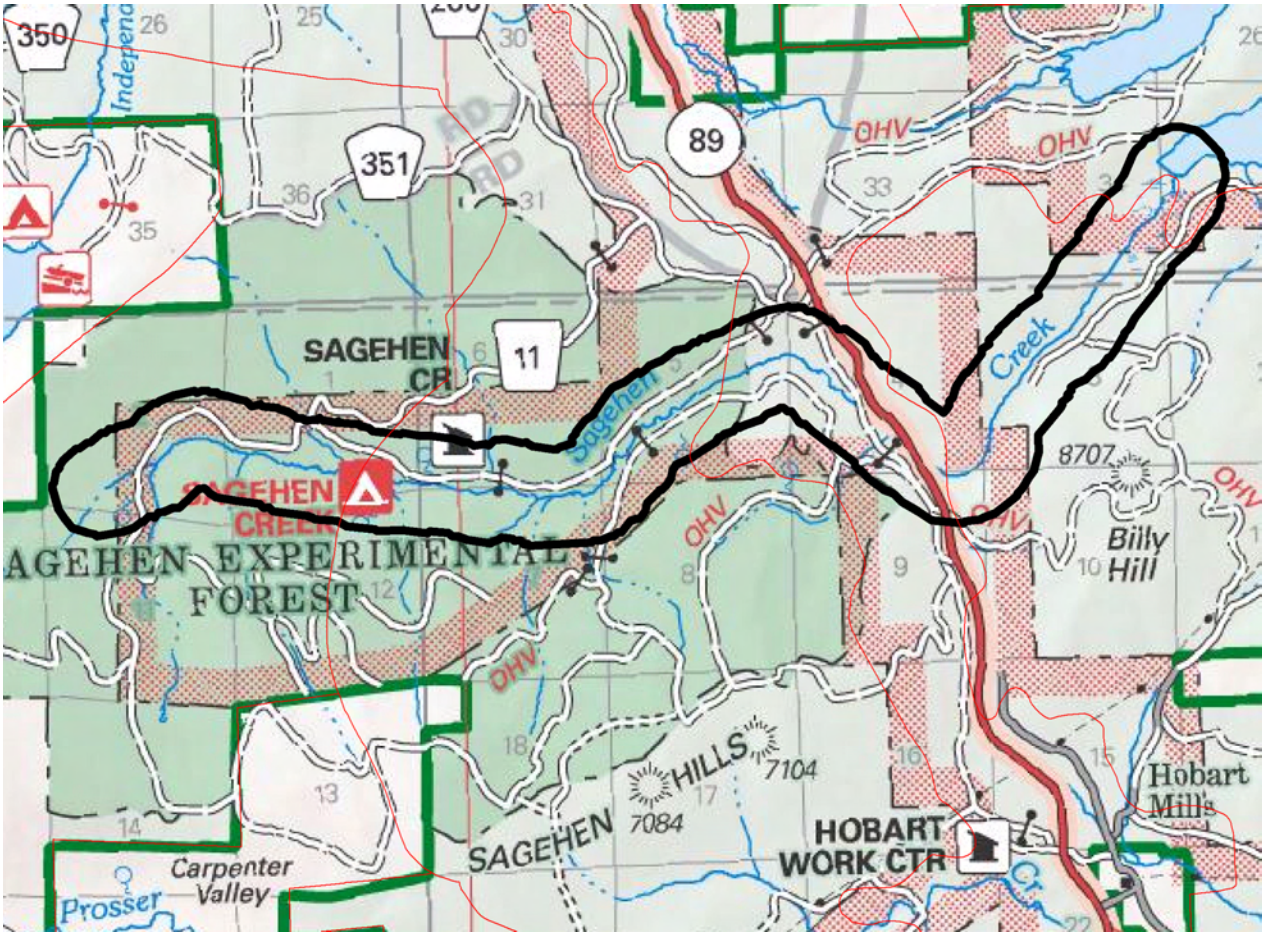

Figure 3.09-17. Sagehen Creek Wild & Scenic River

North Fork American River

Description: Public Law 95-625, November 10, 1978, amended Public Law 90-542, "The Wild and Scenic Rivers Act," and designated the North Fork American River as a part of the National Wild and Scenic Rivers System.

The portion of the North Fork American River designated as a component of the National Wild and Scenic Rivers System extends from a point 0.3 miles above Heath Springs at the north-south section line between Sections 15 and 16, T.16 N., R.14 E., Mount Diablo Meridian, downstream to a point approximately 1000 feet upstream of the Colfax-Iowa Hill Bridge, including the Gold Run Addition Area, a total distance of 38.3 miles.

The North Fork American River is one of three forks which make up the American River System. The headwaters of all originate just west of the Sierra Nevada Crest. The total drainage area of the designated component is about 241 square miles. All of the designated areas are located in Placer County.

The Forest Service and Bureau of Land Management presently share in the responsibility for administering the North Fork American Wild and Scenic River System. The State of California retains management responsibility for its lands (123 acres) within the designated river boundary; management of these lands is coordinated through a Memorandum of Agreement.

Classification: The River is classified in the “Wild” class as designated in the Act.

Designation: The North Fork American River was designated as a “Wild” river since it is free of impoundments and generally in accessible, except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. It represents a vestige of primitive America.

Management Guidelines: The following Management Guidelines are contained in the *North American Wild River Management and Development Plan* (USDA USDI 1979).

- **Recreation**, administration of uses and activities will be directed toward maintaining the natural values of the area. Recreation facilities or other development will be limited to those necessary to protect wild river values.
- **Water**, in cases of conflict between water quality and other resources, uses, and activities, protection of water quality will take precedence.
- **Wildlife and Fisheries**, priorities will be given to management which protects or enhances fish and wildlife values. Fish and wildlife habitat will be managed in a manner compatible with the naturalness of the wild river environment.
- **Transportation**, motorized land and water vehicles and suction dredges will be prohibited within the wild river boundary. Trails in close proximity (parallel) to the river will not be expanded without determination of the need for additional access. Transportation routes outside of the river must meet the visual quality standard specified in Land Management Plan direction.
- **Trail Access**, motorized vehicle use will be prohibited on all trails within the River Management Zone.

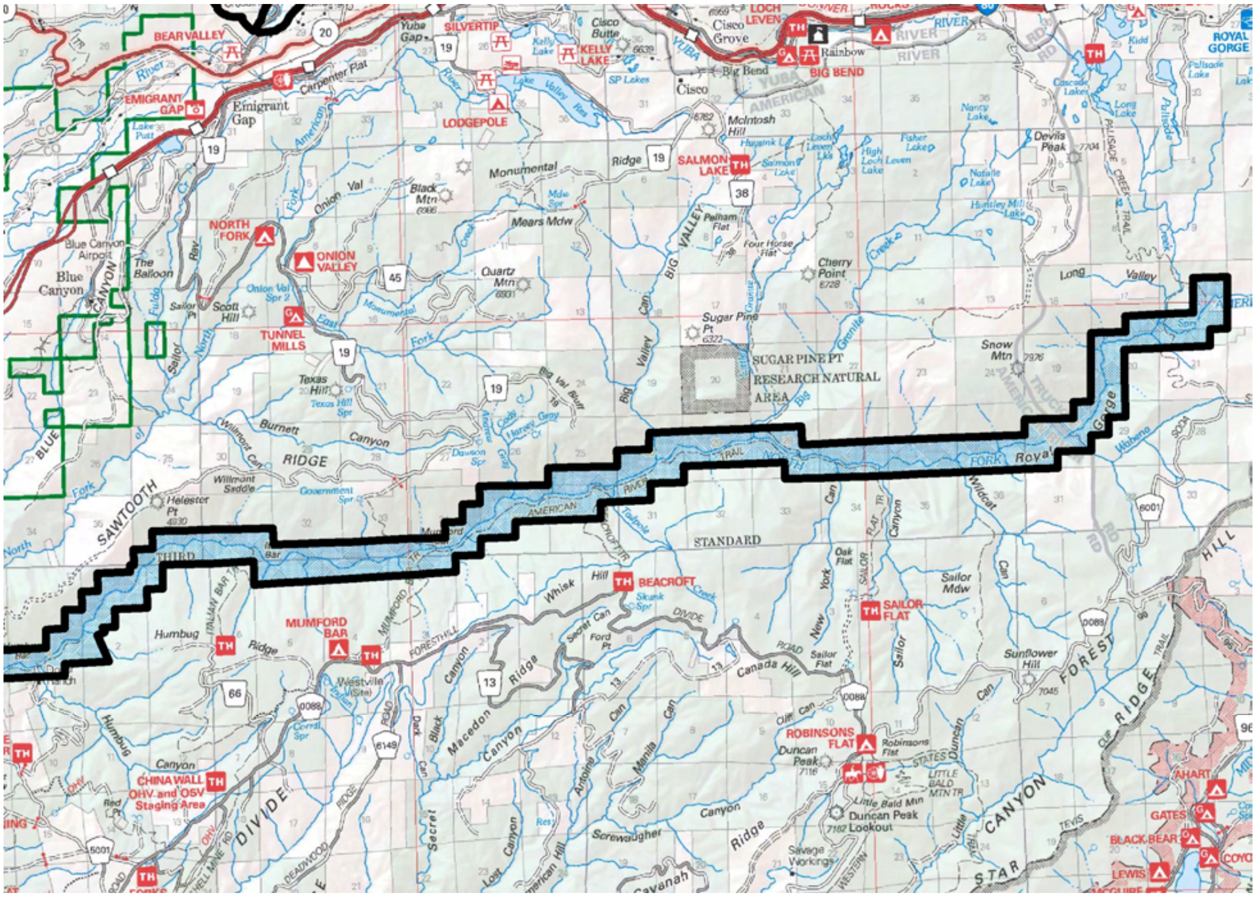

Figure 3.09-18. Upper North Fork American Wild & Scenic River

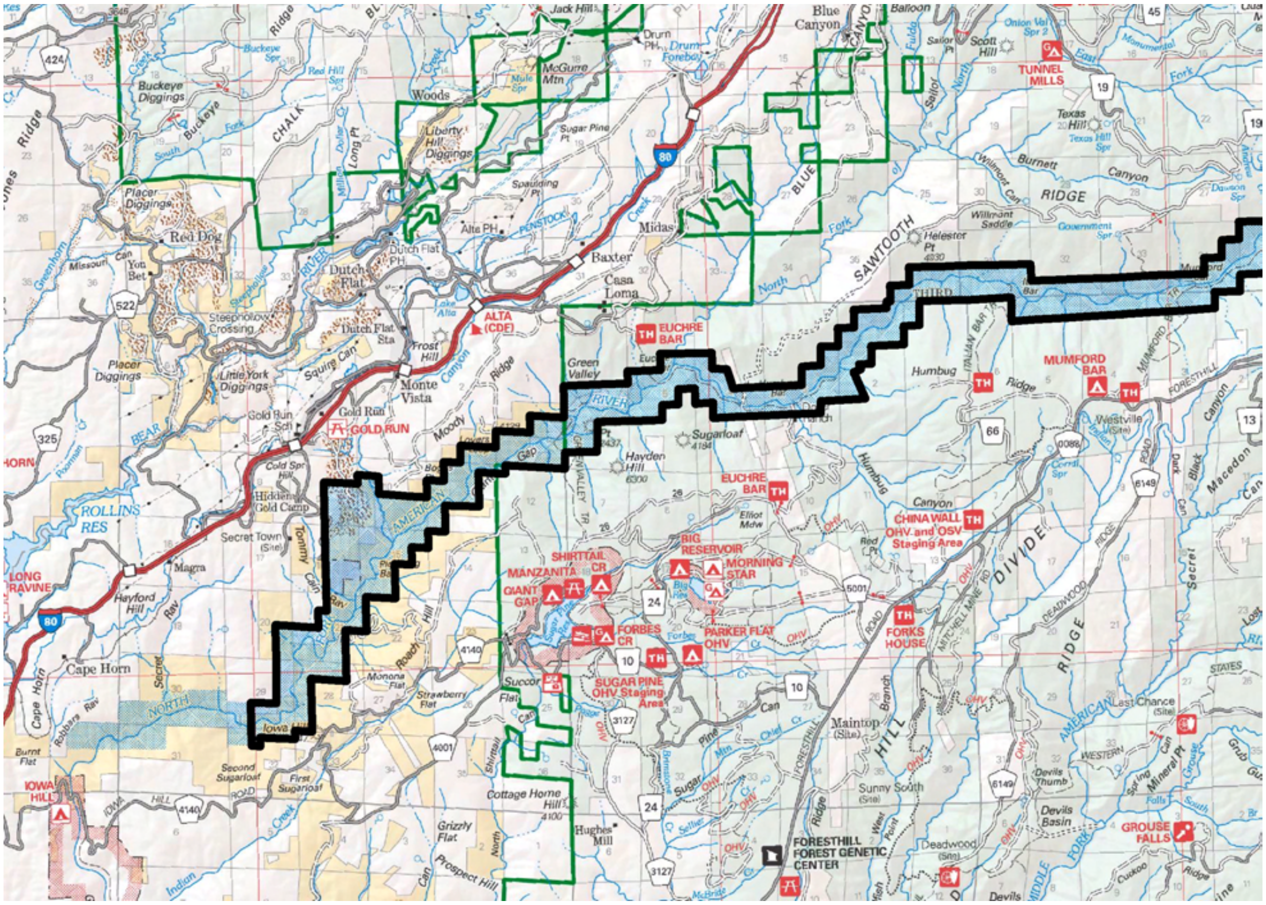

Figure 3.09-19. Lower North Fork American Wild & Scenic River

Table 3.09-24 summarizes the status, outstandingly remarkable values, and classification of all designated and recommended Wild and Scenic Rivers on the Tahoe National Forest.

Table 3.09-24. Wild & Scenic River Status on the Tahoe National Forest

River	Status	Outstandingly Remarkable Values	Classification
North Fork of the American River	Federally Designated	Free flowing character, inaccessibility except by trail, watersheds and shorelines essentially primitive, unpolluted waters, and outstanding features such as scenery, historic, cultural and other similar values.	**Wild** - Entire Length
North Yuba River	Recommended for designation	Gold mining history and State level significance of the fishery. In addition the river provides a broad range of recreation opportunities, higher scenic quality, and plant values.	**Recreation** -Yuba Pass area to Shenanigan Flat **Wild** - Shenanigan Flat to Race Track Point **Scenic** - Race Track Point to WamboBar
Sagehen Creek	Recommended for designation	Ecosystem values in the form of fens, unique plants, special geologic formations that support the fens, unique water chemistry, an excellent assemblage of native fisheries, unique wildlife values, and historical logging values	**Scenic** - Entire length

River	Status	Outstandingly Remarkable Values	Classification
Canyon Creek	Recommended for designation	Semi-primitive and primitive recreation and scenic values as well as its historic mining values	**Wild** - Headwaters to one mile above Poker Flat **Scenic** - One mile above Poker Flat to one mile below Poker Flat **Wild** - One below Flat to confluence with Yuba River
South Yuba River (Lower)	Recommended for designation	Broad recreation opportunities and high scenic qualities, water associated recreation	**Recreation** - Jordan creek confluence to 0.3 mile below Langs crossing **Wild** - 0.3 mile below Langs crossing to one half mile downstream from Fall Creek **Recreation** - One half mile downstream from Fall Creek to confluence of Jefferson Creek **Scenic** - Confluence of Jefferson Creek to confluence of Kentucky Creek

Table 3.09-25 shows the current mileage of roads and trails within Wild and Scenic Rivers on the Tahoe National Forest.

Table 3.09-25. Summary of Current Mileage of Roads and Trails within Wild and Scenic Rivers on the Tahoe National Forest

Road and Trail Category	Season Use	Canyon Creek	North Yuba River	Sagehen Creek	South Yuba River	North Fork American River
Cross country travel						
Acres		4,565	10,634	2,165	3,161	0
Motorized trails un-authorized for motorized use		2.4	10.3	4.8	2.4	0
Roads open to highway legal vehicles only	**Seasonal Closure**	0.0	0.0	2.0	0.3	0.0
Roads open to highway legal vehicles only	**Open Year Around**	0.2	9.8	0.1	4.1	0.0
Roads open to all vehicles	**Open Year Around**	1.4	3.5	7.6	0.7	0.1
	Subtotal NFS Roads	**1.5**	**13.3**	**9.7**	**5.1**	**0.1**
Trails open to high clearance trail vehicles	**Open Year Around**	1.7	2.7	0.2	0.8	0.0
Trails open to ATV's and motorcycles	**Open Year Around**	0.0	0.7	0.0	0.0	0.0
Trails open to motorcycles	**Open Year Around**	2.2	2.4	0.0	0.0	0.0
	Subtotal NFS Motorized Trails	**3.8**	**5.8**	**0.2**	**0.8**	**0.0**
State, County or other jurisdiction roads	**Open Year Around**	0.0	43.9	1.4	4.4	0.0
Roads/trails on private land	**Open Year Around**	0.0	12.3	0.0	6.5	0.0
	Total Motorized	**7.7**	**85.6**	**16.1**	**19.2**	**0.1**
Roads/trails closed to motorized users	**Open Year Around**	0.0	0.0	0.2	0.0	0.0
Trails open only to non-motorized users	**Open Year Around**	0.0	7.0	0.0	9.6	17.0
Trails open only to hikers and equestrians (No mountain bikes allowed)	**Open Year Around**	0.0	2.7	0.0	0.0	0.0
	Subtotal Non-Motorized	**0.0**	**9.7**	**0.2**	**9.6**	**17.0**
Previously decommissioned roads	Closed	0.0	0.0	0.4	0.0	0.0

Wild and Scenic Rivers: Environmental Consequences

North Fork of the American River

The North Fork American River was designated as a "Wild" river since it is free of impoundments and generally in accessible, except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. It represents a vestige of primitive America.

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 National Forest System: There are no proposed additions to the National Forest Transportation System in any of the alternatives. Not adding any additional roads or trails to the National Forest Transportation System in North Fork American River will maintain or enhance the outstandingly remarkable values of the North Fork American River.

Changes in class of vehicle and season of use: There is one tenth of a 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 are consistent with maintaining the outstandingly remarkable values of the North Fork American River.

Table 3.09-26. Miles of Roads and Trails within the North Fork American River by Alternative

		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres		0	0	0	0	0	0	0
Motorized trails un-authorized for motorized use		0	0	0	0	0	0	0
Roads open to all vehicles	**Seasonal Closure**	0	0	0	0.1	0.1	0.1	0
Roads open to all vehicles	**Open Year Around**	0.1	0.1	0.1	0	0	0	0.1
	Subtotal NFS Roads	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
Trails open only to non-motorized users	**Open Year Around**	17.0	17.0	17.0	17.0	17.0	17.0	17.0
	Subtotal Non-Motorized	**17.0**	**17.0**	**17.0**	**17.0**	**17.0**	**17.0**	**17.0**

North Yuba River

The North Yuba River was considered to be a worthy addition into 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, higher scenic quality, and plant values. All of the action alternatives maintain or enhance the outstandingly remarkable values of the North Yuba River.

Cross Country Travel: Cross country travel will be prohibited on 10,634 acres within the river corridor in all of the action alternatives. The prohibition of cross country travel will prevent the proliferation of new un-authorized routes and will maintain or enhance the outstandingly remarkable values of the North Yuba River. The prohibition of cross country travel also results in a reduction of the total amount of roads and trails available for motorized use in all of the action alternatives. The prohibition of cross country travel will enhance the outstandingly remarkable values associated with North Yuba River.

Additions to the National Forest System: There are no proposed additions to the National Forest Transportation System in any of the alternatives.

Changes in class of vehicle and season of use: Wet weather seasonal restrictions on all native surface roads and trails will be imposed in Alternatives 4, 5 and 6 which will improve the current water quality conditions. The class of vehicles allowed will 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. These changes in class of vehicles allowed are the result of a mixed use safety analysis on all but 4 tenths of a mile. Allowing mixed use will have no impact of the rivers outstandingly remarkable values. Table 3.09-27 displays the miles of roads and trails within the North Yuba Wild and Scenic River by alternative.

Cumulative effects: All of the action alternatives will 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 further enhance these values by imposing wet weather seasonal restrictions.

Table 3.09-27. Miles of Roads and Trails within the North Yuba River by Alternative

		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres		10,634	0	0	0	0	0	0
Motorized trails un-authorized for motorized use		10.3	0	0	0	0	0	0
Roads open to highway legal vehicles only	**Open Year Around**	9.8	5.9	9.8	9.8	5.9	7.9	9.8
Roads open to all vehicles	**Seasonal Closure**	0.0	0.0	0.0	0.0	3.8	3.8	0.0
Roads open to all vehicles	**Open Year Around**	3.5	7.4	3.5	3.5	3.6	1.5	3.5
	Subtotal NFS Roads	**13.3**	**13.3**	**13.3**	**13.3**	**13.3**	**13.3**	**13.3**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	2.7	2.7	2.7	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	2.7	2.7	2.7	0.0	0.0	0.0	2.7
Trails open to ATV's and motorcycles	**Seasonal Closure**	0.0	0.0	0.0	0.7	0.7	0.7	0.0
Trails open to ATV's and motorcycles	**Open Year Around**	0.7	0.7	0.7	0.0	0.0	0.0	0.7
Trails open to motorcycles	**Seasonal Closure**	0.0	0.0	0.0	2.4	2.4	2.4	0.0
Trails open to motorcycles	**Open Year Around**	2.4	2.4	2.4	0.0	0.0	0.0	2.4
	Subtotal NFS Motorized Trails	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**
State, County or other jurisdiction roads	**Open Year Around**	43.9	43.9	43.9	43.9	43.9	43.9	43.9
Roads/trails on private land	**Open Year Around**	12.3	12.3	12.3	12.3	12.3	12.3	12.3
	Total Motorized	**85.7**	**75.4**	**75.4**	**75.4**	**75.4**	**75.4**	**75.4**
Roads/trails closed to motorized users	**Seasonal Closure**	0.0	10.3	10.3	10.3	10.3	10.3	10.3
Trails open only to non-motorized users	**Open Year Around**	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Trails open only to hikers and equestrians (No mountain bikes allowed)	**Open Year Around**	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	Subtotal Non-Motorized	**9.7**	**20.0**	**20.0**	**20.0**	**20.0**	**20.0**	**20.0**

Sagehen Creek

Sagehen Creek was considered to be a worthy 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. The stream posses the best ecological/botanical value of the Eastside Rivers considered. These values are further enhanced by a University of California research station that has provided extensive documentation of their natural values existing in and along this stream. All of the action alternatives maintain or enhance the outstandingly remarkable values of Sagehen Creek.

Cross Country Travel: Cross country travel will be prohibited on 2,165 acres within the river corridor in all of the action alternatives. The prohibition of cross country travel will prevent the proliferation of new un-authorized routes and will maintain or enhance the outstandingly remarkable values of Sagehen Creek. The prohibition of cross country travel also results in a reduction of the total amount of roads and trails available for motorized use in all of the action alternatives. Reducing the miles of roads and trails available for use by motor vehicles will enhance the outstandingly remarkable values associated with Sagehen Creek.

Additions to the National Forest System: There are no proposed additions to the National Forest Transportation System in any of the alternatives. Not adding any new roads or trails to the National Forest Transportation System will maintain or enhance the remarkably outstanding values associated with Sagehen Creek.

Changes in class of vehicle and season of use: Wet weather seasonal restrictions on all native surface roads and trails will be imposed in Alternatives 4, 5 and 6 which will improve the current water quality conditions and therefore enhance the outstandingly remarkable values associated with Sagehen Creek. The class of vehicles allowed will 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. These changes in class of vehicles allowed are the result of a mixed use analysis as described in Appendix S. Allowing mixed use on these existing National Forest System roads will have no impact of the rivers outstandingly remarkable values. Table 3.09-28 displays the miles of roads and trails within the Sagehen Creek Wild and Scenic River by alternative.

Table 3.09-28. Miles of Roads and Trails within Sagehen Creek by Alternative

		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres		2,165	0	0	0	0	0	0
Motorized trails –un-authorized for motorized use		4.8	0	0	0	0	0	0
Roads open to highway legal vehicles only	**Seasonal Closure**	2.0	0.0	2.0	2.0	0.0	0.0	2.0
Roads open to highway legal vehicles only	**Open Year Around**	0.1	0.0	0.1	0.1	0.0	0.0	0.1
Roads open to all vehicles	**Seasonal Closure**	0.0	2.0	0.0	7.6	9.7	0.0	0.0
Roads open to all vehicles	**Open Year Around**	7.6	7.7	7.6	0.0	0.0	0.0	7.6
	Subtotal NFS Roads	**9.7**	**9.7**	**9.7**	**9.7**	**9.7**	**9.7**	**9.7**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	0.2	0.2	0.2	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	0.2	0.2	0.2	0.0	0.0	0.0	0.2
	Subtotal NFS Motorized Trails	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
State, County or other jurisdiction roads	**Open Year Around**	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	Total Motorized	**16.1**	**11.3**	**11.3**	**11.3**	**11.3**	**11.3**	**11.3**
Roads/trails closed to motorized users	**Seasonal Closure**	0.2	4.9	5.0	5.0	4.9	5.0	5.0
	Subtotal Non-Motorized	**0.2**	**4.9**	**5.0**	**5.0**	**4.9**	**5.0**	**5.0**
Previously decommissioned roads	**Closed**	0.4	0.4	0.4	0.4	0.4	0.4	0.4

Canyon Creek

Canyon Creek was considered to be a worthy addition into the National Wild and Scenic River System because of its semi-primitive and primitive recreation and scenic values as well as its historic mining values. All of the action alternatives maintain or enhance the outstandingly remarkable values of Canyon Creek. By prohibiting cross country travel and reducing the amount of roads and trails open to motor vehicles.

Cross Country Travel: Cross country travel is prohibited on 4,565 acres within the Canyon Creek river corridor. The prohibition of cross country travel will prevent the proliferation of new un-authorized routes and will maintain or enhance the outstandingly remarkable values of Canyon Creek. The prohibition of cross country travel also results in a reduction of the total amount of roads and trails available for motorized use

Additions to the National Forest System: There are no proposed additions to the National Forest Transportation System in any of the alternatives. Not adding any new roads or trails to the National Forest Transportation System will maintain or enhance the remarkably outstanding values associated with Canyon Creek.

Changes in class of vehicle and season of use: There are no changes proposed to the class of vehicles allowed on existing National Forest System roads in any of the alternatives. Wet weather seasonal restrictions on all native surface roads and trails will be imposed in Alternatives 4, 5 and 6 which will improve the current water quality conditions. These seasonal restrictions will enhance the outstandingly remarkable values associated with Canyon Creek. Table 3.09-29 displays the miles of roads and trails within the Canyon Creek Wild and Scenic River by alternative.

Table 3.09-29. Miles of Roads and Trails within Canyon Creek by Alternative

		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres		0	0	0	0	0	0	0
Motorized trails un-authorized for motorized use		2.4	0	0	0	0	0	0
Roads open to highway legal vehicles only	**Open Year Around**	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Roads open to all vehicles	**Seasonal Closure**	0.0	0.0	0.0	1.4	1.4	1.4	0.0
Roads open to all vehicles	**Open Year Around**	1.4	1.4	1.4	0.0	0.0	0.0	1.4
	Subtotal NFS Roads	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	1.7	1.7	1.7	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	1.7	1.7	1.7	0.0	0.0	0.0	1.7
Trails open to motorcycles	**Open Year Around**	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	Subtotal NFS Motorized Trails	**3.8**	**3.8**	**3.8**	**3.8**	**3.8**	**3.8**	**3.8**
	Total Motorized	**7.7**	**5.3**	**5.3**	**5.3**	**5.3**	**5.3**	**5.3**
Roads/trails closed to motorized users	**Seasonal Closure**	0.0	2.4	2.4	2.4	2.4	2.4	2.4
	Subtotal Non-Motorized	**0.0**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**	**2.4**

South Yuba River

The South Yuba River below Spaulding was considered to be a worthy 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. All of the action alternatives maintain or enhance the outstandingly remarkable values of the South Yuba River.

Cross Country Travel: Cross country travel will be prohibited on 3,161 acres within the river corridor in all of the action alternatives. All of the action alternatives also reduce the number of miles of roads and trails which will be available for motorized use. Reducing the miles of roads and trails available for use by motor vehicles will enhance the outstandingly remarkable values associated with the South Yuba River.

Additions to the National Forest System: Alternatives 2, 5 and 6 add a few short motorized trail spurs to the National Forest Transportation System which provide access to dispersed recreation sites. The nature of these motorized trails is fairly minor and they do not significantly detract from the outstandingly remarkable values associated with the river. Many of the motorized trails are used to provide access for water related recreation which is one of the outstandingly remarkable values of the river.

Changes in class of vehicle and season of use: The class of vehicles allowed will 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 S. Allowing mixed use on these existing National Forest System roads will have no impact of the rivers outstandingly remarkable values. Wet weather seasonal restrictions on all native surface roads and trails will be imposed in Alternatives 4, 5 and 6 which will improve the current water associated recreation activities values of the South Yuba River. Table 3.09-29 displays the miles of roads and trails within the Canyon Creek Wild and Scenic River by alternative.

Table 3.09-30. Miles of Roads and Trails within South Yuba River by Alternative

		Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres		3,161	0	0	0	0	0	0
Motorized trails available for motorized use		2.4	0	0	0	0	0	0
Roads open to highway legal vehicles only	**Seasonal Closure**	0.3	0.0	0.3	0.3	0.0	0.0	0.3
Roads open to highway legal vehicles only	**Open Year Around**	4.1	2.3	4.1	4.1	2.3	2.7	4.1
Roads open to all vehicles	**Seasonal Closure**	0.0	0.3	0.0	0.7	1.3	1.3	0.0
Roads open to all vehicles	**Open Year Around**	0.7	2.5	0.7	0.0	1.5	1.1	0.7
	Subtotal NFS Roads	**5.1**	**5.1**	**5.1**	**5.1**	**5.1**	**5.1**	**5.1**
Trails open to high clearance trail vehicles	**Seasonal Closure**	0.0	0.0	0.0	0.8	1.3	1.3	0.0
Trails open to high clearance trail vehicles	**Open Year Around**	0.8	1.3	0.8	0.0	0.0	0.0	0.8
	Subtotal NFS Motorized Trails	**0.8**	**1.3**	**0.8**	**0.8**	**1.3**	**1.3**	**0.8**
State, County or other jurisdiction roads	**Open Year Around**	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Roads/trails on private land	**Open Year Around**	6.5	6.5	6.5	6.5	6.5	6.5	6.5
	Total Motorized	**19.2**	**17.3**	**16.9**	**16.9**	**17.3**	**17.3**	**16.9**
Trails open only to non-motorized users	**Open Year Around**	9.6	9.6	9.6	9.6	9.6	9.6	9.6
Roads/trails closed to motorized users	**Open Year Around**	9.6	1.9	2.4	2.4	1.9	1.9	2.4
	Subtotal Non-Motorized	**19.3**	**11.5**	**12.0**	**12.0**	**11.5**	**11.5**	**12.0**

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. 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 rare 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 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.

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 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 Tahoe National Forest's exterior boundary and along interior inclusions (i.e., areas of private land excluded when the Tahoe National Forest was established). More than 2,700 miles of property boundary interface between the National Forest 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 owned currently by Sierra Pacific Industries and other timber land managing companies, resulting in about 2,000 miles of property boundary between them and the Tahoe National Forest. Many cooperative agreements for such things as road construction and maintenance have been entered into with adjacent landowners; 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 landowner in the Tahoe National Forest. SPI has stated that they are opposed to public OHV use on their lands. The assumption has been made in estimating environmental effects in this EIS that SPI corporate forest roads will not be available for use by the public.

Scattered throughout the Tahoe National Forest 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, even on lands in the same ownership. Opportunities to coordinate with intermingled and adjacent land owners will continue, and underlining the importance of developing compatible road and trail management objectives between private and National Forest System 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 National Forest System of roads and trails cross private lands. For the portion of these routes on National Forest System lands to be added to the National Forest Transportation System, permission must first be obtained from the private landowner to grant public access across their lands as well. Once this permission is obtained, the portion of the roads and/or trail on National Forest System lands would be added to the National Forest Trans portion System and be made available for public access. Prior to the permission being obtained, public use of these roads and trails would be prohibited. If the landowner is unwilling to give permission for public access across the portion on their lands, the portion of those routes on National Forest System lands would not be added to the

National Forest Transportation System and public use would be prohibited on them. Routes which crossed 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 wheeled motorized vehicles by the public on their land. Table 3.10-1 lists those roads and trails on National Forest System lands which could be added to the National Forest Transportation System once permission from the private land owner is obtained for public access their lands as well.

Table 3.10-1. Routes Potentially Effecting Private Land under Consideration for Addition to the NFTS

Route ID	Description of Need as Part of the NFTS	Mitigation Required Prior to Opening
ARM-5	Trail connecting two routes near Eliot Meadow which connects two National Forest System Roads.	Permission for public access through private land must be obtained from private landowner.
H18-12	Former National Forest System road near Northwest of Rucker Lake	Permission for public access through private land must be obtained from private landowner.
H18N49Y	Former National Forest System Road providing a loop off of the 7 Road west of Bullards Bar Reservoir	Permission for public access through private land must be obtained from private landowner.
H19-22-14	Former National Forest System road just south and parallel to Highway 80 between Emigrant Gap and Yuba Gap	Permission for public access through private land must be obtained from private landowner.
H20-16	Former National Forest System road connecting the 29 Road to a private road owned by Sierra Pacific Industries	Permission for public access through private land must be obtained from private landowner and a right of way from Seirra Pacific Industries.
H29-11	Former National Forest System 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.	Permission for public access through private land must be obtained from private landowner.
H293	Former National Forest System road on Sleighville Ridge northeast of Camptoonville parallel to County Road Road 115 accessing private land at Sleighville House.	Permission for public access through private land must be obtained from private landowner.
H293-19	Former National Forest System Road 293-19 coming off of County Road 293 north of Miller Ranch. First part of road crosses private land.	Permission for public access through private land must be obtained from private landowner.
H293-4-18	Former National Forest System Road south of Henness Pass road accessing private land at Gates Orchard.	Permission for public access through private land must be obtained from private landowner.
H293-4-4	Former National Forest System Road west of Sleighville Ridge crossing Marion Creek and deadending on private land near Oregon Creek.	Permission for public access through private land must be obtained from private landowner.
H3004-10	Former National Forest System Road number 3004-10 just west of Michigan Bluff accessing private land at Blue Gun Diggings.	Permission for public access through private land must be obtained from private landowner.
H3004-8	Former National Forest System Road number 3004-8 near Michigan Bluff connecting two private land parcells, one at Blue Gun Diggins and the other at Sugar Loaf.	Permission for public access through private land must be obtained from both private landowners.
H3127-10-2	Former National Forest System road number 3127-10 located just south of the Sugar Pine OHV Area connecting County Road 3127 to National Forest System road 3127-008. Short segment crosses private land adjacent to County Road 3127.	Permission for public access through private land must be obtained from private landowner.
H34-4	Former National Forest System 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.	Permission for public access through private land must be obtained from private landowner.
H34-8-3	Former National Forest System road accessing dispersed recreation site on private land in Indian Valley just south of Highway 49.	Permission for public access through private land must be obtained from private landowner.
H36-3-1	Former National Forest System 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.	Permission for public access through private land must be obtained from private landowner.

Route ID	Description of Need as Part of the NFTS	Mitigation Required Prior to Opening
H38	Foremer National Forest System road north of the Sugar Pine Flat Research Natural Area coming off National Forest System road number 38 accessing private land at Pelliam Flat.	Permission for public access through private land must be obtained from private landowner.
H49-16	Former National Forest System road number 49-16 parallel to Highway 49 near Bullards Bar Reservoir. Majority of route is on private land.	Permission for public access through private land must be obtained from private landowner.
H652-5-5	Former National Forest System road number 652-5-5 south of Highway 80 near Crystal Lake. Route goes through private land accessing private picnic area at Kelly Lake and continuing on to SP Lake. Majority of route is on private land.	Permission for public access through private land must be obtained from private landowner.
H823-1-1	Former National Forest System road west of Gold Lake coming of National Forest System road number 9 to the north accessing private land at Howard Creek Meadows.	Permission for public access through private land must be obtained from private landowner.
H833	Former National Forest System road west of Malakoff Diggings near Bloddy Run. Short segment near intersection with County Road 522 crosses private land.	Permission for public access through private land must be obtained from private landowner.
H833-10	Former National Forest System road north of Buck Ranch coming off Nevada County Road 833 accessing Orleans Flat. Small segment near junction with county road crosses private land.	Permission for public access through private land must be obtained from private landowner.
H88-13	Former National Forest System 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.	Permission for public access through private land must be obtained from private landowner.
H93-3-1	Former National Forest System road number 93-3-1 just north of Packer Saddle and Robininson Cow Camp. Road dead ends on National Forest System land after crossing private land parcel.	Permission for public access through private land must be obtained from private landowner.
H96-49	Former National Forest System road just west of French Meadowss Reservoir. Connects two National Forest System roads and proceeds to a dead end on private land.	Permission for public access through private land must be obtained from private landowner.
N25-1-1	Former National Forest System road number 25-1-1 connecting National Forest System 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.	Permission for public access through private land must be obtained from private landowner.
N270-4-6	Former National Forest System road number 270-4-6 just east of Stampede Reservoir. Route is a continuation of current National Forest System Road 270-4-6 which terminates at boundary with private land. Entire route is on private land.	Permission for public access through private land must be obtained from private landowner.
N43-14	Foremer National Forest System road 43-14 just south of Robinson Flat extends north off of National Forest System road number 43 into Deep Canyon and access Savage Workings where it dead ends.	Permission for public access through private land must be obtained from private landowner.
N43-14-4	Foremer National Forest System road 43-14-4 just south of Robinson Flat extends south off of National Forest System road number 44 into Deep Canyon and access Savage Workings where it dead ends.	Permission for public access through private land must be obtained from private landowner.
N860-20-1	Former National Forest System road number 860-20-1 just north of Stampede Reservoir. Comes off of Sierra County Road number 86 in Sardine Valley and provides access to the north shore of Stampede Reservoir at Stampede Valley.	Permission for public access through private land must be obtained from private landowner.
N866-1-5	Former National Forest System road number 866-1-5 near the head of Prosser Reservoir. Road parallels Nevada County Road 886b. Entire route is on private land.	Permission for public access through private land must be obtained from private landowner.
N96-110-6	Foremer National Forest road north French Meadows Reservoir. Comes north off of the Western States Trail near Talbots and accesses private land where the route dead ends in three separate locations.	Permission for public access through private land must be obtained from private landowner.
N96-12c	Former National Forest System road coming north off of the Mosquito Ridge Road near Mosquito Narrows. One segemt dead ends at Cedar Springs and the other segment dead ends at Big Oak Flat.	Permission for public access through private land must be obtained from private landowner.

Route ID	Description of Need as Part of the NFTS	Mitigation Required Prior to Opening
N96-15	Former National Forest system road number 96-15. Comes of off Mosquito Ridge Road towards the north accessing Peavine Creek on private land.	Permission for public access through private land must be obtained from private landowner.
N96-22	Former National Forest system road number 96-22. Comes of off Mosquito Ridge Road towards the north accessing Peavine Creek on private land.	Permission for public access through private land must be obtained from private landowner.
TKN-J9	Route just to the east of Stampede Reservoir. Route is the access road underneath a powerline	Permission for public access through private land must be obtained from private landowner.
TKS-6	Route is just west of the The Cedars Lodge. Route goes to the west off of National Forest System Road number 51, crosses private land prior to dead ending on National Forest System Lands.	Permission for public access through private land must be obtained from private landowner.
YRM-M4	Comes off of Sierra County Road number 201 south of the town of Alleghany. Accesses private land at Minnesota Flat	Permission for public access through private land must be obtained from private landowner.
YRN-M3b	Motorcycle trail connecting the Downie River Trail to Castle Rock Trail. Crosses small segment of private land near Castle Rock Trail.	None – Permission has already been received for public access through private land from the landowner.
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.	Permission for public access through private land must be obtained from private landowner.
YRS-F1c	Comes off of Fordyce Jeep trail to the east towards Fordyce Lake to provide access to dispersed site. First half of the route is on priovate land.	Permission for public access through private land must be obtained from private landowner.
YRS-SF5	Comes off of Highway 20 to the north near Bear Valley. One curve in trail touches a parcel of private land.	Permission for public access through private land must be obtained from private landowner.
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.	Secure an agreement with the phone company to allow vehicles to use this route over the buried pipeline.

Adjacent National Forest System Land

The Tahoe National Forest 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 Tahoe National Forest, 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 National Forest System 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 National Forest System 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 situations arise adjacent to private lands where the land owners have conflicting road and trail management objectives and different perceptions about how National Forest System 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 landowners are opposed to OHV use, trespassing by recreationists, and road maintenance. Many people feel the Forest should provide buffers on National Forest System lands. To add to this complexity, landowners may have conflicting needs and attitudes about management of roads and trails next to them. One landowner may be completely supportive of adjoining OHV 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 landowners within and adjacent to National Forest boundaries will significantly increase. The number of landowners with different road and trail management objectives and perceptions about how National Forest System roads and trails should be managed will also increase dramatically. Table 3.10-2 displays the current miles of roads and trails within ¼ mile of private land by class of vehicle and season of use.

Table 3.10-2. Motorized Roads and Trails within ¼ Mile of Private Land

Road/Trail Category	Season of Use	Length (miles)
Cross Country Travel		
Acres	Not Applicable	273,700
Miles of routes unauthorized for motor vehicle	Not Applicable	517.3
Roads open to highway legal vehicles only	Seasonal Closure	11.5
Roads open to highway legal vehicles only	Open Year Around	143.8
Roads open to all vehicles	Seasonal Closure	29.5
Roads open to all vehicles	Open Year Around	468.2
	Subtotal NFS Roads	**653.0**
Trail open to high clearance trail vehicles	Seasonal Closure	1.3
Trail open to high clearance trail vehicles	Open Year Around	36.2
Trail open to ATVs and motorcycles	Seasonal Closure	0.0
Trail open to ATVs and motorcycles	Open Year Around	3.9
Trail Open to motorcycles	Seasonal Closure	0.2
Trail Open to motorcycles	Open Year Around	16.9
	Subtotal NFS Motorized Trails	**58.5**
State, County or other jurisdiction roads	Open Year Around	219.3
	Total Motorized	**1,449.1**
Roads closed to motorized users	Open Year Around	7.0
Trails open only to non-motorized users	Open Year Around	77.3
Trails open only to hikers and equestrians (No mountain bikes allowed)	Open Year Around	38.6
	Subtotal Non-Motorized	**122.8**

Local Plans and Initiatives

County plans, zoning plans: All county Plans in the state of California affect all private roads within county boundaries. In the counties in the Tahoe National Forest, National forest lands and 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 decision from this EIS. County zoning and regulations are only peripherally affected by Tahoe National Forest 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 Tahoe

National Forest, so the cumulative effects of this EIS 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.

State Lands

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.

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:

- Adding motorized roads and trails to the National Forest System which cross private land,
- Management of wheeled motorized vehicle activities adjacent to private

Motorized Roads and Trails Crossing Private Land

Several of the unauthorized routes under consideration for addition to the National Forest System of roads and trails also cross private lands. For the portion of these roads and trails on National Forest System lands to be added to the National Forest System, permission must first be obtained from the private landowner to grant public access across the portion on their lands. Once this permission is obtained, the portion of the roads and/or trails on National Forest System lands would be added to the National Forest Transportation System and be made available for public access. Prior to the permission being obtained, public use of the portion of these roads and trails on National Forest System lands would be prohibited. If the landowner is unwilling to give permission for public access, these routes would not be added to the National Forest System and public use would be prohibited. Routes which crossed 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 motorized vehicles by the public on their land. Table 3.10-3 lists those roads and trails by alternative which would have the portion on National Forest System lands added to the National Forest Transportation System once permission from the private land owner is obtained for public access across the portion on their lands.

Table 3.10-3. Roads and Trails Crossing Private Land Potentially Open to Wheeled Motorized Vehicles by Alternative

Route ID	Description	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
ARM-5	Trail connecting two routes near Eliot Meadow which connects two National Forest System Roads.	X	X		X	X	X	X
H18-12	Former National Forest System road near Northwest of Rucker Lake	X				X		
H18N49Y	Former National Forest System Road providing a loop off of the 7 Road west of Bullards Bar Reservoir	X				X		
H19-22-14	Former National Forest System road just south and parallel to Highway 80 between Emigrant Gap and Yuba Gap	X				X		
H20-16	Former National Forest System road connecting the 29 Road to a private road owned by Sierra Pacific Industries	X				X		
H29-11	Former National Forest System 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 National Forest System road on Sleighville Ridge northeast of Camptoonville parallel to County Road Road 115 accessing private land at Sleighville House.	X				X		
H293-19	Former National Forest System Road 293-19 coming off of County Road 293 north of Miller Ranch. First part of road crosses private land.	X				X		
H293-4-18	Former National Forest System Road south of Henness Pass road accessing private land at Gates Orchard.	X				X		
H293-4-4	Former National Forest System Road west of Sleighville Ridge crossing Marion Creek and deadending on private land near Oregon Creek.	X				X		
H3004-10	Former National Forest System Road number 3004-10 just west of Michigan Bluff accessing private land at Blue Gun Diggings.	X				X		
H3004-8	Former National Forest System Road number 3004-8 near Michigan Bluff connecting two private land parcells, one at Blue Gun Diggins and the other at Sugar Loaf.	X				X		
H3127-10-2	Former National Forest System road number 3127-10 located just south of the Sugar Pine OHV Area connecting County Road 3127 to National Forest System road 3127-008. Short segment crosses private land adjacent to County Road 3127.	X				X		
H34-4	Former National Forest System 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		
H34-8-3	Former National Forest System road accessing dispersed recreation site on private land in Indian Valley just south of Highway 49.	X				X		
H36-3-1	Former National Forest System 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.	X				X		
H38	Former National Forest System road north of the Sugar Pine Flat Research Natural Area coming off National Forest System road number 38 accessing private land at Pelliam Flat.	X				X		
H49-16	Former National Forest System road number 49-16 parallel to Highway 49 near Bullards Bar Reservoir. Majority of route is on private land.	X				X		

Route ID	Description	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
H652-5-5	Former National Forest System road number 652-5-5 south of Highway 80 near Crystal Lake. Route goes through private land accessing private picnic area at Kelly Lake and continuing on to SP Lake. Majority of route is on private land.	X				X		
H823-1-1	Former National Forest System 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		
H833	Former National Forest System road west of Malakoff Diggings near Bloddy Run. Short segment near intersection with County Road 522 crosses private land.	X				X		
H833-10	Former National Forest System road north of Buck Ranch coming off Nevada County Road 833 accessing Orleans Flat. Small segment near junction with county road crosses private land.	X				X		
H88-13	Former National Forest System 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		
H93-3-1	Former National Forest System road number 93-3-1 just north of Packer Saddle and Robininson Cow Camp. Road dead ends on National Forest System land after crossing private land parcel.	X				X		
H96-49	Former National Forest System road just west of French Meadowss Reservoir. Connects two National Forest System roads and proceeds to a dead end on private land.	X				X		
N25-1-1	Former National Forest System road number 25-1-1 connecting National Forest System 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		
N270-4-6	Former National Forest System road number 270-4-6 just east of Stampede Reservoir. Route is a continuation of current National Forest System Road 270-4-6 which terminates at boundary with private land. Entire route is on private land.	X				X		
N43-14	Former National Forest System road 43-14 just south of Robinson Flat extends north off of National Forest System road number 43 into Deep Canyon and access Savage Workings where it dead ends.	X				X		
N43-14-4	Former National Forest System road 43-14-4 just south of Robinson Flat extends south off of National Forest System road number 44 into Deep Canyon and access Savage Workings where it dead ends.	X				X		
N860-20-1	Former National Forest System road number 860-20-1 just north of Stampede Reservoir. Comes off of Sierra County Road number 86 in Sardine Valley and provides access to the north shore of Stampede Reservoir at Stampede Valley.	X				X		
N866-1-5	Former National Forest System road number 866-1-5 near the head of Prosser Reservoir. Road parallels Nevada County Road 886b. Entire route is on private land.	X				X		
N96-110-6	Former National Forest road north French Meadows Reservoir. Comes north off of the Western States Trail near Talbots and accesses private land where the route dead ends in three separate locations.	X				X		
N96-12c	Former National Forest System road coming north off of the Mosquito Ridge Road near Mosquito Narrows. One segemt dead ends at Cedar Springs and the other segment dead ends at Big Oak Flat.	X				X		
N96-15	Former National Forest system road number 96-15. Comes of off Mosquito Ridge Road towards the north accessing Peavine Creek on private land.	X				X		

Route ID	Description	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
N96-22	Former National Forest system road number 96-22. Comes of off Mosquito Ridge Road towards the north accessing Peavine Creek on private land.	X				X		
TKN-J9	Route just to the east of Stampede Reservoir. Route is the access road underneath a powerline	X	X		X	X	X	X
TKS-6	Route is just west of the The Cedars Lodge. Route goes to the west off of National Forest System Road number 51, crosses private land prior to dead ending on National Forest System Lands.	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	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-F1c	Comes off of Fordyce Jeep trail to the east towards Fordyce Lake to provide access to dispersed site. First half of the route is on priovate land.	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
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	X	X
	Number of Routes Crossing Private Land	**43**	**9**	**0**	**5**	**43**	**7**	**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 could be expected to continue unless action was taken by the private landowner to stop public access. Alternative 3 would prohibit use by wheeled motorized vehicles on all routes un-authorized for motor vehicles on National Forest System lands which also cross private land. Alternatives 4, 6 and 7 have a minor amount of unauthorized roads and trails crossing private 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.

Alternatives 2 and 5 have a significant amount of unauthorized roads and trails crossing private where use by wheeled motorized vehicles would be allowed to continue. The majority of these routes are routes are within the Mosquito, Cal-Ida, Boca, Prosser, Stampede networks where all of the existing unauthorized routes within the boundary of this area would be open for motorized wheeled vehicles for the purpose of providing an OHV destination experience. This use however would only be allowed once the private land owner has given permission for public access across their lands as well. Prior to such permission being given, public use by motorized vehicles would be prohibited.

Management of wheeled motorized vehicle activities adjacent to private land

Private land interface situations may occur when National Forest System 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 situations arise adjacent to private lands where the land owners have conflicting road and trail management objectives and different perceptions about how National Forest System roads and trails adjacent or near their property should be managed.

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

Road/Trail Category	Season of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross Country Travel								
Acres		273,700	0	0	0	0	0	0
Routes un-authorized for motorized use (miles)	**Not Applicable**	517.3	0	0	0	0	0	0
Roads open to highway legal vehicles only	Seasonal Closure	11.5	0.0	11.5	11.5	0.0	5.9	11.5
Roads open to highway legal vehicles only	Open Year Around	143.8	47.2	142.4	142.4	47.2	87.6	142.4
Roads open to all vehicles	Seasonal Closure	29.5	41.0	29.5	499.1	551.0	543.8	29.5
Roads open to all vehicles	Open Year Around	468.2	564.8	469.7	0.0	55.1	15.7	469.7
	Subtotal NFS Roads	**653.0**	**653.0**	**653.0**	**653.0**	**653.3**	**653.0**	**653.0**
Trail open to high clearance trail vehicles	Seasonal Closure	1.3	1.4	1.3	40.4	83.2	46.7	1.3
Trail open to high clearance trail vehicles	Open Year Around	36.2	47.1	36.2	0.0	0.0	0.0	40.6
Trail open to ATV's and motorcycles	Seasonal Closure	0.0	0.0	0.0	5.2	5.2	5.2	0.0
Trail open to ATV's and motorcycles	Open Year Around	3.9	5.2	3.9	0.0	0.0	0.0	5.2
Trail Open to motorcycles	Seasonal Closure	0.2	0.2	0.2	22.3	25.4	24.7	0.2
Trail Open to motorcycles	Open Year Around	16.9	25.2	16.9	0.0	0.0	0.0	22.9
	Subtotal NFS Trails	**58.5**	**79.1**	**58.5**	**67.9**	**113.7**	**76.6**	**70.3**
State, County or other jurisdiction roads	**Open Year Around**	219.3	219.3	219.3	219.3	219.3	219.3	219.3
	Total Motorized	**1449.1**	**952.4**	**931.8**	**941.2**	**987.4**	**949.9**	**943.6**
Roads/trails closed to motorized users	Closed	7.0	503.7	524.3	514.9	468.7	506.2	512.5
Trails open only to non-motorized users	Open Year Around	77.3	77.3	77.3	77.3	77.3	77.3	77.3
Trails open only to hikers and equestrians (No mountain bikes allowed)	Open Year Around	38.6	38.6	38.6	38.6	38.6	38.6	38.6
	Total Non-Motorized	**122.8**	**619.6**	**640.1**	**630.8**	**584.6**	**622.1**	**628.4**

All of the action alternatives reduce the number of miles of roads and trails open to wheeled motorized vehicles within ¼ mile private land. 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.

3.11. Society, Culture & Economy

The Tahoe National Forest Region (TNF Region) encompasses more area than the Tahoe National Forest itself. For the purposes of this EIS, the Tahoe National Forest Region consists of all or part of Five California counties in which the Tahoe National Forest is located. These counties are Nevada, Placer, Plumas, Yuba and Sierra. Information on Tahoe National Forest 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 Tahoe National Forest, especially Lake Tahoe, 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. Lake Tahoe is midway on the I-80 highway corridor through the Tahoe National Forest between Reno and Sacramento.

Population and Demographics

Historical Background

People have lived in the TNF Region for thousands of years. A deep and enduring connection continues between American Indians, the first residents, and the forest.

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 ecosystem. 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 (low-level) 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. 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

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 the Placer County. Placer County has also seen the largest population growth in recent years with a more than 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 this 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. The Forest Service will need to respond to increasing needs for potable water, recreation, natural resource extraction, and community fire protection.

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. 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 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 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.

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.

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.

By 2040, the share of the population less than 17 years old will have climbed once again. Elderly people will be a lower percentage of the population than they are currently. In the foreseeable future, the Sierra Nevada Region population will not be "graying." 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. 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 among counties of the TNF Region. 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.

During the 1990's, the labor force in Fresno, Madera, and Tehama counties, located along the Interstate 5 corridor, grew more than 17 percent. However, workforce growth in other Sierra Nevada counties located along the Interstate 5 corridor has proceeded at a slower pace, or, in some cases, declined. Yuba County, although close to the nexus of Interstate 5 and Interstate 80, saw a net reduction in its workforce in the 1990s.

Although Washoe County has grown rapidly, the 17 percent growth in its labor force is approximately half that of Nevada as a whole. (Nevada's high labor force growth rate is a result of the rapid economic growth in the Las Vegas metropolitan area.) While Esmeralda and Mineral Counties lie between Las Vegas and Reno, they do not reflect the strong economic growth of these two major urban centers of Nevada.

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. In Calaveras, Lassen, Modoc, Plumas, and Tuolumne Counties, the civilian labor force has declined between 9 and 15 percent from peaks in 1992 and 1993.

Data for many Sierra Nevada communities, particularly in Fresno, Tehama, and Yuba counties, are not available.

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 Amador, El Dorado, Nevada, and Placer counties (all of which are within commuting distance of Sacramento); some communities in the Owens Valley; and Washoe County, including Reno. Other foothill communities, such as those in the Oroville area in Butte County, experienced high unemployment between 1990 and 1998.

Unemployment data aggregated by county or by subregion do not show differences in unemployment between communities. Fresno and Mariposa counties show marked differences in community unemployment, even between communities that are located near one another. In general, more remote communities at high elevations have higher unemployment rates than lower elevation communities in the same county. This pattern is reversed in the Southern Sierra subregion, however. Counties in this subregion have unemployment rates as high as three times greater than the California average. In the Sierra Nevada portion of Kern County, however, unemployment rates in all but one community are lower than the County average.

Unemployment in California peaked in 1995. Communities and counties in the Sierra Nevada Region, however, experienced peaks in unemployment in 1993. Employment in the Sierra Nevada Region responds to economic trends that are different than those that affect employment in more urban and industrialized portions of California and Nevada. A statewide economic upswing in California in the late 1990s appears to have reduced unemployment in many mountain communities to levels close to 1990 unemployment figures. Yet, many Sierra Nevada communities continue to experience relatively high unemployment rates.

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 Sierra Nevada 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 TNF Region counties. 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, the right column, 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 Tahoe National Forest 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 Tahoe National Forest provides. In particular, would changes in the use of the National Forest for recreation and the amount of change in the designation of Forest roads and trails be large enough or significant enough to cause measurable economic changes? Is the economy of the local area diverse enough and robust enough that the proposed changes will be insignificant or will they be felt in very specific segments of the local economy?

National Visitor Use Monitoring (NVUM)

The National Visitor Use Monitoring (NVUM) program provides reliable information about recreation visitors to national forest system managed lands at the national, regional, and forest level. Information about the quantity and quality of recreation visits is required for National Forest plans, Executive Order 12862 (Setting Customer Service Standards), and implementation of the National Recreation Agenda. To improve public service, the agency’s Strategic and Annual Performance Plans require measuring trends in 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*; English, Kocis, Zarnoch, and Arnold; Southern Research Station; May 2002 (www.fs.fed.us/recreation/programs/nvum).

The Tahoe National Forest participated in the National Visitor Use Monitoring (NVUM) project from October 2004 through September 2005. There were approximately 3,930,000 national forest visits on Tahoe National Forest during fiscal year 2005. The full Tahoe NVUM report is available on the web through the Natural Resource Information System (NRIS) Human Dimensions Module at: 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 (%)[1/2]	Percent as Main Activity (%)[3/4]
Snowmobiling	Motorized	0.7	0.5
Driving for Pleasure	Motorized	17.5	4.8
OHV Use	Motorized	7.4	3.3
Other Motorized Activity	Motorized	0.2	0.1
		Motorized Subtotal	**8.7**
Hiking / Walking	Non-motorized	29.9	9.1
Bicycling	Non-motorized	4.5	2.6
Other Non-motorized	Non-motorized	10.9	3.0
Cross-country Skiing	Non-motorized	5.9	5.0
Backpacking	Non-motorized	1.4	0.5
Horseback Riding	Non-motorized	0.4	0.3
		Non-motorized Subtotal	**20.5**
Downhill Skiing	Other	45.2	43.5
Fishing	Other	8.6	4.2
Viewing Natural Features	Other	52.7	4.8
Relaxing	Other	39.9	5.4
Motorized Water Activities	Other	3.8	0.8
Hunting	Other	4.0	3.4
Non-motorized Water	Other	3.2	1.0
Developed Camping	Other	6.2	3.3
Primitive Camping	Other	1.6	0.2
Picnicking	Other	6.7	0.6
Viewing Wildlife	Other	33.3	0.3
Sightseeing	Other	0.0	0.0
No Activity Reported	Other	2.8	2.9
Resort Use	Other	3.8	0.3
Visiting Historic Sites	Other	12.2	2.0
Nature Study	Other	5.4	0.1
Gathering Forest Products	Other	3.7	2.6
Nature Center Activities	Other	2.9	0.0
		Other Subtotal	**75.3**
		Total	**104.5**

[1] Survey respondents could select multiple activities so this column may total more than 100%.

[2] The number in this column is the percent of survey respondents who indicated participation in this activity.

[3] Survey respondents were asked to select just one of their activities as their main reason for the forest visit. Some respondents selected more than one, so this column may total more than 100%.

[4] The number in this column is the percent of survey respondents who indicated this activity was their main activity.

The primary activity participation rates (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 3.11-9a displays the number of visits for these activities. The number of visits is based on the primary purpose for the visit (Percent as Main Activity) displayed in Table 3.11-8 and the total number of visits of 3,931,709 reported in the Tahoe National Forest 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. The table indicates the most popular non-motorized use is hiking/walking, followed by cross-country skiing. The most popular motorized use is driving for pleasure, followed by OHV use. The table 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 3.11-9a. Number of Visits by Activity

	Use (Visits)				
	Non-local Day Use	**Non-local Overnight**	**Local Day use**	**Local Overnight**	**Non-Primary**
Non-motorized					
Hiking/Walking	13,048	25,316	119,878	9,341	7,611
Bicycling	3,771	7,317	34,646	2,700	2,200
Other Non-motorized	4,230	8,207	38,862	3,028	2,467
Cross-country Skiing	6,761	20,961	44,449	3,293	757
Backpacking	0	1,640	0	2,510	167
Horseback Riding	373	723	3,425	267	217

	Use (Visits)				
	Non-local Day Use	Non-local Overnight	Local Day use	Local Overnight	Non-Primary
Motorized					
Snowmobiling	924	1,057	5,037	726	847
Driving for Pleasure	5,108	6,189	70,520	2,438	8,194
OHV Use	6,506	11,427	29,810	8,694	1,911
Other Motorized Activity	217	381	994	290	64
Other					
Fishing	8,777	16,653	37,997	7,022	3,040
Hunting	3,056	13,510	37,749	14,861	1,925
Viewing Wildlife	422	976	1,771	307	625
Motorized Water Activities	1,004	2,366	6,022	1,927	519
Non-motorized Water	3,973	5,747	52,890	2,145	6,781
Downhill Skiing	111,606	180,623	342,968	49,819	17,230
Developed Camping	563	19,459	826	18,375	2,989
Primitive Camping	0	643	0	984	65
Resort Use	There are no NVUM estimates for trip type segment shares for these activities				
Picnicking					
Viewing Natural Features					
Visiting Historic Sites					
Nature Center Activities					
Nature Study					
Relaxing					
Gathering Forest Products					
Sightseeing					
No Activity Reported					
Sub Total	**23,323**	**54,976**	**139,940**	**44,781**	**12,064**

Table 3.11-9b. 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

	Expenditures ($ per visit)				
	Non-local Day Use	**Non-local Overnight**	**Local Day use**	**Local Overnight**	**Non-Primary**
Motorized					
Snowmobiling	49.09	128.80	29.57	68.93	28.33
Driving for Pleasure	17.62	66.54	13.33	42.73	10.00
OHV Use	28.57	64.80	19.00	48.50	14.62
Other Motorized Activity	28.57	64.80	19.00	48.50	14.62
Other					
Fishing	21.00	95.65	20.00	48.00	20.00
Hunting	38.10	116.32	30.00	79.47	25.50
Viewing Wildlife	20.80	82.59	10.80	53.75	10.00
Motorized Water Activities	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 Tahoe National Forest were estimated. The economic effects of all other types of recreation combined on the Tahoe NF 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 that surrounds the Tahoe National Forest used for this jobs and income analysis was five counties in Northern California and one in Nevada surrounding the Tahoe National Forest. 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 Tahoe National Forest 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 presented. Estimated economic effects are displayed in the following ways:

1. Direct, and indirect and induced employment and labor income response coefficients by activity type (jobs and labor income per 1,000 visits); and
2. Estimated employment and labor income by motorized and non-motorized activity types.

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 visits presented in Table 3.11-10 were used to estimate the economic effects for local and non-local use by activity type.

Table 3.11-10 indicates the following: First, economic effects tied to local visitation generate lower employment and labor income effects. This is a result of local visitors spending less per visit in comparison to non-local visitors (see Table 3.11-9). Second, 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). Third, the largest economic effect is associated with non-local cross-country skiing, but is followed fairly closely by non-local snowmobiling. In general, economic effects vary by the amount of spending and by the type of activity, but it can not be generalized that motorized or non-motorized activities contribute more or less to the local economy on a per visit basis. It is also important to be careful with the use of response coefficients. They reflect an economic structure that is a snapshot in time, that is, they are not applicable to visitation numbers that are dramatically different from current recreation levels. If recreation activities and/or visits were to change radically, there would be a structural shift in the economy as spending patterns changed and these response coefficients would no longer reflect underlying economic processes.

Table 3.11-10. 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	0.164	0.073	$4,503	$3,080
	Local OVN	0.729	0.334	$20,401	$14,105
	NonLocal Day	0.371	0.147	$9,840	$5,894
	NonLocal OVN	2.337	0.985	$62,451	$40,866
	NP	0.164	0.073	$4,503	$3,080
Backpacking	Local Day	-	-	$0	$0
	Local OVN	0.660	0.340	$19,880	$14,857
	NonLocal Day	-	-	$0	$0
	NonLocal OVN	0.862	0.401	$25,603	$16,633
	NP	0.660	0.340	$19,880	$14,857

		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	0.280	0.132	$8,030	$5,599
	Local OVN	0.746	0.349	$20,949	$15,026
	Non Local Day	0.440	0.207	$12,624	$8,801
	Non Local OVN	1.244	0.582	$34,916	$25,045
	NP	0.280	0.132	$8,030	$5,599
Driving	Local Day	0.186	0.080	$5,007	$3,351
	Local OVN	1.057	0.414	$26,022	$17,187
	Non Local Day	0.292	0.125	$7,873	$5,270
	Non Local OVN	1.763	0.690	$43,376	$28,648
	NP	0.186	0.080	$5,007	$3,351
Snowmobile	Local Day	0.498	0.233	$14,352	$9,891
	Local OVN	1.932	0.771	$47,812	$32,057
	Non Local Day	0.851	0.387	$24,106	$16,154
	Non Local OVN	3.221	1.284	$79,691	$53,431
	NP	0.498	0.233	$14,352	$9,891
Cross Country Ski	Local Day	0.318	0.136	$8,202	$5,732
	Local OVN	1.997	0.826	$51,477	$34,342
	Non Local Day	0.500	0.214	$12,885	$9,004
	Non Local OVN	3.329	1.376	$85,801	$57,239
	NP	0.318	0.136	$8,202	$5,732
All Other Use					
	Local Day	0.263	0.119	$7,291	$5,048
	Local OVN	0.973	0.442	$26,771	$18,779
	Non Local Day	0.478	0.199	$12,507	$8,271
	Non Local OVN	2.336	0.984	$61,620	$40,966
All Other Activities	NP	1.745	0.730	$45,703	$30,421

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 350 total average annual jobs in the 5 county area (direct, indirect and induced, full-time, temporary, and part-time) and $11.2 million total labor income (direct, indirect and induced) are attributable to non-motorized visitation on the Tahoe National Forest. The two largest activities among those in the table are hiking/walking and cross-country skiing, together these account for about 13% of the jobs and 13% of the income generated from the activities analyzed. These activities account for about 262 jobs and provided $8.4 million in labor income to the nine-county area.

Motorized activities were responsible for approximately 100 total jobs (direct, indirect and induced) and $3.3 million total labor income (direct, indirect and induced). The two largest motorized uses are OHV Use and driving for pleasure. These two activities contribute about 4.4% of the jobs from the activities in the table, and provide about 4.5% of the labor income. Together these two activities contribute 87 jobs and provide about $2.9 million in labor income to the area.

"All Other Activities" (see Table 3.11.8 for a list) are significant economic contributors for the activities studied. They provide 1,519 jobs, or 74% of the jobs from the activities analyzed. Labor income is about $49 million, or 77% of the income generated by these activities.

Table 3.11-12 shows that about 18% of the jobs provided from these activities are from non-motorized use, 5% from motorized use and 77% from "Other Activities." The contributions to labor income are 18% non-motorized use, 5% 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*	2	1	51,656	38,605
Non-local	1	1	43,474	28,244
Hiking/Walking - *Local*	26	12	756,114	518,658
Non-local	64	27	1,769,505	1,150,526
Horseback Riding - *Local*	1	0	21,603	14,819
Non-local	2	1	50,557	32,872
Bicycling - *Local*	8	3	218,525	149,898
Non-local	18	8	511,407	332,515
Cross-country Skiing - *Local*	21	9	552,854	380,765
Non-local	73	30	1,951,844	1,304,962
Other Non-motorized - *Local*	9	4	245,114	168,136
Non-local	21	9	573,631	372,973
Total Non-motorized	**246**	**104**	**$6,746,286**	**$4,492,972**
Subtotal	**350**		**$11,239,257**	

	Employment (full & part-time jobs)		Labor Income (2008 dollars)	
	Direct	**Indirect & Induced**	**Direct**	**Indirect & Induced**
Motorized Use				
OHV Use - *Local*	14.8	7.0	436,341.1	308,005
Non-local	17.1	8.0	498,032.8	355,523
Driving for Pleasure - *Local*	15.7	6.6	431,153	288,013
Non-local	12.4	4.9	319,507	211,392
Snowmobiling - *Local*	3.9	1.7	110,760	75,658
Non-local	4.2	1.7	110,240	73,904
Other Motorized Activity - *Local*	0.5	0.2	14,545	10,267
Non-local	0.6	0.3	16,601	11,851
Total Motorized	**69**	**30**	**$1,937,179**	**$1,334,614**
Subtotal	**100**		**$3,271,793**	
All Other Use				
All Other Activities - *Local*	300	135.93	8,566,267	5,966,518
Non-local	762	321	20,791,117	13,815,523
Total Other	**1,062**	**457**	**$29,357,384**	**19,782,041**
Subtotal	**1,519**		**$49,139,425**	
Grand Total	**1,377**	**591**	**38,040,849**	**25,609,626**
Grand subtotal	**1,968**		**63,650,476**	

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%	0.1%
Non-local	0.1%	0.0%	0.1%	0.0%
Hiking/Walking - Local	1.3%	0.6%	1.2%	0.8%
Non-local	3.3%	1.4%	2.8%	1.8%
Horseback Riding - Local	0.0%	0.0%	0.0%	0.0%
Non-local	0.1%	0.0%	0.1%	0.1%
Bicycling - Local	0.4%	0.2%	0.3%	0.2%
Non-local	0.9%	0.4%	0.8%	0.5%
Cross-country Skiing - Local	1.1%	0.4%	0.9%	0.6%
Non-local	3.7%	1.5%	3.1%	2.1%
Other Non-motorized - Local	0.4%	0.2%	0.4%	0.3%
Non-local	1.1%	0.4%	0.9%	0.6%
Total Non-motorized	**12.5%**	**5.3%**	**10.6%**	**7.1%**

	Employment (% of full & part-time jobs)		Labor Income (2008 dollars) (% of Total Income)	
	Direct	**Indirect & Induced**	**Direct**	**Indirect & Induced**
Motorized Use				
OHV Use - Local	0.8%	0.4%	0.7%	0.5%
Non-local	0.9%	0.4%	0.8%	0.6%
Driving for Pleasure - Local	0.8%	0.3%	0.7%	0.5%
Non-local	0.6%	0.2%	0.5%	0.3%
Snowmobiling - Local	0.2%	0.1%	0.2%	0.1%
Non-local	0.2%	0.1%	0.2%	0.1%
Other Motorized Activity - Local	0.0%	0.0%	0.0%	0.0%
Non-local	0.0%	0.0%	0.0%	0.0%
Total Motorized	**3.5%**	**1.5%**	**3.0%**	**2.1%**
All Other Use				
All Other Activities - *Local*	15.2%	6.9%	13.5%	9.4%
Non-local	38.7%	16.3%	32.7%	21.7%
Total Other	**54.0%**	**23.2%**	**46.1%**	**31.1%**
Totals	**69.9%**	**30.1%**	**59.8%**	**40.2%**
	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	65.9	1,270,881.3
	Non Local	179.6	3,222,090.4
Total Motorized Use	Local	34.9	681,943.7
	Non Local	34.2	652,669.8
Total All Other Use	Local	299.8	5,966,518.0
	Non Local	762.1	13,815,523.1
Total	Local	400.6	7,919,342.9
	Non Local	976.0	17,690,283.3
Total for Area		**1,376.6**	**25,609,626.2**

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	0.006%	0.004%
	Non Local	0.017%	0.011%
Total Motorized Use	Local	0.003%	0.002%
	Non Local	0.003%	0.002%
Total All Other Use	Local	0.029%	0.019%
	Non Local	0.072%	0.045%
	Total Use	0.138%	0.088%
Total for Area		**1,511,303**	**76,354,830,000**

Table 3.11-13b shows 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 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 be relatively static although the use patterns may change. For example, even though the overall number of available roads and trails is reduced in all of the action alternatives, the same levels of use would simply become more concentrated in those areas. However, motor vehicle use is already concentrated in many areas of the Forest at this time, so this effect may not be realized either during implementation; but at some point some users would no longer 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 native surface (dirt) 2 roads and system 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.

American Indian Rights and Interests: Affected Environment

Laws Pertaining to American Indian Tribes

Laws pertaining to the rights of federally recognized American Indian tribes acknowledge that these tribes have specific rights and interests, many unlike those accorded to other governments. Most American Indian lands in California are small. American Indians in California and Nevada rely on Federal lands for exercising their interests and rights to access and use natural resources, cultural resources, and ceremonial sites, and to seek economic well-being (Reynolds 1996).

An important distinction in U.S. law is that federally recognized American Indian tribes are not a special interest group; they are sovereign governments distinct from Federal and State governments. This legal standing confers government-to-government relations between the Federal Government and each federally recognized tribe. Powers that Federal laws do not expressly limit remain inherent powers of individual tribes. Reservations, Rancheria, and Indian colonies all comprise “Indian Country” as defined in the 1948 Indian Country Statute. American Indian governments have jurisdiction and authority over resources on Indian Country lands. On lands outside Indian Country, rights reserved for tribal governments may include rights to hunt and fish; rights to gather traditional plants, mushrooms, and lichens; and rights to water.

Federal policy for tribes emphasizes self-determination and government-to-government relationships. Table 3.11-14 lists major laws that shape how the Federal government supports tribal self-determination interests and government-to-government consultation. In addition, a long tradition of case law has defined reserved rights for American Indians, including water rights and trust responsibility of the Federal government, among others (Getches and others 1998).

Claims for compensation by California Indians for European-American land taking are still considered by many tribes to be outstanding. Also, many unrecognized tribes are seeking recognition from the Federal government. It is unclear how these cases may affect the Tahoe National Forest in the future.

Table 3.11-14. Federal laws relevant to American Indian concerns regarding National Forest management

Law	Purpose
National Environmental Policy Act of 1969	Requires consideration of effects on cultural values and diversity.
American Indian Religious Freedom Act of 1978, as amended in 1994	Protects Indian religious practices and access to sacred sites.
Federal Land Policy and Management Act of 1976	Coordinates with Indian tribes to inventory, plan, and manage resources of value to Tribes.
National Historic Preservation Act of 1976	Accounts for impacts of management on prehistoric and historic sites.
Archeological Resources Protection Act of 1979 as amended in 1992	Protects archeological resources and requires that affected tribes be notified if archeological studies might harm or destroy culturally or spiritually important sites.
Native American Graves Protection and Repatriation Act of 1990	Requires consultation with tribes about disposition of Native American remains, funerary objects, and other cultural relics.

American Indian groups exert influences at national, regional, and local levels. For this EIS, their influence is most pronounced at the local level. There are approximately 11 Indian tribes and communities residing in or near the Tahoe National Forest. Indian people make up approximately one percent of the total population within the Tahoe National Forest Region. The federally recognized tribes have populations ranging up to 1,655 individuals. The Forest Service consults with federally recognized tribes, non-recognized tribes, organizations, and individuals to comply with the laws displayed in Table 3.11-14.

Importance of National Forest Lands and Resources to American Indian People

Indian country is a complex pattern of reservations, Rancherias, and allotments scattered throughout the Sierra Nevada. Federal American Indian reservations range from 0.5 acre to 313,690 acres; five tribes have no land base at all. There are four reservations larger than 50,000 acres each. The 477,000-acre Pyramid Lake Reservation lies on the eastside of the Sierra Nevada; the people who live there have a significant interest in the management of nearby Sierra Nevada national forests.

American Indian tribes, communities, and individuals live principally in the foothills on both the west and east sides of the Tahoe National Forest. Some American Indian communities and individuals reside off the reservations while others live on allotments within national forests administrative boundaries. Many American Indians have also migrated to nearby urban centers. The tribes discussed in this section continue to maintain their cultural identities while participating in many day-to-day social and economic activities of other communities.

Tribal concerns related to this EIS have been shared with the Forest Service at public and tribal meetings. Key tribal concerns include: road access and special lands and their associated activities.

Road Access

Many ceremonial locations, cemeteries, traditional gathering areas, and archaeological sites are located in the national forests. These areas contribute to the tribal community's way of life, their identity, their traditional practices, and cohesiveness. While roads were not a traditional means of access to these sites they are essential for many now. Some Indian people have expressed concern about potential changes in roaded access to these sites.

Special Lands and Associated Activities

Many sacred areas are located in national forests. Ceremonial activities are held in these areas. Occasionally, ceremonial activities are held with little notice to the Forest Service, and, at other times, these activities are large gatherings attended by tribes and the general public. Some activities, particularly those of a religious nature, must be performed in specific settings or environments.

The designation of "sacred" lands is tribally based. According to some traditions, the Creator designated sacred lands. These lands are often situated in areas with unique and fixed geological features or other landscape attributes. Many American Indians consider major land alterations, such as clearcutting, road building, or mining, on sacred lands to be disrespectful. Certain activities, such as bear hunting during traditional "Bear Dance Celebrations," are also considered disrespectful.

As more people visit and use national forests, conflicts arise between tribal uses of culturally important areas and other uses of these same areas. The unique characteristics of culturally important areas attract many people for many different reasons. Some of these areas are currently experiencing increased recreational use that, at times, conflicts with tribal uses. In the past, some campgrounds were located on tribal sites and some roads were located on prehistoric and historic trails, further illustrating the critical need for local consultation between the Forest Service and American Indian tribes.

American Indian Rights and Interests: Environmental Consequences

Factors Used to Assess Environmental Consequences

Tribal input provided to the Forest Service during pre-scoping and scoping for this EIS identified a goal for providing appropriate access to sacred sites, ceremonial sites, and traditional use areas. Access to traditional use areas is not presently quantifiable in the absence of baseline inventories. Therefore, the factor used to assess the consequences of the alternatives is the total miles of roads and trails open to wheeled motorized vehicles and season of use. Chapter 3.05 "Heritage Resources" describes consequences to traditional cultural resources that are also heritage resources, such as archaeological sites, sacred sites, and traditional cultural properties.

Effects of the Alternatives on American Indian Rights and Interests

Table 3.11-15 displays the total miles of roads and trail open to wheeled motorized use by class of vehicle. Alternative 5 provides the greatest opportunity for wheeled motorized use on the Tahoe National Forest. However the seasonal wet weather restrictions associated with Alternative 5 reduce its overall level of access. Alternatives 3, 4, 6 and 7 provide lower levels of access in terms of total miles. Access in Alternatives 4 and 6 is reduced even further due to the implementation of wet weather seasonal restrictions.

Table 3.11-15. Summary evaluation of consequences to American Indians based on access

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	31	0	31	31	0	18	31
Roads Open to Highway Legal Vehicles Only	Seasonal Restriction	602	213	598	598	213	370	598
Roads Open to All Vehicles	All Year	110	141	110	1,900	2,086	2,066	110
Roads Open to All Vehicles	Seasonal Restriction	1,786	2,175	1,789		230	76	1,790
Trails Open To High Clearance Trail Vehicles	All Year	5	6	5	203	434	227	6
Trails Open To High Clearance Trail Vehicles	Seasonal Restriction	184	227	184				208
Trails Open to ATVs and Motorcycles	All Year				20	29	29	
Trails Open to ATVs and Motorcycles	Seasonal Restriction	18	20	18				20
Trails Open to Motorcycles	All Year	1	1	1	142	154	149	1
Trails Open to Motorcycles	Seasonal Restriction	127	152	127				144

Civil Rights Impact Analysis

Environmental justice speaks to concerns that costs of Federal decisions could fall disproportionately on people of a particular ethnic or cultural heritage group, or on people with low incomes. Executive Order 1289 requires federal agencies to identify where such disproportionate burdens might occur as the result of Federal actions. Social impact analysis identifies areas where health and well-being of people are at risk as the result of actions conducted in this EIS.

The National Environmental Policy Act (NEPA) provides the basis for environmental justice and social impact analysis. Section 101 of NEPA sets forth six goals pertaining to social well-being and environmental justice:

1. Fulfill the responsibility of each generation as trustees of the environment for following generations;
2. Assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
3. Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

4. Preserve important historical, cultural, and natural aspects of our natural heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
5. Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The evaluation of social impacts, environmental justice, and civil rights considers people of color, gender-based groups, civic and community organizations, students and youth, the elderly poor and working class communities, farm workers, other labor groups, and communities.

During development of the Notice of Intent and EIS for the Motorized Travel Management Project, people expressed concerns relating to environmental justice and civil rights. Concerns related to environmental justice and civil rights can be organized into major topic areas of community fire risk, human health, employment, and poverty.

This part analyzes five topics for social impacts including environmental justice and civil rights that relate to the five problem areas addressed in this EIS. The topics for analysis are:

- Race, Cultural Heritage, Employment, and Income
- Children in Poverty
- Childhood Education
- Community Needs for Fuel Wood
- Barriers to Communication

Factors used in Civil Rights Impact Analysis

Community clusters are used to display how the eight alternatives in this EIS 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 Tahoe National Forest. Table 3.11-16 displays those community clusters used in this analysis.

Table 3.11-16. Community clusters used to analyze economic and social impacts on Tahoe National Forest Communities stemming from alternatives proposed in the Public Wheeled Motorized Travel Management EIS

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	-
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	-
	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	-
	95972	Rackerby	260
	95981	Strawberry Valley	242
	96125	Sierra City	311
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 Tahoe National Forest 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. Collecting new information is not essential to discern differences among alternatives or required for a reasoned choice among options.

Race, Cultural Heritage, Employment, and Income: Affected Environment

The Tahoe National Forest community clusters have larger white populations than communities located just outside the Region. Table 3.11-17 shows percentages of people by racial composition and by Hispanic cultural heritage in the community clusters. None of the racial and cultural minorities that combined comprise more than 10 percent of a cluster's population.

Table 3.11-17. 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

Note: Figures in bold indicate community clusters with greater than 10 percent minority racial populations and greater than ten percent Hispanic-heritage populations.

Source: US Census Bureau, 1990 Census Data

Per capita income figures show that in general racial and cultural minority groups in the Tahoe National Forest Region earn less than their white neighbors. Table 3.11-18 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 3.11-18. 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

Note: Figures in bold indicate community clusters where (1) per capita incomes of combined minority racial groups is less than half the per capita income of whites; (2) per capita incomes of people with Hispanic heritage is less than half the per capita income of whites; and (3) more than ten percent of all employment comes from combined agriculture and forestry.

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 Tahoe National Forest 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 services employment in community clusters. Criterion 4 identifies communities with a high dependence upon the services sector.

Table 3.11-19. 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

Race, Cultural Heritage, Employment, and Income: Environmental Consequences

Potential impacts 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.

Predictions about changes in recreational use that may occur on the Forest are difficult to make and would be highly speculative. The Forest Service believes that under all action alternatives, levels of use would be relatively static although the use patterns may change. For example, even though the overall number of available roads and trails is reduced in all of the action alternatives, the same levels of use would simply become more concentrated in those areas. However, motor vehicle use is already concentrated in many areas of the Forest at this time, so this effect may not be realized either during implementation; but at some point some users would no longer 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 native surface (dirt) roads and system 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. Any potential effects would likely impact gas stations, convenience stores, and other retail stores in local communities.

Children in Poverty: Affected Environment

Children are one population group that is disproportionately represented within low-income families. Table 3.11-20 shows US Census Bureau estimates for all people living in poverty and for children living in poverty in Sierra Nevada Region counties. Children are all people less than 18 years old. The US Census Bureau defines poverty based on threshold incomes for families of different sizes. Thresholds change yearly and do not vary geographically.

The percentages of people living in poverty in the Tahoe National Forest 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 Tahoe National Forest Region 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 3.11-20. All people and all children living in poverty in Tahoe National Forest 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.

Children in Poverty: Environmental Consequences

Children may disproportionately suffer from economic decisions of the Forest Service if their parents lose jobs or must take lower paying jobs. Predictions about changes in recreational use that may occur on the Forest and affect employment are difficult to make and would be highly speculative. The Forest Service believes that under all action alternatives, levels of use would be relatively static although the use patterns may change. For example, even though the overall number of available roads and trails is reduced in all of the action alternatives, the same levels of use would simply become more concentrated in those areas. However, motor vehicle use is already concentrated in many areas of the Forest at this time, so this effect may not be realized either during implementation; but at some point, some users would no longer 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 native surface native surface (dirt) roads and system 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. Any potential effects would likely impact gas stations, convenience stores, and other retail stores in local communities.

Childhood Education: Affected Environment

Table 3.11-21 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 3.11-21. 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 Tahoe National Forest 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 US Forest Service and other federal agencies based on the average of the three highest annual payments for the period 1986 to 1999. 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 3.11-22. 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 3.11-22 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 3.11-23. 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

Childhood Education: Environmental Consequences

The Secure Rural Schools and Community Self-Determination Act of 2000 gives the counties the option to received 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 by changes in Forest Service timber receipts.

Other social and economic factors in communities or other Federal and State funding may influence more the ability of public education systems in the Region to prepare their students for higher education than the Forest Service. Instances of departures from environmental justice based on predictions about changes in recreational use that may occur on the Forest are difficult to make and would be highly speculative. The Forest Service believes that under all action alternatives, levels of use would be relatively static although the use patterns may change. For example, even though the overall number of available roads and trails is reduced in all of the action alternatives, the same levels of use would simply become more concentrated in those areas. However, motor vehicle use is already concentrated in many areas of the Forest at this time, so this effect may not be realized either during implementation; but at some point, some users would no longer attain the experience they desire and would likely seek other areas off-forest. The point at which this would occur is speculative

Community Needs for Fuel Wood: Affected Environment

Fuel wood supplies are critical to rural people in California with low incomes. Data about fuel wood demand and supply in Tahoe National Forest 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.

Community Needs for Fuel Wood: Environmental Consequences

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 will provided the greatest opportunity for fuel wood gathering.

Table 3.11-24. 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	31	0	31	31	0	18	31
Roads Open to Highway Legal Vehicles Only	Seasonal Restriction	602	213	598	598	213	370	598
Roads Open to All Vehicles	All Year	110	141	110	1,900	2,086	2,066	110
Roads Open to All Vehicles	Seasonal Restriction	1,786	2,175	1,789		230	76	1,790

Barriers to Communication: Affected Environment

The National Environmental Policy Act (NEPA) mandates that the Forest Service actively reach out to members of the public, including those people whom the Forest Service has historically underserved. Where poverty and language barriers occur, Forest Service responsibilities are complicated. Data on language barriers for adults in the Tahoe National Forest counties are available from the 1990 US Decennial Census. These data may not reflect current conditions. Indicators of where the Forest Service needs to compensate for outreach are where child poverty and lack of child proficiency in English are prevalent. The rationale is that children who are poor and who do not speak English well also have parents who are poor and do not speak English well.

Table 3.11-25 displays percentages of children in poverty and percentages of children with limited English proficiency. None of the counties have both a high percentages of poverty (greater than 15 percent) and difficulty in English-proficiency among children (greater than 10 percent).

Table 3.11-25. Percentages of child poverty and Limited English Proficiency (LEP) in Tahoe National Forest Region elementary and secondary schools

Subregion and County	Children in Poverty, 1996	LEP 19971998
Plumas	18.2	1.8
Sierra	10.6	0.1
Nevada	12.4	0.5
Placer	9.8	3.7
Yuba	20.2	0.0

Sources: US Census Bureau, California State Department of Education

In communities just outside the Tahoe National Forest Region, especially those in the Sacramento Valleys, larger proportions of residents are poor. For example, 20 percent of the children living in the Tahoe National Forest portion of

Yuba County are living in poverty; in Yuba County as a whole, 34 percent of the children are living in poverty. Poorer residents are frequently immigrants with limited English-proficiency as well.

Barriers to Communication: Environmental Consequences

In the public comment period between the appearance of the draft EIS and the final EIS, Tahoe National Forest staff will reach out to people from whom the Forest Service has not heard. Of particular interest to the Forest Service is inclusion of people who care about the Tahoe National Forest, but who may not see their role in shaping decision-making as significant or worthy. Many people who rely on the Tahoe National Forest at particular seasons may live considerable distances away, yet their concerns deserve to be heard.

The Forest Service will work to overcome barriers to communication among people who are poor and who have limited English proficiency. Attention will focus especially on American Indian residents, Hispanic communities, and recent South and Southeast Asian and East European immigrants.

Summary of Civil Rights Impact Analysis including Environmental Justice in the Sierra Nevada Region

Table 3.11-26 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 3.11-26. 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			Yes	
Grass Valley/Nevada City					
West I-80 Corridor/Auburn					
Yuba River	Yes	Yes	x	Yes	
East I-80 Corridor					

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