3.13 Terrestrial Wildlife

3.13.1 Introduction

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

Analysis Framework: Statute, Regulation, LRMP and Other Direction

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

Endangered Species Act (ESA)

The Endangered Species Act of 1973 (16 USC 1531 et seq.) requires that any action authorized by a Federal agency not be likely to jeopardize the continued existence of a threatened or endangered (TE) species or result in the destruction or adverse modification of habitat of such species that is determined to be critical. Section 7 of the ESA, as amended, requires the responsible Federal agency to consult the USFWS and the National Marine Fisheries Service concerning TE species under their jurisdiction. It is Forest Service policy to analyze impacts to TE species to ensure management activities are not likely to jeopardize the continued existence of a TE species or result in the destruction or adverse modification of habitat of such species that is determined to be critical. This assessment is documented in a Biological Assessment (BA) and is summarized or referenced in this chapter.

Forest Service Manual and Handbooks (FSM and FSH 2670)

Forest Service Sensitive (FSS) species are species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and ensure their continued viability on National Forests. It is Forest Service policy to analyze impacts to sensitive species to ensure management activities do not create a significant trend toward Federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE) and is summarized or referenced in this chapter.

Sierra Nevada Forest Plan Amendment (SNFPA)

The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified the following standards and guidelines applicable to motor vehicle travel management and terrestrial wildlife, which will be considered during the analysis process:

Wetland and Meadow Habitat (Management S&G 70): See Water (Aquatic) Resources section.

California Spotted owl and Northern Goshawk (Management S&G 82): Evaluate proposals for new roads, trails, off-highway vehicle routes and recreational and other developments for their potential to disturb nest sites.

Under the Sierra Nevada Forest Land Management Plan Amendment protected activity centers (PACs) will be established for known and discovered northern goshawks (200 acres) to protect breeding adults and their offspring. Designate northern goshawk PACs based upon the latest documented nest site and locations(s) of alternate nests. If the actual nest site is not located, designate the PAC based on the location of territorial adult birds or recently fledged juvenile goshawks during the fledgling dependency period.

Fisher and Marten (Management S&Gs 87 and 89): Evaluate proposals for new roads, trails, off-highway vehicle routes and recreational and other developments for their potential to disturb den sites.

The standard and guideline # 87 for fisher den sites will be implemented which states ‘mitigate impacts where there is documented evidence of disturbance to the den site from existing recreation, off-highway vehicle route, trail and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes and recreational and other developments for their potential to disturb den sites’.

In 2007, the Conservation Biology Institute developed a model predicting the probability of fishers occurring in areas of the southern Sierras (Spencer, et al. 2007).There is a 700 acre buffer fisher den site designation which has been applied to some of the den sites as of August 2009.

Standard and guideline #89 states ‘mitigate impacts where there is documented evidence of disturbance to the den sites from existing recreation, off- highway vehicle route, trail and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes and recreational and other developments for their potential to disturb den sites’. No mitigation needs to occur at this time for marten because there are no known marten den sites on the Sierra National Forest.

Riparian Habitat (Management S&G 92): See Water Resources section.

Bog and Fen Habitat (SNFPA ROD page 65, S&G #118): Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans and wheeled vehicles (See Botanical Resources section for more detail).

The Southern Sierra Fisher Conservation Area

The conservation strategy (SNFPA ROD, USDA-FS 2004a) contains four critical elements for fisher conservation: 1) it provides management direction for the Southern Sierra Fisher Conservation Area to support fisher habitat requirements; 2) it provides for suitable habitat linkages between southern and northern Sierra Nevada fisher populations; 3) it provides protection for all den sites; and 4) it provides suitable habitat for possible fisher reintroductions.

The Southern Sierra Fisher Conservation Area (SSFCA) encompasses the known occupied range of the fisher in the Sierra Nevada. This consists of an elevational band from 3,500 feet to 8,000 feet (errata March 2001e) on the Sierra and Sequoia National Forests. This area will be managed to support fisher habitat consistent with the protections for the California spotted owl.

SNF Land and Resource Management Plan

The LRMP management direction for sensitive species is to develop and implement management practices, referred to as standards and guidelines, to ensure sensitive species do not become threatened or endangered because of Forest Service actions. Under LRMP standards and guidelines, the SNF is to arrange management activities to protect and preserve nests and dens of all sensitive wildlife species until young have dispersed (S&G #53); similarly, LRMP management direction for Federally-listed threatened and endangered species is to manage them according to their recovery plans (USDA-FS 1991). The LRMP Forestwide Goals and Objectives for Threatened, Endangered, Proposed and Sensitive species are:

- Manage fish, wildlife and plant habitats to maintain viable populations of all resident fish, wildlife and plant species.
- Manage habitat for State and Federally-listed threatened and endangered fish, wildlife and plant species to meet the objectives of their recovery plans.
- Emphasize habitat improvement for sensitive, threatened, endangered and harvest species.
- Manage habitat for Forest Service sensitive fish, wildlife and plant species in a manner that prevents any species from becoming a candidate for threatened or endangered status.

There is specific management direction listed here for the goshawk because it identifies information that is unique due to the LRMP direction listed below. This direction is in addition to what is listed in the SNFPA ROD.

- Under LRMP management direction, 55 goshawk territories have been established on the SNF. The LRMP standard and guidelines provide for up to 50 acres of suitable habitat encompassing goshawk nest sites to be managed to benefit goshawks (S&G #56). Additionally, in the Errata to the Record of Decision Final Environmental Impact Statement, LRMP (USDA-FS September 24, 1991a) - Management Standard and Guidelines (Page 1), two guidelines for goshawks were identified. A 50-acre primary zone of older mature forest surrounding the occupied or potential nest site and a secondary zone of 75 acres around the primary zone will have a limited operating season between March 15 and August 15 or a limited operating season based on site specific information. As directed in the LRMP, a network of goshawk territories has been developed on the SNF. The network and guidelines for management of the goshawk territories has been approved by the Forest Supervisor (USDA-FS 1997). For each goshawk territory, these guidelines call for managing 175 contiguous acres to benefit the goshawk.

Effects Analysis Methodology

The species assessment presented here is organized by Species Groups divided along major habitat associations or life zones. Projected effects of motor 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 (Table 3- 136). More detailed information is also found in the Biological Assessment/Evaluation for Motorized Travel Management (Sorini-Wilson, 2010) and Project Management Indicator Species report, SNF (Strand and Sanchez 2010) and are incorporated by reference.

This assessment consists of 4 steps: (1) identify wildlife species and groups; (2) identify roads, motorized trails, and Open Areas associated factors for each group; (3) develop and apply assessment processes and GIS models to evaluate the influence of roads, motorized trails and Open Areas associated factors on each group; and (4) analyze the effects of the proposed alternatives based on the model outputs and analyses.

Table 3- 136. Identify Wildlife Special Status Species on the SNF

Species	Federally Listed Threatened/ Endangered	Forest Service Sensitive	Management Indicator Species (MIS)	Category for Project Analysis*	California Wildlife Habitat Relationships (CWHR)	Habitat	Distribution on SNF and in the Project Area
Fresno kangaroo rat	X					The nearest habitat is found in the southwestern portion of the San Joaquin Valley.	Project area is above elevational limit for species.
Sierra Nevada bighorn sheep	X					East slope of the Sierra Nevada's on the Inyo NF at Wheeler Crest, Mt Baxter and Mt Williamson. Found in mountainous habitat containing rolling meadows and plateaus in proximity to steep rocky terrain, often w/80% slopes on southerly aspects.	Project area is not habitat
California condor	X					Open terrain and roost on cliffs and large trees.	Project area is not habitat
Valley elderberry longhorn beetle	X					Elderberry shrubs; covered under programmatic consultation	There is habitat within the project area.
Bald eagle		X				Mature conifer forest near large bodies of water	Nests near large reservoirs across the Forest

Species	Federally Listed Threatened/ Endangered	Forest Service Sensitive	Management Indicator Species (MIS)	Category for Project Analysis*	California Wildlife Habitat Relationships (CWHR)	Habitat	Distribution on SNF and in the Project Area
Peregrine falcon		X				On SNF known or suspected eyries occur along or near the North and South Kings River, San Joaquin River and Merced River. Requires protected cliffs and ledges for cover.	Vehicles will not be travelling or disturbing suitable habitat
California spotted owl		X	X	3	6, 5D, 5M, 4D, 4M ***	Late Seral Closed Canopy Coniferous Forest; Mature and late-successional conifer forest	Suitable habitat across Forest.
American marten		X	X	3	6, 5D, 5M, 4D, 4M ***	Late Seral Closed Canopy Coniferous Forest	Suitable habitat across Forest.
Pacific fisher		X			5D, 4D**	Mature and late-successional conifer forest	Suitable habitat across Forest; known den sites
California wolverine		X				Areas of low human disturbance such as caves, hollows in cliffs, logs, rock outcrops and burrows for cover.	Suitable habitat on Forest. No known or verified sightings since 1930s. Habitat not affected by the project because there are no roads and motorized trails in this type of habitat.

Species	Federally Listed Threatened/ Endangered	Forest Service Sensitive	Management Indicator Species (MIS)	Category for Project Analysis*	California Wildlife Habitat Relationships (CWHR)	Habitat	Distribution on SNF and in the Project Area
Sierra Nevada red fox		X				Mature subalpine conifer forest and riparian/montane meadow; dense vegetation and rocky areas, In the Sierra Nevada, prefers forests interspersed with meadows or alpine fell-fields. On the SNF, habitat exists primarily in wilderness.	Suitable habitat on Forest. Habitat not affected by the project.
Northern goshawk		X			4D, 4M, 5D, 5M	Late Seral Closed Canopy Coniferous Forest	Forestwide
Great gray owl		X			5D, 5M, 6	Mature and late-successional conifer forest adjacent to meadows	Suitable habitat across Forest.
Willow flycatcher		X				Riparian shrub (willow) and wet meadow	Specific mdws; 9 known occupied sites.according to Framework
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 3000 feet in elevation
Pallid bat		X				Affinity for oak and mixed hardwood conifer, Roost sites can include buildings, mines, caves and live oak trees and oak snags.	Habitat is generally below 10,000 feet in elevation

Species	Federally Listed Threatened/ Endangered	Forest Service Sensitive	Management Indicator Species (MIS)	Category for Project Analysis*	California Wildlife Habitat Relationships (CWHR)	Habitat	Distribution on SNF and in the Project Area
Townsend's big-eared bat		X				Cave and mine dependent	Habitat is generally below 6000 feet in elevation
Fox sparrow			X	3		Shrubland (west-slope chaparral types)	
Mule deer			X	3		Early to intermediate successional stages of most forest, woodland, and brush habitats ***	
Yellow warbler			X	3		Riparian. (May also breed in montane chaparral and open canopy coniferous forest habitat). ***	
Mountain quail			X	3		Early and Mid Seral Coniferous Forest. Found particularly on steep slopes in open, brushy stands of conifer and deciduous forests and woodlands, and in chaparral. ***	
Blue grouse			X	3		Late Seral Open Canopy Coniferous Forest	
Northern flying squirrel			X	3		Late Seral Closed Canopy Coniferous Forest	
Hairy woodpecker			X	3		Snags in Green Forest	
Black-backed woodpecker			X	2		Snags in Burned Forest	

*The column marked 'category for project analysis' is only for MIS species/habitat. The categories are as follows: Category 1: MIS whose habitat is not in or adjacent to the project area and would not be affected by the project; Category 2: MIS whose habitat is in or adjacent to project area,

but would not be either directly or indirectly affected by the project; Category 3: MIS whose habitat would be either directly or indirectly affected by the project.

Habitat is based on CWHR Version 8.1 (Modified) and current research. All CWHR size classes and canopy closures are included unless otherwise specified; **dbh = diameter at breast height; **Canopy Closure classifications:** S=Sparse Cover (10-24% canopy closure); P= Open cover (25-39% canopy closure); M= Moderate cover (40-59% canopy closure); D= Dense cover (60-100% canopy closure); **Tree size classes:** 1 (Seedling)(<1" dbh); 2 (Sapling)(1"-5.9" dbh); 3 (Pole)(6"-10.9" dbh); 4 (Small tree)(11"-23.9" dbh); 5 (Medium/Large tree)(≥24" dbh); 6 (Multi-layered Tree) [In PPN and SMC] (Mayer and Laudenslayer 1988).

***The CWHRs and habitats listed above define the habitat primarily utilized for reproduction and foraging by the species. They differ from those defined in the MIS Report for some species (discussed below) because the MIS Report focuses on defining a specific habitat type versus defining the habitat utilized by a wildlife species. The MIS Report does not include the 4D and 4M CWHR size and density classes for the California spotted owl and American marten since it focuses on defining the late-seral closed canopy habitat type. While the mule deer utilizes various habitat types, it serves as an MIS only for the oak-associated hardwood and hardwood/conifer habitat type in the MIS Report. The MIS Report focuses on the riparian habitat utilized by the yellow warbler, and on the early and mid seral coniferous forest habitats utilized by the mountain quail and not on other habitats that may be utilized by these two species.

Based on the information presented in Table 3- 136, there will be no direct or indirect effects to the following species, and these species will not be addressed further in this document: Fresno kangaroo rat, Sierra Nevada bighorn sheep, California condor, peregrine falcon, and black-backed woodpecker.

There will be no direct or indirect effects to wolverine or Sierra Nevada red fox because their habitat is not being impacted with this project; therefore, these species will not be addressed further in this document. The Sierra Nevada red fox uses dense vegetation and rocky areas which pertain to a portion of the wilderness. There are no unauthorized routes or proposed facilities in the wilderness; therefore, the habitat is not being impacted.

Wolverine habitat as described by Zeiner et al (1990) is areas of low human disturbance such as caves, hollows in cliffs, logs, rock outcrops and burrows for cover. They den in similar habitat. There are no roads and motorized trails in this type of habitat and there have been no verified sightings since the 1930s; therefore, the habitat is not being impacted.

Assumptions Specific to the Terrestrial Biota Analysis

1. All vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type.
2. Location of roads and motorized trails is equal to disturbance effects from use (i.e., assume all roads and motorized trails provide the same level of disturbance), unless local data or knowledge indicate otherwise.
3. Habitat effectiveness and suitability is negatively impacted in the short term. In the long term, habitat effectiveness and quality will not change on or near added roads and motorized trails, but will increase to at least some degree due to subsequent passive restoration on or near unauthorized roads and motorized trails that are not added to the NFTS.
4. Open Areas include cross-country areas that are open to all vehicles, parking areas that are open to 'highway-legal vehicles only,' and staging areas that are open to 'highway-legal vehicles only.' Of the three types of those open to all vehicles tend to have the highest level of impact. To be conservative, all three types will be analyzed as if they were open to all vehicles and analyzed for the highest level of impact. As such, the three different types of areas will not be analyzed separately. Throughout the remainder of this report, they will be cumulatively referred to as Open Areas or areas.

Data Sources

1. GIS layers with the following information: roads and motorized trails; habitats; and 'designated' or important wildlife areas.
    - The following GIS layers were used to assess effects of the road, motorized trails and areas proposed to be added to the NFTS: California spotted owl protected activity centers (PACs) and Home Range Core Areas (HRCAs), along with known nest sites, territorial pairs and individual sightings; goshawk PACs and territories; great gray owl PACs; Deer Population Centers, Holding Areas, Winter Range and Migration routes; FAUNA database of incidental sightings for TES species; and past survey results.
    - To determine suitable habitat, the vegetation layer used is a combination of 1997 and 2001 vegetation layers. The combination of the 1997 and 2001 layers was implemented because it was determined by resource managers that the 1997

vegetation was more accurate regarding density for mixed conifer in the elevations roughly 5000 feet and above and the 2001 vegetation layer was more accurate for the elevation 5000 feet and below, for Ponderosa pine (developed for the SNF by the USDA Remote Sensing Lab). Meadow and plantation data were also embedded in the suitable habitat vegetation layer used for this project analysis.

2. Site specific surveys and assessment of any localized sensitive wildlife habitats where roads and trails were proposed to be added to the NFTS. The analysis of the alternatives was based on consideration of the best available science, including applicable peer-reviewed studies and local data.

Northern goshawk surveys were conducted according to Survey Methodology for Northern goshawks in the Pacific Southwest region, Forest Service (USDA, 2002a); California spotted owls were surveyed according to Protocol for Surveying for California spotted owls in proposed management areas and habitat conservation areas (USDA, 2006) and Pacific Southwest Research Stations method; great gray owl surveys were conducted using survey protocol for the great gray owl in the Sierra Nevada of California, May 2000 (Beck and Winter 2000); furbearer surveys have been conducted by Pacific Southwest Research station and UC Berkeley using survey methods that are a mix of baited camera stations, hair snares, scat dogs and tracking radio-collared individuals.

Field visits were also conducted when reconnaissance through GIS suggested further field data was needed. When visiting proposed facilities, field data was recorded for habitat type, canopy cover and suitability of wildlife habitat. Details of field visits and forms are available and are on file at the High Sierra Ranger District, wildlife biology office.

Terrestrial Biota Measurement Indicators

- Acres open to motorized use and miles of unauthorized routes and Open Areas within terrestrial biota habitat.
- Density of roads and motorized trails at the 6th field watershed level.
- Miles of roads and motorized trails at forestwide scale and within the habitat for each species group.
- Number of sensitive sites for Threatened, Endangered and Sensitive (TES) species (e.g., Protected Activity Core [PACs], nest sites, winter roost areas) within ¼ mile of an added roads and motorized trails or Open Area.
- The proportion of a species (or species group) habitat that is affected by motorized roads, motorized trails and Open Areas.

Terrestrial Biota Methodology by Action

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

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Ten analysis units, wilderness excluded because motorized use is not allowed.

Indicator(s): Acres open to motorized use and miles of unauthorized routes within terrestrial biota habitat.

Methodology: GIS analysis of existing unauthorized routes in relation to habitat.

Rationale: Studies have documented that motorized travel can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance and modifying habitat (Gaines et al. 2003, Trombulak and Frissell 2000, USDA-FS 2000).

2. Direct and indirect effects of adding facilities (roads, motorized trails and/or Open Areas) to the NFTS, including identifying seasons of use and vehicle class.

Considerations: Display information related to indicators in tabular form (indicators by alternatives).

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Ten analysis units, wilderness excluded because motorized use is not allowed.

Indicator(s): (1) Density of motorized roads and motorized trails; (2) Miles of motorized roads and motorized trails; (3) Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added roads and motorized trails or Open Areas; (4) The proportion of a species (or species group) habitat that is affected by motorized roads and motorized trails.

Methodology: GIS analysis of added facilities in relation to habitat and important/sensitive terrestrial biota areas.

Rationale: Literature indicates that placement of motor vehicle facilities in relation to habitat can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance and modifying habitat (Gaines et al. 2003, Trombulak and Frissell 2000, USDA-FS 2000).

3. Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads).

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Ten analysis units, wilderness excluded because motorized use is not allowed.

Indicator(s): (1) Density of roads and motorized trails; (2) Miles of roads and motorized trails; (3) Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile; (4) The proportion of a species (or species group) habitat that is affected by motorized facilities.

Methodology: GIS analysis of NFTS changes in relation to habitat and important and sensitive terrestrial biota areas.

Rationale: Literature indicates that location of motorized facilities in relation to habitat can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance and modifying habitat (Gaines et al. 2003, Trombulak and Frissell 2000, USDA-FS 2000).

4. Non-Significant LRMP Amendments

As explained in section 3.1.1, the non-significant LRMP amendments do not have effects to wildlife species or habitat (including MIS habitat). The amendment changing the language of S&G 17 pertaining to the management of ML1 roads updates the direction of the LRMP

to be consistent with national direction. The potential for impacts to wildlife species or habitat have been analyzed under Action 3, Changes to the NFTS. The amendment change ROS class has no relevance to wildlife species or habitat. The facilities proposed to be added to the NFTS within the ROS class area have been analyzed under Action 2, Additions to the NFTS. Therefore, the environmental consequences of these amendments will not be discussed further in the wildlife resources section.

5. Cumulative Effects

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

Long-term timeframe: 20 years.

Spatial boundary: SNF, excluding wilderness because motorized use is not allowed.

Indicator(s): (1) Density of roads and motorized trails; (2) Miles of roads and motorized trails; (3) Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added roads and motorized trails or Open Area; (4) The proportion of a species (or species group) habitat that is affected by motorized roads and motorized trails (see Aquatic Biota section for discussion of fish, amphibian and reptile species).

Methodology: GIS analysis of past/current, added and future roads and motorized trails/Open Areas in relation to habitat and important and sensitive terrestrial areas and in context of other past/current and future management actions affecting terrestrial habitat.

Rationale: Literature indicates that placement of motorized facilities in relation to habitat can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance and modifying habitat (Gaines et al. 2003, Trombulak and Frissell 2000, USDA-FS 2000).

3.13.2 Affected Environment and Environmental Consequences

First, the affected environment will be discussed for wildlife groups and species, followed by the environmental consequences for wildlife groups and species. Each group will be analyzed for the effects of each alternative against the indicators. Any species specific effects will also be discussed.

Affected Environment – General Wildlife

On the SNF the following habitat types exist in the project area: oak woodland, shrubland, riparian, meadow, Ponderosa pine, Jeffrey pine, incense cedar, Sierra mixed conifer, white fir, red fir and finally juniper at the higher elevations. There is suitable seasonal or year-round habitat for about 346 vertebrate species including 31 species of fish, 13 species of amphibians, 22 reptiles (see Aquatics Biota section for fish, amphibians and reptile analysis), 198 birds and 82 mammals. There are currently four species listed as Endangered or Threatened under the Endangered Species Act (ESA) and thirteen species listed as Forest Service Sensitive. These species and their habitats on the SNF are described in detail in the SNF Motorized Travel Management EIS Biological Evaluation/Biological Assessment (BE/BA) (incorporated by reference) (Sorini-Wilson, 2010). In addition there are 12 Management Indicator Species (MIS) habitats or ecosystem components. Only eight will be discussed in this section because wet meadow and riverine and lacustrine are covered under the aquatics section. Sagebrush habitat is not identified for this forest and there are currently no snags in burned forest habitat within the project analysis

area. These eight habitats and species associated with them are described in detail in the SNF Motorized Travel Management MIS Report (Strand and Sanchez 2010) (also incorporated by reference).

USFWS Endangered Species

Fresno kangaroo rat	*Dipodomys nitratoides exilis*
Sierra Nevada bighorn sheep	*Ovis candadensis californiana*
California condor	*Gymnogyps californianus*

The endangered species listed above have been identified by the USFWS as within Fresno, Madera or Mariposa county but are not within the project area, therefore, they will not be addressed further in this document. Unless otherwise noted, no further consultation on these species pursuant to the Endangered Species Act of 1973 is required with the Fish and Wildlife Service for these particular activities, unless new information reveals effects of the proposed action not considered here.

USFWS Threatened Species

Valley elderberry longhorn beetle	*Desmocerus californicus dimporphus*

There is habitat for the Valley elderberry longhorn beetle within the project area. Therefore, the project will follow the Project Design Criteria for Valley elderberry longhorn beetle as outlined in the "Route Designation Project Design Criteria for 'No effect' or 'May affect Not Likely to Adversely Affect' determinations (October 2006)." The U.S. Fish and Wildlife Service has concurred with the determination of May Affect Not Likely to Adversely Affect when the Project Design Criteria are followed (see project record).

Forest Service Sensitive Species

The following ten species are within the project area and are discussed (along with habitat requirements and effects) in this document. The 1998 Forest Service Sensitive Species list has been updated six times since 1998.

Bald eagle	*Haliaeetus leucocephalus*
California spotted owl	*Strix occidentalis occidentalis*
American marten	*Martes americana*
Pacific fisher	*Martes pennanti pacifica*
Northern goshawk	*Accipter gentiles*
Great gray owl	*Strix nebulosa*
Willow flycatcher	*Empidonax traillii*
Western red bat	*Lasiurus blossevillii*
Pallid bat	*Antrozous pallidus*
Townsend's big-eared bat	*Corynorhinus townsendii*

Forest Service Management Indicator Species

The ten habitat types, along with the associated management indicator species, are within the project area and are discussed (along with habitat impacts) in this document (8 in this section and 2 in Aquatic Biota section). The Forest Service Management Indicator Species (MIS) list (2007) for the SNF is a representation of habitat and species associated with those habitats. The MIS species are listed in Table 3- 136.

Affected Environment Related to Current Motorized Use

Some of the threatened, endangered and sensitive species and habitat for MIS are currently being affected by cross-country motorized use of the SNF. Literature describing the effects of roads and motorized trails upon wildlife have often grouped or categorized species in various ways to describe effects (Knight and Gutzwiller, ed. 1995, Gaines et al. 2003, Wisdom et al 2000). Gaines et al. (2003) categorized species into the following five groups (Table 3- 138) based upon a combination of their biology and interactions with road- and motorized trail-associated factors: (1) old forest associated (or late-successional forest associated) ;(2) wide ranging carnivores species; (3) ungulates (oak-woodland and oak conifer); (4) riparian-associated species; and (5) cavity dependent species. MIS habitats are addressed under the five categories where appropriate. Those habitats that don't fit into a category will be addressed at the end of the chapter. A summary of the types of road- and trail-associated effects is presented in Table 3- 137.

Table 3- 137. 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
Collisions	Harvest	Mortality or injury resulting from a motor vehicle running over or colliding with an animal	• **Wide-ranging carnivores** • **Late successional species** • **Aquatic-Riparian species** • **Ungulates**
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** • **Late successional species** • **Aquatic-Riparian species** • **Ungulates**
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**

Road and Trail – Associated factors[1]	Activity Type[2]	Definition of Associated Factors	Wildlife Group Affected
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 carnivores** • **Late successional** • **Aquatic -Riparian 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** • **Late successional** • **Aquatic-Riparian associated** • **Ungulates** • **Oak-associated** • **Snag-dependent species**
Physiological response	Disturbance	Increase in heart rate or stress hormones when near a road or trail or network of roads or trails	• **Ungulates** • **Late successional** • **Aquatic-Riparian associated** • **Wide-ranging species** • **Oak-Associated** • **Snag-dependent**

[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.

Table 3- 138 displays the wildlife groups and the associated species representatives that will be discussed in the EIS.

Table 3- 138. Wildlife Group and Species Represented Within Groups

Wildlife Group	Species[1]
Late-successional forest associated species	California spotted owl, northern goshawk, great gray owl, American marten, Pacific fisher, northern flying squirrel*, blue grouse*
Wide-ranging carnivores	Mule deer
Ungulates (Oak-woodland and oak-conifer associated species)	Bald eagle, great gray owl, willow flycatcher, yellow warbler*, Western red bat, Townsend's big eared bat
Riparian-associated species	Pallid bat, hairy woodpecker**, Townsend's big-eared bat
Cavity-dependent species	California spotted owl, northern goshawk, great gray owl, American marten, Pacific fisher, northern flying squirrel*, blue grouse*

[1.] *Some of the species that are listed in the wildlife group will be addressed in the MIS section of this chapter, under the applicable MIS habitat or ecosystem component. Further detail is available in the MIS Report (Strand and Sanchez 2010), which can be found in the project record.

Zone Of Influence

It is important to keep in mind that impacts from roads and motorized trails vary significantly depending on the purpose, type, width, length, location (ridgetop, mid slope, bottom), type and amount of maintenance, and developmental stage (newly constructed, maintained, decommissioned, abandoned). Geology, topography, and climate play an important role in road stability and impact, as does the degree and type of interaction with stream networks (USDA 2003a). Degree of impact also depends upon road/trail density (USDA FS 2000). Therefore, caution must be taken when generalizing about the environmental effects of a road or motorized trail.

It is also important to determine the effective width, or zone of influence, of a road or motorized trail before determining the degree of impact upon wildlife. One must consider: (1) not only the width of the road or trail itself, but also (2) the area disturbed by construction (i.e. road banks), and (3) the distance that wildlife is disturbed and/or habitat use is modified or avoided (USDA FS 2000). The distance that an animal must be from a road or trail to remain undisturbed or behaviorally unmodified by it depends on the species. Many of the studies have focused on species that do not occur on the SNF (such as elk, grizzly bear, gray wolf, big horn sheep, and northern spotted owl); however, they can be used to provide a general idea of the degree and diversity of road effects upon wildlife. There is a table displayed in the MIS report (Strand and Sanchez 2010) showing the species, distance of displacement/impact, road density impacts and the references.

The zone of influence (ZOI) for the species discussed in this analysis is ¼ mile on either side of center line (1/2 mile corridor) around existing and proposed additions to the NFTS (USDA 2003a). 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, trails and areas (facilities). Motorized facilities 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 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 (as applied using GIS analysis). The zone of influence is a relative index of habitat effectiveness used to compare alternatives (see Indicator #4).

The ¼ mile ZOI should cover a large enough area to encompass habitat taken out of effective use in highly motorized Open Areas where disturbance to wildlife has the potential to be the greatest. Beyond the ¼ mile ZOI, it is likely that there would be enough vegetative screening to decrease an animal's sensitivity to disturbance, thereby permitting the animal to effectively use habitat beyond that point.

Affected Environment – by Terrestrial Biota Indicator

The SNF Motorized Travel Management (MTM) Project proposes to: (1) prohibit cross-country travel; (2) add some roads and motorized trails to the NFTS; (3) make changes to the NFTS including changing seasonal open period and vehicle class on some NFTS roads and motorized trails and; (4) make non-significant LRMP amendments (Note: The analysis of aquatic wildlife habitats (Lacustrine/Riverine and Meadow Habitats) are covered under the aquatics section of this document.

Table 3- 139 below shows the existing condition and proposed changes for the Travel Management FEIS. The comparison between alternatives and direct and indirect effects are based on these numbers. Changes to vehicle class and non-significant changes to the LRMP do not affect terrestrial wildlife (as previously explained) and, thus, are not reflected in the table.

Table 3- 139. Differences between Alternatives in Allowable Motorized Use within the Analysis Area

	Acres Open to Motorized Cross-country Travel	Number and Acres of unauthorized Open Areas that Can Receive Motorized Use Under Allowable Cross-Country Travel	Number and Acres of FS Managed Open Areas	Miles of Unauthorized Routes that Can Receive Motorized Use Under Allowable Cross-Country Travel	Miles of NFTS Roads and Motorized Trails (miles of roads and motorized trails added to the NFTS that are included in total)	Miles of NFTS Roads and Motorized Trails with Seasonal Closures (changes in seasonal closures)	Miles of NFTS Roads and Motorized Trails Closed to Vehicles Year-round (changes in year-round closures)	Miles and Density of All Motorized Facilities in Analysis Area (1)	
								Miles	Density
Alt.1	605,000	2900 consisting of 965 acres	59 consisting of 124 acres open to OHV	552	2,504 (+0)	470 (+0)	236 (+0)	3,530	2.82
Alt.2	0	0	60 consisting of 131 acres open to OHV use	0	2,548 (+44)	986 (+516)	446 (+210)	3,016	2.41
Alt.3	0	0	59 consisting of 124 acres open to OHV	0	2,504 (+0)	470 (+0)	236 (+0)	2,972	2.38
Alt.4	0	0	70 consisting of 161 acres open to OHV use	0	2,555 (+51)	1,568 (+1,098)	418 (+182)	3,023	2.42
Alt.5	0	0	79 consisting of 232 acres open to OHV use	0	2,589 (+85)	1,625 (+1,155)	418 (+182)	3,057	2.45

(see next page for key)

NFTS =National Forest Transportation System

(1) Density calculations provided in the last column include: (1) all NFTS roads and motorized trails including those that are closed year-round and seasonally closed; (2) private roads maintained by residents, Southern California Edison (SCE) or Pacific Gas and Electric (PG&E); (3) roads maintained by County, State, National Parks, Bureau of Land Management and other Federal Agencies; and (4) For Alternative 1 ONLY, unauthorized routes that will continue to receive use under allowable motorized cross-country travel.

Table 3- 140. Acres and Percent Terrestrial MIS Habitat Impacted by Motorized Travel by each Alternative.

	Shrubland Habitat	Montane Hardwood Habitat	Riparian Habitat	Early Seral Coniferous Forest Habitat	Mid Seral Coniferous Forest Habitat	Late Seral Open Canopy Coniferous Forest Habitat	Late Seral Closed Canopy Coniferous Forest Habitat	Green Forest Snag Habitat
Alt.1	32,297 (64%)	150,928 (74%)	198 (75%)	40,642 (100%)	265,455 (86%)	1,320 (63%)	54,451 (82%)	149,643 (40%)
Alt.2	19,428 (38%)	91,013 (45%)	178 (67%)	24,992 (62%)	163,864 (53%)	879 (42%)	32,593 (49%)	128,393 (34%)
Alt.3	21,953 (43%)	101,671 (50%)	177 (67%)	26,460 (66%)	185,015 (60%)	1,036 (49%)	37,513 (57%)	126,157 (34%)
Alt.4	18,575 (37%)	79,819 (39%)	160 (61%)	22,767 (56%)	152,699 (50%)	847 (40%)	30,346 (46%)	128,881 (34%)
Alt.5	21,210 (42%)	93,038 (46%)	170 (64%)	28,146 (70%)	184,593 (60%)	978 (47%)	36,375 (55%)	130,623 (35%)

Environmental Consequences – General

For the no action alternative, direct and indirect effects focus on unauthorized routes that will likely continue to receive public motorized use under continued cross-country travel. For the action alternatives, direct and indirect effects focus on roads and motorized trails added to the NFTS in that alternative. Effects related to proposed changes to the NFTS are addressed under each alternative for each species or habitat component.

Table 3- 141 lists the design features that will be implemented with each alternative. The determinations for threatened, endangered and Forest Service sensitive species are made based on these being implemented. The design features have been incorporated into the season of use applied to each facility (see Appendix A).

Table 3- 141. Design Features for Terrestrial Biota

Resource Issue Code	Title	Design Features
WL-1	Noise disturbance to territorial or nesting goshawks.	Seasonal closure from Feb 15-Sept 15. Consult with district biologist to determine if nesting is occurring or surveys need to be conducted.
WL-2	Noise disturbance to territorial or nesting California spotted owl	Seasonal closure from Mar 1- Aug. 15. Consult with district biologist to determine if nesting is occurring or surveys need to be conducted.
WL-3	Noise disturbance to territorial or nesting Great Gray owls	Seasonal closure from Mar 1- Aug. 15. Consult with district biologist to determine if nesting is occurring or surveys need to be conducted.
WL-4	Noise disturbance to deer in holding areas	Seasonal closures for: -Deer holding areas above 5,000 feet elevation – May 15 to June 15 and October 1 through November 30. -Deer holding areas below 5,000 feet elevation – May 1 to June 1 and October 15 to November 30.
WL-5	Noise disturbance to deer in winter ranges	Seasonal closures in deer winter range from December 1 through April 30

Road, Motorized Trail and Unauthorized Route Density

The table below shows the road, motorized trail and unauthorized route density (including unauthorized routes in Alternative 1) (mi/sq. mi.) by alternative within the analysis area. The density includes all jurisdictions on forest (BLM, County, Forest Service, Private, State and SCE). The difference between Table 3- 142 and Table 3- 143 is that all the analysis area does not necessarily fall into a MIS vegetation type.

Table 3- 142. Road, Motorized Trail and Unauthorized Route Density in the Project Area by Alternatives including all Jurisdictions

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
2.82 mi/sq. mi.	2.41 mi/sq. mi.	2.38 mi/sq. mi.	2.42 mi/sq. mi.	2.45 mi/sq. mi.

Table below shows the road density within MIS vegetation type separated by roads, motorized trails and unauthorized routes.

Table 3- 143. Road, Motorized Trail and Unauthorized Route Density in MIS Habitat Types by Alternatives Including all Jurisdictions

Vegetation Type	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Shrubland Motorized Routes	2.39 mi/sq. mi.	2.04 mi/sq. mi.	2.04 mi/sq. mi.	2.06 mi/sq. mi.	2.08 mi/sq. mi.
Oak-associated Hardwood and Hardwood/conifer Motorized Routes	2.16 mi/sq. mi.	1.84 mi/sq. mi.	1.81 mi/sq. mi.	1.83 mi/sq. mi.	1.87 mi/sq. mi.
Riparian Motorized Routes	3.78 mi/sq. mi.	3.66 mi/sq. mi.	3.66 mi/sq. mi.	3.66 mi/sq. mi.	3.66 mi/sq. mi.
Early Seral Coniferous Motorized Routes	4.60 mi/sq. mi.	3.95 mi/sq. mi.	3.83 mi/sq. mi.	3.94 mi/sq. mi.	4.00 mi/sq. mi.
Mid Seral Coniferous Motorized Routes	3.09 mi/sq. mi.	2.73 mi/sq. mi.	2.69 mi/sq. mi.	2.74 mi/sq. mi.	2.76 mi/sq. mi.
Late Seral Open Canopy Coniferous Motorized Routes	2.50 mi/sq. mi.i	2.33 mi/sq. mi.	2.33 mi/sq. mi.	2.33 mi/sq. mi.	2.33 mi/sq. mi.
Late Seral Closed Canopy Coniferous Motorized Routes	2.70 mi/sq. mi.	2.40 mi/sq. mi.	2.38 mi/sq. mi.	2.40 mi/sq. mi.	2.43 mi/sq. mi.

Calculations for Alternative 1 include existing unauthorized routes because use of these routes can be assumed to continue as part of continued cross-country travel.

Direct and Indirect Effects – General for Terrestrial Biota

In recent years, the increasing demand for motorized recreational opportunities on National Forest System lands has led 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 (e.g., mule deer). Most commonly, interactions included displacement and avoidance where animals were reported as altering their use patterns in response to roads. Disturbance at specific sites are also commonly reported, such as disruption at breeding or wintering sites. Collision with vehicles is another common report. Edge effects and habitat fragmentation, especially in regard to late-successional forests, is another commonly identified impact of roads. The broad general impacts of wheeled motorized roads and trails to wildlife species are summarized here (Trombulak and Frissell 2000). Details and research citations are available in Terrestrial BE/BA (Sorini-Wilson 2010).

- Increased terrestrial species mortality from collision with vehicles
- Modification of animal behavior
- Alteration of the terrestrial habitat
- 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 for mortality or injury from vehicle related collisions. 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 paved roads and highways.

Road and motorized 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.

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 motorized trails that are only used by high clearance four-wheel drive, motorcycle and all-terrain vehicles (ATVs). Other wildlife is more sensitive to the latter. In general, all roads and motorized trails, depending on the type of vehicle and the amount of use, have some type of positive or negative impact on wildlife.

The most common interaction identified in literature between roads and motorized trails and wildlife species was 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 and Pelton 1989, McLellan and 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 with 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 wheeled vehicles to terrestrial wildlife can include disturbance from noise generated by motor vehicles. 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, magnitude and location and 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 2002, Steidl and

Powell 2006). Effects of noise can cause physiological responses in wildlife including increased heart rate and altered 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 motorized trail-associated noise have 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 656 foot (200 meter) distance. While other studies (Noss 2000 and Knight and Gutzwiller 1995) reported 1300 to 3000 feet is the distance at which deer and elk are impacted by roads (Further details in Strand and Sanchez 2010). 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.

Forest roads and motorized 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 Terrestrial Wildlife Habitats

Forest roads and motorized trails can both enhance and decrease habitat for wildlife (Jalkotzy et al. 1997). The road or motorized 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 motorized 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 upon which wildlife feed.

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 road densities include increased harvest including allowed and prohibited, disturbance/harassment from noise and habitat alteration. Brocke et al. (1988) reported that high road densities can elicit a variety of negative impacts on certain wildlife species. These effects include human disturbance. In Adirondack counties, the black bear population density index 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.

The science available to describe the interactions between focal wildlife species and roads is more developed than that available to describe the interactions between focal wildlife species and recreation trails. Much of the research has been focused on wide-ranging carnivores and ungulates. Other lesser known species could benefit from additional research on the effects of roads; this is especially true for less mobile species where roads may inhibit movements or fragment habitats.

Disturbance at a specific site was also commonly reported and included disruption of animal nesting, breeding or wintering areas (Linnell et al. 2000, Papouchis et al. 2001, Skagen et al. 1991). Collisions between animals and vehicles were commonly reported and affected a diversity of wildlife species, from large mammals (Gibeau and Heuer 1996, Lehnert et al. 1996) to amphibians (Ashley and Robinson 1996). Finally, edge effects associated with roads or road networks constructed within habitats, especially late-successional forests, were commonly identified (Hickman 1990, Miller et al. 1998).

Late-Successional Forest Associated Species

This species group is associated with mature-to-old forests that contain characteristics of late-successional stages. These characteristics include large trees for a given growing site, relatively high canopy closure and elevated amounts of decadence in the form of snags, down logs, in-tree decay and deformity. The SNF Bioregional MIS Report (USDA Forest Service 2008b) separated late-successional forests into two MIS habitat types 1) Late Seral Open Canopy Coniferous Forest Habitat and 2) Late Seral Closed Canopy Coniferous Forest habitat. This section of Chapter 3 will discuss the two late-successional forest habitat types and associated TES (California spotted owl, Northern goshawk, Great gray owl, American marten, and Pacific fisher) and MIS wildlife (blue grouse and Northern flying squirrel).

California Spotted Owl – Affected Environment

The California spotted owl is designated by the Regional Forester as a sensitive species and is selected as a Management Indicator Species on the SNF. The SNF has 234 designated California spotted owl Protected Activity Centers (PACs) and 228 Home Range Core Areas (HRCAs). Protected Activity Centers are delineated around spotted owl territorial pairs or territorial individuals and are compromised of the best available habitat encompassing 300 acres. The Sierra Nevada Forest Plan Amendment (USDA-FS 2004a) provides direction to designate PACs and HRCAs compromised of the best habitat using California Wildlife Habitat Relationships (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 65,950 acres of suitable spotted owl habitat with CWHR types 6, 5D, 5M, 4D and 4M within the analysis area.

The SNF has conducted surveys for spotted owl presence and reproductive status across the forest since the early 1980s. Approximately 200,000 acres of suitable habitat, which includes 3D and 3M habitat types, has been surveyed on the SNF following Pacific Southwest Region, USDA Forest Service Protocol.

Additional information can be found in the BE/BA (Sorini-Wilson, 2010).

California Spotted Owl – Environmental Consequences

The following indicators were chosen to provide a relative measure of the direct and indirect effects to the owl. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Miles of roads and motorized trails added to the NFTS within PACs.
- Number of PACs intersected by roads and motorized trails added to the NFTS (Percentage of all PACs in Zone of Influence).
- Acres of roads and motorized trails added to the NFTS within ¼ mile of PACs. A ¼ mile buffer was placed on each side of the road and motorized trail which would

allow for a polygon to be developed and then a calculation would occur through GIS to convert miles to acres.

- Number of PACs occurring within ¼ mile of roads and motorized trails added to NFTS.
- Percentage of spotted owl PACs (total acres) occurring within ¼ mile 'zone of influence' (ZOI); of roads and motorized trails added to the NFTS.
- Standard and Guideline #82 has been met because each road and motorized trail was evaluated on how it lays on the landscape in coordination with the PACs and nest sites. If a road or motorized trail was within ¼ mile of a nest site or if the nest site information was greater than 5 years old then a seasonal restriction was applied from March 1 through August 15. According to the spotted owl protocol if the nest site is greater than 5 years old then a survey would need to be conducted (WL-2).

Studies reviewed by Gaines et al. (2003) indicated that northern spotted owls were likely to be affected by the following road and motorized trail-associated factors: Collisions, disturbance at a specific site, physiological response, edge effects and snag reduction. These same factors, as well as "habitat loss and fragmentation" are expected to affect California spotted owls based upon review of the available literature (Verner et al. 1992, Blakesley 2003, Seamans 2005).

Direct Effects

Disturbance: California spotted owls could be disturbed during the nesting season by cross-country travel. Disturbance could lead to reduced time on the nest, thereby threatening eggs or young, with exposure. Disturbance from off-road travel would typically occur in daylight when owls are in the resting portion of the diurnal cycle. Off-road disturbance impacts are limited by the heavily timbered areas where spotted owls nest. In general, these impacts are possible but not likely because the design feature associated with Resource Issue Code WL- 2 is in place to reduce the noise disturbance during the breeding cycle. The minor possibility of off-road disturbance impacts would have no measurable impact on long-term population parameters; therefore, the effect on northern spotted owls of continued cross-country travel is negligible and discountable (same assumption for California spotted owl) (Modoc EIS, Turner 2009, USDA-FS 2009b).

The seasonal closure will be implemented where known nest sites are adjacent to roads and motorized trails or where the surveys are greater than 5 years old, and according to the protocol, should be surveyed to determine current nest location.

The issue of elevated sound and visual disturbance of forest wildlife species remains a complex and poorly understood subject. The Forest Service, Region 5, has generally assumed that activities (including road and trail use) occurring farther than ¼ mile from a spotted owl nest site have little potential to affect spotted owl nesting (USDA-FS 2004a). This distance corresponds to the mean distance at which Mexican spotted owls were found to show an alert response to noise disturbance from chainsaws (Delaney et al. 1999). In addition, Wasser et al. (1997) found that stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located less than ¼ mile from a major logging road compared to spotted owls in areas greater than ¼ mile from a major logging road. Preliminary results from studies of motorcycle use in proximity to northern spotted owl nest sites show similar findings. These effects are likely more significant for male than for female spotted owls, and appear to be more significant in May when the chicks are still in the nest than in July when they have fledged and have some ability to escape the disturbance (Hayward and Wasser 2008). Chronic high levels of stress hormones may have negative consequences on reproduction or physical conditions of birds

through these effects are not well understood (Marra and Holberton 1998, Gaines et al. 2003, USDI Fish and Wildlife Service 2006).

Short-term responses in birds, as stated by Bowles in Knight and Gutzwiller (1995), have a similar (short-term) continuum of responses as mammals; at the mildest level, they alert. Next, they exhibit mild aversion by flipping their wings (intention movements to fly), pecking at each other and walking, swimming or flying short distances. More intense aversion triggers longer movements, crouching on the nest, attacks on conspecifics or on the source of the disturbance (raptors, terns) and long interruptions of normal behavior. In the extreme case, individuals or flocks respond with panic flight or running.

Indirect Effects

Habitat loss, fragmentation and edge effects: Studies have shown California spotted owls to be sensitive to changes in canopy closure and habitat fragmentation (Seamans 2005, Blakesley 2003, North et al. 2000), which could result from road networks. Roads and motorized trails can result in a decrease in interior forest patch size, decreasing the amount of habitat increasing the distance between suitable interior forest patches for old forest species like the California spotted owl. As migration between suitable habitat patches becomes more difficult, suitable habitats are less likely to remain occupied over time (Reed et al. 1996, Zabel et al. 1992). Trails, with their narrower width, result in little or no reduction in forest canopy and would therefore be unlikely to result in a negative edge effects or habitat fragmentation as compared to roads.

Table 3- 144. Proposed Additions to the NFTS for Alternatives (2, 4 and 5) that Intersects Protected Activity Centers (PACs)

PAC	Alt 2	Alt 4	Alt 5
FR112	0	.60	.60
MA020	0	.82	.82
MA025	3.0	.24	1.7
MA026	.24	.41	.42
MA074	.05	.05	.05
MA075	0	.66	.66
MP008	.76		
MP043	.56	.56	.56
MP080	.24		
Total	**4.85 mi**	**3.34 mi**	**4.81 mi**

ALTERNATIVE 1 – NO ACTION

Effects due to Continued Cross-country Motor Vehicle Travel: Cross-country travel would not be prohibited under this alternative. Therefore, it is assumed the route proliferation would continue over the short and long-term and the effects of the unauthorized routes would be similar to those discussed under adding roads and motorized trails to the NFTS. Because 605,000 acres of the SNF would be open to cross-country motor vehicle travel, it is likely that there would be the continued use of 552 miles of unauthorized routes and 125 acres of Open Areas under this alternative. There are 209 PACs or HRCAs that intersect with some portion of a roads and motorized trails or Open Areas within this alternative. There are 23,833 acres affected by unauthorized routes within ¼ miles of PACs. The acres reflect buffer overlap between unauthorized routes. There are two Open Areas that are within a HRCA, however, the Open Areas are adjacent to the road and have been in existence for some time and don't appear to affect the owls. The nest site is greater than 1 mile from the Open Areas.

Effects Due to Additions to the NFTS: Under this alternative, there are no roads, motorized trails, or Open Areas proposed for addition to the NFTS; therefore, there will be no effects.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the NFTS. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effects on spotted owls within the zone of influence for each PAC and associated habitat.

ALTERNATIVE 2 – PROPOSED ACTION

Effects due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to the NFTS roads and motorized trails. It would limit the proliferation of unauthorized routes near spotted owl activity centers, PACs and suitable habitat. This would reduce the risk of direct and indirect effects to the spotted owl from motorized travel over the short and long term; which in turn, is a beneficial effect for spotted owls.

In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects Due to Additions to the NFTS: Under this alternative, there are 44 miles of roads and motorized trails and 6 acres of Open Areas proposed for addition to the NFTS. Of the 44 miles added, 11 miles are within three Spotted Owl PACs and eight HRCAs (less than 1 percent or 3 of 234 total PACs and 4 percent or 8 of 228 total HRCAs) (See Table 3- 145 below). The 6 acres of Open Areas are not within any PAC. None of the roads, motorized trails, or Open Areas are within ¼ mile of known nest sites. Since roads and motorized trails proposed within this alternative are native surfaced with slower rates of travel, they would not likely result in any human-caused mortality, but would likely increase minor disturbance to some roosting owls within the analysis area. Although actual disturbance effects will be largely influenced by site-specific factors, it is assumed that all roads and motorized trails within owl habitat may result in minimal disturbance to roosting owls.

Table 3- 145. California Spotted Owl Indicators – Alternative 2

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within PACs/HRCAs	11 miles
Number of PACs/HRCAs intersected by roads and motorized trails added to the NFTS.	9 PACs/ 10 HRCAs
Acres of added facilities ZOI in PACs	5,352 acres
Number of PACs occurring within ¼ mile of the ZOI added to NFTS	8
Percentage of spotted owl PACs (total acres) occurring within ¼ mile 'zone of influence' of roads and motorized trails added to the NFTS	3%

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Changes to vehicle class are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck or motorized recreation vehicle, is assumed to provide the same magnitude of impact for this analysis.

Changes to the NFTS that have a positive effect on spotted owls are seasonal closures to NFTS roads and motorized trails within the zone of influence for each spotted owl PAC and associated

habitat. In addition, some NFTS roads and motorized trails are proposed to prohibit use (closed year-round); this will also have a positive effect on spotted owls because noise disturbance would not occur and potential harassment by vehicles passing by would not occur.

When there is a change of seasonal closure, there are more restrictive timeframes. There are 446 versus 236 miles of NFTS roads with year-round closures and 986 versus 470 miles of NFTS roads and motorized trails which will be seasonally opened. This is a benefit to wildlife because more habitat will have less disturbance. There would be fewer disturbances to nesting birds as discussed above.

Although the exact timing may vary, spotted owls start nesting near the month of March. Since seasonal closure would overlap the beginning of the nesting period and approximately 98 percent of the spotted owl PACs would be within the closures, it would reduce disturbance to owl within the PACs.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes near spotted owl activity centers and PACs. This would reduce the risk of direct and indirect effects to the spotted owl from motorized travel over the short and long term. Direct and indirect effects are the same as described in Alternative 2.

In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects Due to Additions to the NFTS: Under this alternative, there would be no new roads, motorized trails, or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the spotted owl.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS; therefore, the effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes near spotted owl activity centers and PACs. This would reduce the risk of direct and indirect effects to the spotted owl from motorized travel over the short and long term. The effects are the same as described in Alternative 2.

In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects Due to Additions to the NFTS: Under this alternative, there would be 51 miles of motorized trails and roads and 37 acres (11 Open Areas) proposed for addition to the NFTS. Of those 51 miles approximately 7 miles would be added to the NFTS that intersect with 13 Spotted Owl PACs/HRCAs. None of the added roads, motorized trails or areas intersects with nest sites. There are two Open Areas that have been established for years within a HRCA. There will be no additional effects to owls because the nest site is greater than 1 mile from the area. Current data does not show owl sightings within ¼ mile of Open Areas.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to

wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Under this alternative, the change to seasonal open period would be a benefit to spotted owls because the roads and motorized trails would be closed during the important breeding times which in turn would be less noise disturbance. There are 552 miles of NFTS roads closed year-round and 1512 miles of roads seasonally closed under this alternative. The ZOI would be less because the roads and motorized trails would not be open during important incubation and nesting times. Under Alternative 1, 236 miles of NFTS roads are closed year-round, and 470 are seasonally closed. There are 140 miles of prohibited roads (roads closed year-round) within the PACs due to the design criteria, associated with Resource Issue Code WL-2 or due to wet weather closures.

Table 3- 146. California Spotted Owl Indicators – Alternative 4

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within PACs	7.4 miles
Number of PACs/HRCAs intersected by roads and motorized trails added to the NFTS	5 PACs/8 HRCAs
Acres of roads and motorized trails added to the NFTS within ¼ mile of PACs	5,352 acres
Number of PACs occurring within ¼ mile added to NFTS (ZOI)	7
Percentage of spotted owl PACs (total acres) occurring within ¼ mile 'zone of influence; of roads and motorized trails added to the NFTS	3%

Overall, Alternative 4 has beneficial effects to spotted owls because the least amount of habitat and PACs are being impacted.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Direct and indirect effects are the same as described in Alternative 2.

In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects Due to Additions to the NFTS: Under this alternative, there are 85 miles of roads and motorized trails proposed for addition to the NFTS. There would be less noise disturbance to owls because there would be less vehicles accessing suitable habitat compared to Alternative 1. The design feature, associated with Resource Issue Code WL-2 is in place to help alleviate some of the disturbance to known nest sites.

This alternative also adds the most Open Areas (105 acres (20 areas)) across the SNF. These areas can be used for staging prior to events or overnight use after an event. Spotted owls are nocturnal and it could disrupt their flight pattern for foraging; however, they may return to the area once vehicles have left. Of the 20 areas, two are within HRCA FR119, and are greater than 1 mile from the current nest site location.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** The changes that occur under this alternative would open NFTS

roads or trails which have the potential to disrupt behavior patterns for the spotted owls. They could disperse from an area while noise disturbance occurs and return at a later time. Under this alternative the most changes occur which is opening more area for vehicles and this in turn opens more habitat compared to the action alternatives which could affect the owls nesting or foraging behavior over time. Compared to Alternative 1, there is less habitat that will be affected because less habitat is opened for vehicles. Use will be prohibited on 418 miles of NFTS roads and motorized trails that would be closed year-round. This is compared to Alternative 1 in which 236 miles of roads and motorized trails are closed year-round. An additional 1161 miles more seasonal closures will occur under this alternative than Alternative 1. Of the 418 miles of roads closed year-round, 92 miles are prohibited in PACs. This was implemented with the design feature, associated with Resource Issue Code WL-2 or it was closed year-round for wet weather closures.

Table 3- 147. California Spotted Owl Indicators – Alternative 5

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within PACs	12.6 miles
Number of PACs/HRCAs intersected by roads and motorized trails added to the NFTS	6 PACs/12 HRCAs
Acres of roads and motorized trails added to the NFTS within ¼ mile of PACs	5,352 acres
Number of PACs occurring within ¼ mile of ZOI of roads and motorized trails added to NFTS	19
Percentage of spotted owl PACs (total acres) occurring within ¼ mile 'zone of influence; of roads and motorized trails added to the NFTS	8%

Table 3- 148. Seasonal and Prohibited (Closed Year-Round) Changes to NFTS roads which intersect Spotted owl PACs

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Miles of Prohibited Roads	0 miles	110miles/58,764 acres	0	110 miles/58,764 acres	92 miles/48,437 acres
Seasonal closures to protect spotted owl PACs	no	no	no	yes	yes

Cumulative Effects

Overall adding facilities to the NFTS in combination with all the other activities on the SNF will have a minor change to spotted owl habitat or species because it is a negligible amount. It is less than 1 percent of the PACS/HRCAs that are affected by this project. The affect of the action is small enough that it is not contributing to the cumulative effects to the species. Also as shown in Table 3- 165 with regards to percent improvement in late seral closed canopy coniferous forest habitat in comparison to the No Action alternative, the action alternatives would increase the amount of effective habitat for the spotted owl.

In the Notice of Finding on a petition to list the California spotted owl, the USFWS identified that loss of habitat to large forest fires and habitat modification for fuels reduction were the primary risk factors to California spotted owls occurring on NFS lands (USFWS 2006a). Appendix E

provides a list and description of past, present and reasonably foreseeable projects on the Forest and private lands within the SNF boundary. Some, but not all, of these activities will contribute to effects upon California spotted owls.

The effect of motorized trails on spotted owl populations or habitats was not identified as a significant risk factor by either the Forest Service or the USFWS. However, given the proportion of spotted owl nest sites and habitat potentially affected and considering the projections for future increases in recreation uses and OHV activity, Alternative 1 may, over time, contribute to cumulative effects upon spotted owl populations. Because Alternative 1 does not restrict vehicles to designated facilities, there is a high degree of uncertainty about future route proliferation in owl habitat which may have disturbance and habitat effects beyond the effects of routes open to motorized use. Alternative 1 presents the greatest risk of contributing to adverse cumulative effects upon spotted owl habitat and populations because there would not be a prohibition on cross-country travel. Alternative 3 contributes the least to cumulative effects because cross-country travel would be prohibited, open route densities in spotted owl habitat are lowest and no roads or motorized trails would be designated. Alternatives 2, 5 and 4 would result in progressively lower risk to spotted owls due to the amount of roads and motorized trails being added to the system. Considering the proportion of spotted owl habitat influenced by motorized roads and motorized trails and projections for future increase in recreation uses and OHV activity, the alternatives may result in minor cumulative impacts when combined with other past, present and reasonably foreseeable future actions that affected spotted owl habitat. Although the action alternatives may result in cumulative impacts, they are very minor in comparison to existing road, motorized trails and unauthorized route densities and other potentially significant impacts (fire, fuels/vegetation treatments).

Fire records show since 1911, approximately 31,000 acres have burned in PACs and 15,000 acres have burned in HRCAs regarding spotted owl habitat.

Northern Goshawk – Affected Environment

The northern goshawk is designated as a Forest Service Sensitive Species in the Pacific Southwest Region. There are currently 65,950 acres of suitable goshawk habitat on the SNF as defined by CWHR types 4M, 4D, 5M, 5D. The SNF does not have CWHR 6. Northern goshawk territories are managed on the SNF as Protected Activity Centers (PACs) as prescribed by the SNFPA (USDA-FS 2004a). To date, the SNF has 55 known northern goshawk PACs and territories. As of 1998, 20 of the 55 territories have been incorporated into the Regional Forest Service database. They were included for submittal to the regional database based on the following criteria: 10 have at least one active nest site for which the nest location is known; four are historical nest sites for which the nest location is unknown; four are based on observations of young; two are based on observations of territorial defense or repeated sightings. The remaining 35 are based on incidental sightings of goshawk and/or suitable goshawk habitat. Additional information can be found in the BE/BA (Sorini-Wilson, 2010).

Northern Goshawk – Environmental Consequences

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the Northern goshawk. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Miles of roads and motorized trails added to the NFTS within PACs.

- Number of PACs intersected by roads and motorized trails added to the NFTS (Percentage of all PACs in Zone of Influence).
- Miles of roads and motorized trails added to the NFTS within ¼ mile of PACs
- Number of PACs occurring within ¼ mile of roads and motorized trails added to NFTS.
- Percentage of goshawk PACs (Total acres) occurring within ¼ mile ZOI of roads and motorized trails added to the NFTS.
- Standard and Guideline #82 has been met because each route was evaluated on how it lays on the landscape in coordination with the PACs and nest sites. If a road and motorized trail was within ¼ mile of a nest stand, a seasonal restriction was applied from February 15 through September 15. If the nest site information was greater than one year old, then a survey was conducted to see if the nest stand could be located and then the seasonal restriction was applied, associated with Resource Issue Code WL-1 within the season of use.

Direct and Indirect Effects

Disturbance: Northern goshawks actively defend nest sites during portions of the breeding season. Cross-country travel could lead to direct effects by disturbance that disrupts pair-bonding, cause exposure of eggs or young to inclement weather and increases adult energy expenditures. Little published information exists regarding the sensitivity of northern goshawks to nest site disturbances from recreational activities.

Human disturbance has the potential to cause goshawks to abandon nesting during the nesting and post fledgling period (February 15 through September 15). Goshawks initiate breeding when the ground is still covered in snow and sometimes they locate their nests 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 motorized recreation activities begin. Joslin and Youmans (1999) recommend maintaining low road densities to minimize disturbance to goshawk. Grubb et al. (1998) reported that vehicle traffic on roads more than ¼ mile from nests did not elicit any discernable behavioral response from goshawks.

There may be disturbance, however, the seasonal closure will be implemented (Feb 15 – Sept 15) as design feature where known nest sites are adjacent to roads or motorized trails or where there is potential for disturbance. The purpose of implementing the design feature is to reduce noise disturbance to goshawks.

Habitat loss, fragmentation and edge effects: The major threat to northern goshawks at the present time, involves the effects of vegetation management (e.g. timber harvest, fuels treatments) and wildfire on the amount, distribution and quality of habitat (DeStefano 1998).

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 it can fragment habitat. Fragmented habitat, in turn, can cause edge effect, where the goshawk may avoid areas because an area is too open being at the edge of habitat. They are more likely to hunt and nest in habitat with closed canopy. Compared to smooth surface roads, native surface roads probably do not pose as much risk of habitat fragmentation due to their narrow width relative to the natural tree spacing in late-seral forests.

Trails, with their narrower width, result in little or no reduction in forest canopy and would therefore be unlikely to result in a negative edge effects or habitat fragmentation as compared to roads.

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Cross-country travel would not be prohibited under this alternative; therefore, it is assumed the route proliferation would continue over the short and long term. No NFTS intersect known goshawk nests. There are 552 miles of unauthorized routes and 125 acres of 59 Open Areas.

Effects Due to Additions to the NFTS: Under this alternative, there are no roads, motorized trails, or Open Areas identified for addition to the NFTS; therefore, there would be no direct or indirect effects to goshawks.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the NFTS. Closure conditions would not change; therefore, there would be no direct and indirect effects to the Northern goshawk. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effects on goshawks within the zone of influence for each PAC and associated habitat.

ALTERNATIVE 2 – PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes near goshawk activity centers, territories and preferred habitat. This would reduce the risk of direct and indirect effects to goshawks from motorized travel over the short and long-term.

In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects Due to Additions to the NFTS: The SNF has monitored nest sites in proximity to some roads and trails. There are 14 NFTS roads and motorized trails that will be added and intersect goshawk territories (175 ac) or PACs (200 ac) (See Table 3- 149 below).

Proposed motorized trail KD-122 (Alternatives 2 and 5) has the most potential to disturb goshawks because it is adjacent to a historical nest site. The goshawks have not been there for at least three survey years (Sorini-Wilson, 2010). The roads and motorized trails that are listed in Table 3- 149 intersect territories or PACS but not known nest sites.

Actual nest locations are often difficult to locate and may move around from year-to year within a PAC. Therefore, actual nest locations remain unknown for some of the PACs and those nests that have been located may have moved since it was last located.

Since roads and motorized trails proposed within this alternative are native surface roads and motorized trails with slower rates of travel, they would not likely result in any human-caused mortality, but would likely increase disturbance to some roosting goshawks within the project area. Although actual disturbance effects will be largely influenced by site-specific factors, it is assumed that all roads and motorized trails within a PAC may result in disturbance to some goshawks. Therefore, this alternative would result in some level of disturbance within approximately 7 percent (4/55) of the goshawk PACs in the project area. As mentioned, it is assumed that activities greater than ¼ mile away have little potential to affect goshawks. Under this alternative, approximately 7 percent of goshawk PACs (percentage of total PACs) would

occur within the zone of influence of roads and motorized trails. Disturbance resulting from these actions is likely to result in increased flushing from roosts to perches, increased alarm responses and increased stress hormone levels in some individual goshawks; however, applying the seasonal closures associated with Resource Issue Code WL-1 and SW-1 will minimize the disturbance to some individual goshawks.

Table 3- 149. Roads and Motorized Trails Proposed to be Added to NFTS (Alts 2, 4 and 5) that Intersect Goshawk Territories or PACs

Analysis Unit	Alternative	Roads and Motorized Trails	Goshawk Territory or PAC
Westfall	2	PK-5	SIEGH47
Westfall	2,4,5	PK-4	SIEGH47
Westfall	2,5	SR-21z	SIEGH47
	2	SV-2	SIEGH47
Westfall	2,5	JSM107	SIEGH45
Westfall	2,5	SV-1	SIEGH47
	2,5	SV-1b	SIEGH47
Westfall	4,5	SV-1a	SIEGH47
Tamarack-Dinkey	2,4,5	JH-115	SIEGH6
Dinkey-Kings	2,5	KD-122	SIEGH6
Tamarack-Dinkey	2,5	PK-30z	SIEGH21
Tamarack-Dinkey	2,5	PK-31z	SIEGH21
Tamarack-Dinkey	2,5	PK-32x	SIEGH21
Tamarack-Dinkey	2,5	PK-33z	SIEGH21

As discussed under data sources, the roads and motorized trails assessment was conducted, where GIS suggested further field data was needed. Details of field visits and forms are on file at the High Sierra Ranger District, wildlife biology office.

Actions proposed in this alternative would result in some indirect effects through habitat modification. The addition of roads and motorized trails to the NFTS within and near PACs would result in minor amounts of habitat fragmentation. Since the majority of these roads and motorized trails are narrow and native surfaced they would only result in minor reductions in overhead cover and would not significantly reduce goshawk movement between habitat patches.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** Changes to the NFTS that have a positive effect on goshawk are seasonal closures to NFTS roads within the zone of influence for each goshawk PAC and associated habitat. In addition, some NFTS roads are proposed to be prohibited (closed year-round) (see table below titled *Seasonal and Prohibited (Closed Year-Round) changes to NFTS roads Goshawk PACs*); this will also have a positive effect on goshawks. Compared to Alternative 1, there are 446 miles versus 236 miles of year-round closures and 986 versus 470 miles of roads and motorized trails that will be seasonally closed. The table below (Table 3- 150) describes the indicators for Alternative 2.

Although the exact timing may vary, goshawks start nesting near the month of February. Since seasonal closure would overlap the beginning of the nesting period and approximately 90 percent of the goshawks PACs would be within the closures, it would reduce disturbance to goshawks within PACs.

Table 3- 150. Northern Goshawk Indicators – Alternative 2

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within PACs	2.4 miles
Number of PACs or territories intersected by roads and motorized trails added to the NFTS	5
Acres of added roads and motorized trails ZOI in PACs	1969 acres
Number of PACs occurring within ¼ mile of the ZOI of roads and motorized trails added to NFTS	4
Percentage of gohsawk PACs (total acres) occurring within ¼ mile of the 'zone of influence	7%

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Direct and indirect effects are the same as described in Alternative 2.

In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects Due to Additions to the NFTS: Under this alternative, there would be no new roads, motorized trails, or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the goshawks.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS; therefore, the effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes near goshawk PACs and territories. This would reduce the risk of direct and indirect effects to the goshawk from motorized travel over the short and long-term. The effects are the same as described in Alternative 2.

In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects Due to Additions to the NFTS: Under this alternative, 51 miles of roads and motorized trails are proposed for addition to the NFTS. Of those 51 miles approximately 0.2 miles would be added to the NFTS that intersect with goshawk PACs or territories. As seen in the table below (Table 3- 151), there are fewer roads and motorized trails that are proposed under this alternative than in other alternatives, which in turn, would be beneficial to wildlife; however, effective habitat use will be disturbed within the 1,294 acres ZOI for goshawks due to edge effect. In this zone, there is the potential that the species may not utilize the area because of noise and, due to disturbance, there is potential for greater energy expenditure. There are no Open Areas being added within goshawk PACs or territories; therefore, there will be no direct or indirect effects.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** Alternative 4 would prohibit (close year-round) use on 552 miles of NFTS roads and motorized trails. This is opposed to the 236 currently prohibited to motor vehicle use year-round. There would be 1568 miles of seasonal closures as opposed to the 470 that currently exist. There would be 316 more miles closed year-round. Because changes to the NFTS would include wet seasons of use restrictions (associated with Resource Issue Code SW-1) early breeding activities such as pair-bonding and nest initiation may have fewer disturbances. However, since this is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel the effect of changes to season of use (compared to Alternative 1) is expected to be minor to undetectable.

Table 3- 151. Northern Goshawk Indicators – Alternative 4

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within PACs	.2 miles
Number of PACs or territories intersected by roads and motorized trails added to the NFTS	2
Acres of roads and motorized trails added to the NFTS within ¼ mile (ZOI) of PACs	1294
Number of PACs occurring within ¼ mile added to NFTS	6
Percentage of goshawk PACs (total acres) occurring within ¼ mile of the 'zone of influence'	11%

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Direct and indirect effects are the same as described in Alternative 2.

In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects Due to Additions to the NFTS: Under this alternative there are 85 miles of roads and motorized trails and 105 acres of 20 Open Areas proposed for addition to the NFTS. The effects are similar to Alternative 2 but because there is an increase in the number of roads and motorized trails to be added to the NFTS, near activity centers and within preferred habitat, there would be a slight increase in the direct and indirect effects to goshawk within the project area. There are no known goshawk nests adjacent to the proposed Open Areas.

The addition of roads and motorized trails to the NFTS within and near goshawk PACs would result in minor amounts of habitat fragmentation. Since the majority of these roads and motorized trails are narrow and native surfaced, they would only result in minor reductions in overhead cover and would not significantly reduce goshawk movement between habitat patches.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** Actions proposed in this alternative would result in some indirect effects through habitat modification. There are 182 more miles of year-round closures and 1161 more miles of season closures than the current situation (Alternative 1, No Action). It would be a

beneficial effect to the species because more area would have closures during the important nesting time for goshawks (Table 3- 153).

Table 3- 152. Northern Goshawk Indicators – Alternative 5

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within PACs	1.9 miles
Number of PACs or territories intersected by roads and motorized trails added to the NFTS	4
Acres of roads and motorized trails added to the NFTS within ¼ mile of PACs	2548 acres
Number of PACs occurring within ¼ mile (ZOI) added to NFTS	8
Percentage of goshawk PACs (total acres) occurring within ¼ mile of the 'zone of influence	15%

Table 3- 153. Seasonal and Prohibited (Closed Year-round) Changes to NFTS roads Goshawk PACs

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Miles of Prohibited Roads	0 miles	8.18 miles/ 2124 ac	0	8.32 miles/2301 ac	6.27 miles/1772 ac
Seasonal closures to protect goshawk PACs	no	no	no	yes	yes

Cumulative Effects

In 2001 and 2004 the Forest Service amended Sierra Nevada Forest Plans to better address the needs of old forest-associated species (USDA-FS 2001, 2004a). During this assessment, the following risk factors were identified for northern goshawks in the Sierra Nevada: 1) changes to the amount and quality of goshawk habitat from timber harvest and fuels treatments; 2) loss of breeding territories due to stand replacing fires; and 3) breeding site disturbance from vegetation treatments, human recreation or falconry harvest. Appendix E provides a list of cumulative projects on the forest. Some, but not all, of these activities will contribute to effects upon northern goshawks.

Vegetation and fuels reduction projects will continue to be the primary activity affecting goshawk habitat on the SNF. These projects will likely occur on estimated 2000 to 3000 acres per year on underburns and 1000 acres per year on pile burning (Ballard 2009). Since 1917, there are approximately 1266 acres (portions of 12 PACs/territories) within goshawk PACs that have had fire.

The effect of open roads and motorized trails on goshawk populations or habitats was not identified as a significant risk factor by the Forest Service, but breeding site disturbance from human recreation was addressed (USDA 2001 and 2004a). Given the proportion of goshawk nest sites and habitat potentially affected, Alternative 1, may, overtime, contribute to cumulative effects to the goshawk populations. Alternative 1 does not restrict cross-country travel to designated facilities; there is a high degree of uncertainty about future route proliferation in goshawk habitat which may have disturbance and habitat effects beyond the effects of routes

open to motorized use. There are 31 PACs/territories that are affected by unauthorized routes under Alternative 1.There are 20,910 acres of ZOI within ¼ mile of Goshawk PACs. The sum reflects overlap that occurs between PACs. There are 48 miles of roads and motorized trails that currently exist within Goshawk PACs.

Alternative 3 contributes the least to cumulative effects because cross-country travel would be prohibited, seasonally open NFTS densities in goshawk habitat are lowest and no additional roads or motorized trails would be designated. Alternatives 2, 5 and 4 would result in progressively lower risk to goshawks due to the amount of roads and motorized trails being added to the system.

Considering the proportion of goshawk habitat influenced by roads, motorized trails, increases in recreation use, OHV activity, as well as timber harvest and fuels treatments, the alternatives may result in minor cumulative impacts when combined with other factors affecting goshawk habitat. Although the action alternatives may result in cumulative effects, they are minor in comparison to existing NFTS road densities and other potential impacts (see Table 3- 142, Table 3- 143 and Table 3- 166). As shown in Table 3- 165 with regards to percent improvement in late seral closed canopy coniferous forest habitat in comparison to the No Action Alternative, the action alternatives would increase the amount of effective habitat for the goshawk.

Great Gray Owl – Affected Environment

The great gray owl is listed as sensitive on the Pacific Southwest Region Forester's Sensitive Species List (USDA-FS 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 of meadows 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 in diameter at breast height (dbh) and 20 feet tall. There is approximately 9000 acres of suitable great gray owl habitat (nesting and foraging) within the analysis area. There are 10 great gray owl PACs on the SNF. Additional information can be found in the BE/BA (Sorini-Wilson, 2010).

Great Gray Owl – Environmental Consequences

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the great gray owl. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Miles of roads and motorized trails added to the NFTS within PACs
- Acres of roads and motorized trails added to the NFTS that intersects PACs
- Acres of habitat within ZOI
- Acres of roads and motorized trails ZOI within 600 feet of meadows in habitat
- Number of PACs occurring within ¼ mile of the ZOI of roads and motorized trails added to NFTS
- Percentage of great gray owl PACs occurring within ¼ miles of the ZOI

Direct and Indirect Effects

Great gray owl foraging habitat (meadows) can be entered with OHVs if they don't damage resources under Alternative 1; however, vehicles are not allowed in meadows under the rest of the alternatives. The edge effect, as it pertains to meadows, may not be as great because there are few roads and motorized trails that impact the suitable nesting habitat near meadows.

Disturbance: There may be some disturbance to great gray owl nesting habitat (e.g. noise disturbance when vehicles are passing by) where roads and motorized trails are within the habitat.

The use of meadows for foraging is likely affected by the quality of the meadow habitat. Meadow habitat quality may be affected numerous different ways by motorized travel. The most obvious way motor vehicles may impair meadow quality is through direct mechanical damage (rutting). Since soil typically has lower bulk density and can be more easily penetrated when it is wet, mechanical damage often occurs in meadows that are naturally wet or in dry meadows after significant rainfall or immediately following the retreat of the snow at higher elevations. When roads or trails are created in meadows they may intercept surface and subsurface flow (Kattelmann 1996). When flows are intercepted and redirected, meadow drying occurs, changing the fauna and flora associated with it.

Habitat loss, fragmentation and edge effects: There may be some loss of habitat or edge effect to great gray owls; however, it is thought to be minimal since roads and motorized trails are not adjacent to meadows under all action alternatives. Changing the faunal community within meadows may impact quantity and quality of great gray owl foraging. Two species that have been noted as being important prey items to great gray owls are microtines and pocket gophers (Franklin 1988, Winter 1981, Winter 1982). Winter (1981) and (1982) found that microtines may be a preferred prey item for great gray owls in the Sierra Nevada area and may be essential for successful reproduction. He further suggested that Microtus were also associated with moist areas that had good grass cover. Therefore, slight shifts in meadow hydrology caused by motorized travel may impact suitable habitat for mictrotines; thereby potentially adversely affecting the quantity and quality of great gray owl prey.

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Cross-country travel would not be prohibited under this alternative; therefore, it is assumed the route proliferation would continue over the short and long term. The use of these roads and motorized trails and the continued proliferation of new unauthorized routes would result in increasing amounts of direct and indirect effects to great gray owls. There are 4.9 miles of unauthorized routes and NFTS roads and motorized trails that intersect 10 PACs, but no NFTS roads and motorized trails or unauthorized routes intersect known great gray owl nest stands.

Effects Due to Additions to the NFTS: Under this alternative, here are no roads, motorized trails, or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effects to great gray owls.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the NFTS. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effects on great gray owls within the zone of influence for each PAC and associated habitat.

ALTERNATIVE 2 – PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes near great gray owl PACs and habitat. This would reduce the risk of disturbance to great gray owls from motorized travel over the short and long term.

Effects Due to Additions to the NFTS: There are 0.11 miles of motorized trail proposed for addition to the NFTS that intersect great gray owl PACs. There would be potential noise disturbance to the owls if this motorized trail was included in the system. The Open Area proposed to be added is not within great gray owl habitat; therefore, there would be no effect.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Although the exact timing may vary, great gray owls start nesting near the month of March. Since seasonal closure associated with Resource Issue Codes WL-3 or SW-1 would overlap the beginning of the nesting period, and approximately 90 percent of the great gray owl PACs would be within the closures, it would reduce disturbance to owl within the PAC.

Table 3- 154. Great Gray Owl Indicators – Alternative 2

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within PACs	0.11 miles
Number of PACs or territories intersected by roads and motorized trails added to the NFTS	1 PAC
Acres of roads and motorized trails added to the NFTS that intersect the one PAC	150 acres
Acres of habitat within ZOI	53
Acres of roads and motorized trails ZOI within 600 feet of meadows in GGO habitat	134
Number of PACs occurring within ¼ mile of ZOI or roads and motorized trails added to NFTS	1
Percentage of great gray owl PACs (total acres) occurring within ¼ mile of the 'zone of influence'	5%

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Direct and indirect effects are the same as described in Alternative 2.

Effects Due to Additions to the NFTS: Under this alternative, there would be no roads, motorized trails, or Open Areas proposed for addition to the NFTS; therefore, there would be no change to direct or indirect effect to great gray owls.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, the effects would be the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Direct and indirect effects are the same as described in Alternative 2.

Effects Due to Additions to the NFTS: Under this alternative, there would be no roads, motorized trails, or Open Areas proposed for addition to the NFTS within great gray owl PACs or within ¼ mile of activity centers, which is a benefit to the species because there would be less noise disturbance as compared to Alternative 1. In turn, there would be less indirect effects to prey base because there are less roads and motorized trails disturbing owl habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). This alternative would not result in any changes to NFTS that would affect great gray owls because there are no roads or motorized trails within the PACs or within ¼ mile of activity centers.

Table 3- 155. Great Gray Owl Indicators – Alternative 4

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within PACs	0 miles
Number of PACs or territories intersected by roads and motorized trails added to the NFTS	0
Acres of roads and motorized trails added to the NFTS that intersects PACs	0 acres
Acres of habitat within ZOI	895
Acres of roads and motorized trails ZOI within 600 feet of meadows in GGO habitat	2423
Number of PACs occurring within ¼ mile of the ZOI of roads and motorized trails added to NFTS	3
Percentage of great gray owl PACs (total acres) occurring within ¼ mile of the 'zone of influence'	16%

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes near great gray owl PACs and habitat. This would reduce the risk of direct and indirect effects to great gray owls from motorized travel over the short and long term.

Effects Due to Additions to the NFTS: Under this alternative, there is one motorized trail in Miami proposed for addition to the NFTS, TR-08 (WES Analysis Unit), which has the most potential to disturb great gray owls because it intersects a great gray owl PAC. Of the 9000 acres of suitable habitat, there would be 150 acres of motorized trail (ZOI for TR-08) that intersect habitat. Because the seasonal restriction (March 1 through August 15) associated with Resource Issue Code WL-3 would be applied to this roads and motorized trails, the noise disturbance effect is minimized. There are no Open Areas within great gray owl habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Although the exact timing may vary, great gray owls start nesting near the month of March. Since seasonal closure associated with Resource Issue Codes WL-3 and

SW-1 would overlap the beginning of the nesting period, and approximately 90 percent of the great gray owl PACs would be within the closures, it would reduce disturbance to owls within the PAC.

Table 3- 156. Great Gray Owl Indicators – Alternative 5

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within PACs	0.11 miles
Number of PACs or territories intersected by roads and motorized trails added to the NFTS	1 PAC
Acres of roads and motorized trails added to the NFTS that intersects the one PAC	150 acres
Acres of habitat within ZOI	1255
Acres of roads and motorized trails ZOI within 600 feet of meadows in GGO habitat	3531
Number of PACs occurring within ¼ mile added to NFTS	3
Percentage of great gray owl PACs (total acres) occurring within ¼ mile 'zone of influence'	16%

Cumulative Effects

Currently, there are 4.9 miles of unauthorized routes and roads that intersect 10 PACs.

Appendix E provides a list and description of cumulative projects on the SNF. Some, but not all, of these activities will contribute to effects upon great gray owls. Factors responsible for low numbers of great gray owls breeding in the Sierra Nevada are not fully known.

In some meadows, livestock grazing has reduced the suitability of meadow vegetation for microtine rodents and other great gray owl prey (USDA 2001).

Although human disturbance has not been recognized as a significant threat to great gray owls, the use of motor vehicles in meadow habitats can have significant impacts to meadow hydrology. The greatest risk of impacts to great gray owls and their habitats is in Alternative 1 since it would not prohibit cross-country travel and meadows are often easily accessed by vehicles. Therefore, the direct and indirect effects of Alternative 1 and the effects of continued livestock grazing may have significant impacts to individuals because of the potential change to meadow hydrology. The meadow hydrology impacts the prey base and in turn affects the foraging habitat which is within the vicinity of the nesting habitat. Conversely in Alternatives 2, 4 and 5, motorized trails would no longer occur in meadows, therefore, there should not be an adverse effect to owls within the project area because at least that one component, (vehicles in meadows), would not impact meadow hydrology.

American Marten – Affected Environment

The American marten is designated by the Regional Forester as a Sensitive Species and is selected as a Management Indicator Species on the SNF. 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 greater than 40 percent canopy closure for both resting and foraging and avoided stands with less than 30 percent canopy closure (Spencer et al. 1983). Martens generally avoid habitats that lack overhead cover, presumably because these areas do not provide

protection from avian predators (Allen 1982, Bissonette et al 1988, Buskirk et al. 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 (Buskirk et al. 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 1997; 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 (Bisonette et al. 1997, *in* USDA-FS 2004a).

Standard and guideline #89 states "mitigate impacts where there is documented evidence of disturbance to the den sites from existing recreation, off-highway vehicle route, trail and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes and recreational and other developments for their potential to disturb den sites." No mitigation needs to occur at this time for marten because there are no known marten den sites on the SNF.

Additional information can be found in the BE/BA (Sorini-Wilson, 2010).

The entire project area is approximately 800,000 acres, of that there are approximately 131,000 acres of habitat for the marten (15 percent of the area).

American Marten – Environmental Consequences

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the marten. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Miles of roads and motorized trails added to the NFTS within marten habitat
- Acres of habitat in the project area
- Miles of unauthorized roads and motorized trails within the habitat, and the acres of habitat encompassed by their ¼ mile zone of influence
- Miles of NFTS roads, private roads, and other public roads within the habitat, and the acres of habitat encompassed by their ¼ mile zone of influence
- Total road density within the habitat (including all roads, motorized trails, and unauthorized roads and motorized trails with permitted use)
- Acres of managed and unauthorized Open Areas within the habitat

Direct and Indirect Effects

Disturbance: The marten could be affected by loss of dens, increased disturbance of individual martens and by indirect impacts to prey. Motorized use has the potential to result in direct mortality on higher speed roads, collapse den sites, resulting in the potential loss of adults or young. Motorized use can also increase disturbance, resulting in additional energy expenditures. Indirectly, vehicles can affect the squirrel populations that marten primarily feed on. Squirrel populations may be impacted by increased disturbance resulting in lowered energy reserves

available for the production of young. If cross-country travel occurs to the extent that soil compaction was to occur, food resources for squirrels, particularly truffles, could be diminished. Reduced production of young and reduced production of food would reduce the size of squirrel populations available for marten to prey upon (personal observation Turner 2009).

Zielinski et al. (2008) studied the effects of motor vehicles (including over the snow vehicles) on marten in the Lake Tahoe and Sierra National Forests. They evaluated the effects at the two study sites by comparing marten occupancy rates and probabilities of detection in areas where recreational vehicle use is allowed and encouraged (motorized areas) with wilderness areas where vehicles are prohibited (non-areas). Martens were exposed to relatively low levels of disturbance in the study areas. The authors estimated that a marten might be exposed to 0.5 vehicle passes/hour and that this exposure had the greatest effect on less than 20 percent of a typical home range area. In addition, most motor vehicle activity occurs during the day, when martens tend to be less active. The study found that marten occupancy or probability of detection did not change in relation to the presence or absence of motorized facilities and OHV use when the facility (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 authors hypothesized that the risks posed to martens may not be perceived by martens as great enough to relocate or they may habituate to the disturbance. The study did not, however, measure behavioral, physiological or demographic responses, so it is possible that motor vehicles may have effects, alone or in concert with other threats, that were not quantified in the study. As stated by Zielinski as a management implication, placing motorized facilities so they avoid high-quality marten habitat (late successional conifer forests near meadows and riparian areas (Spencer et al. 1983) will minimize the possibility that martens encounter motor vehicle stimuli when they are actively engaged in foraging or social behavior.

In reviewing Zielinski's paper (Zielinski et al. 2008), none of the response variables measured suggested martens were affected by the level of motor vehicle use that occurred in the study sites. The approach assumed that if increased motor vehicle use had negative effects on martens they would observe 1) fewer occupied sample units, 2) greater nocturnal behavior or 3) few females in the areas. The approach excluded measuring the potential direct effects of motor vehicles on individual martens and they do not know how they would react in the presence of motor vehicles or their sound or whether their exposure to vehicles generates a stress response that produced deleterious effect on reproduction or survival.

Bowles reported (in Knight and Gutzwiller 1995) from a few studies (Edge and Marcum 1985 on elk; Dorrance et al. 1975; Singer and Beattie 1986 on deer, and Gese et al. 1989 on coyotes) that the range at which animals avoided traffic was approximately the range at which they could detect traffic noise, suggesting that traffic noise was meaningful through association with human activity. Even if motor vehicle disturbance is proven significant, most of the effects of noise disturbances are mild enough that they may never be detectable as changes in population size or population growth against the background of normal variation.

Habitat loss, fragmentation and edge effects: Roads in general contribute to habitat fragmentation, a reduction in habitat connectivity and potential for road kill of marten and their prey. Noise, dust and associated disturbance will be site specific and relatively short-term, but may extend into adjacent forest areas.

Habitat modification resulting from the removal of near ground vegetation and coarse woody material appears to be the primary potential effect of adding roads and motorized trails to the NFTS. Localized areas of low growing native vegetation may be modified (e.g. crushed or uprooted). This could result in a minor reduction in habitat for forest birds and rodents which form the majority of prey items for American martens.

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Cross-country travel would not be prohibited under this alternative; therefore, it is assumed the route proliferation would continue over short-and long-term effects.

Alternative 1 would have the greatest impact to marten habitat because it has the largest number of motorized trail open to the public and the highest road density (Table 3- 165).

Although occasional direct mortality may occur from collisions with off-road vehicles, this appears to be an exceedingly rare event for the marten and has not been reported to occur within the SNF. It is possible this could occur under this alternative; however, given existing use and mobility of the species within this group, such occurrences would remain rare and inconsequential to species population dynamics. At the long-term analysis point, assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

Included with cross-country travel are the effects from the continuation of use on 552 miles of unauthorized routes and 125 acres of Open Areas. Of the 552 miles of unauthorized routes, 75 miles are within marten habitat (13 percent) of the analysis area.

A larger impact, both in the short term and the long term, would be disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to marten. The amount of disturbance that would affect any of the species is dependent on vehicle use, with more vehicles potentially being more disturbances.

Effects Due to Additions to the NFTS: There are no proposed additions to the NFTS under this alternative; therefore, there will be no direct or indirect effects.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative**,** there are no proposed changes to the current season of use on NFTS roads. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effects on marten within the zone of influence for the species and associated habitat.

ALTERNATIVE 2 – PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: This alternative would prevent disturbance to the marten by prohibiting cross-country travel. In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The marten would not be affected by disturbance, trampling or indirect impacts to prey or food resources from cross-country vehicle travel. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 44 miles of roads and motorized trails, and one, 6-acre Open Area are proposed for addition to the NFTS. Of the 44 miles, 10.92 miles are within marten habitat. The addition of roads and motorized trails could affect marten because there would be noise disturbance to the species. There are incidental observations of marten within ¼ mile of the Open Area. This alternative would contain 92 percent less roads and motorized trails (44/552) than Alternative 1.

Actions proposed in this alternative would result in some indirect effects through habitat modification. The addition of roads and motorized trails to the NFTS within preferred marten habitat would result in minor amounts of habitat fragmentation. Since the majority of these roads and motorized trails are narrow and native surfaced, they would only result in minor reductions in overhead cover and would not significantly reduce marten movement between habitat patches.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Compared to Alternative 1, there would be 446 versus 236 miles closed year-round and 986 miles versus 470 seasonally closed. These NFTS facilities would have minimal disturbance from vehicles during the closure periods. Since the closure periods coincide with the Resource Issue Code SW-1 and cover winter and early spring, early denning activities may have fewer disturbances. However, this is also the period when facilities are often blocked by snowdrifts and unavailable for wheeled travel. Therefore, the impact is expected to be variable by year and minor to undetectable. Closure and removal of roads has been found to effectively provide wildlife security and increase the amount of available wildlife habitat (Wildland CPR 2006).

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Direct and indirect effects are the same as described in Alternative 2.

Effects Due to Additions to the NFTS: Under this alternative there would be no roads, motorized trails, or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to marten.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative there would be no changes to the seasons of use; therefore, the effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: This alternative would prevent disturbance to marten by prohibiting cross-country travel. In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The marten would not be affected by disturbance, trampling or indirect impacts to prey or food resources.

Effects Due to Additions to the NFTS: Under this alternative, 42 miles of NFTS motorized trails, 9 miles of roads and 11 Open Areas that are equivalent to 37 acres are proposed for addition to the NFTS. Of the added 51 miles, 15 miles (30 percent) are within suitable marten habitat. There is the potential that the marten may not utilize the area because of noise and due to disturbance there is potential for greater energy expenditure. There are no Open Areas within suitable marten habitat.

Since there is a decrease in Alternative 4 in the number of roads and motorized trails added to the system compared to what currently exists under Alternative 1, within marten habitat, there would be a decrease in direct or indirect effects to marten within the project area. These decreases would result in fewer individuals being impacted and less habitat being fragmented and this alternative is unlikely to result in impacts to marten populations within the project area.

Alternative 2 and 4 would have similar impacts because approximately the same amount of miles of roads and motorized trails would be added within marten habitat to the existing system. There would be some effects to marten, such as noise disturbance or displacement, because of roads being opened.

As seen in Table 3- 143 and Table 3- 165, there are fewer roads and motorized trails proposed to be added to the NFTS which, in turn, could be beneficial to wildlife because there would be fewer disturbances.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Alternative 4 would prohibit (close year-round) use on 552 miles of NFTS roads and motorized trails. This is opposed to the 236 currently prohibited. Currently, there are 465 miles of seasonal closures; however, under this alternative there would be 1568 miles seasonal closures. These changes would incorporate the roads and motorized trails to be closed during the important time periods for species. These areas would result in no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early denning activities may have fewer disturbances. However, this is also the period when roads and motorized trails are often blocked by snow drifts and unavailable for wheeled travel. Therefore, the seasonal closure impact is expected to be minor to undetectable.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: This alternative would prevent disturbance to the species within this group by prohibiting cross-country travel. In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 70 miles of motorized trails, 15 miles of roads, and 20 Open Areas equivalent to 105 acres are proposed for addition to the NFTS. Of the 85 miles, 20 miles (24 percent) are within marten habitat. Under the action alternatives, there would be the potential for the greatest effect because there are the most roads and motorized trails open; however, it is still less than what currently exists. There are no Open Areas within marten habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Under this alternative, there are 418 miles of roads and motorized trails closed year-round. This is opposed to the 236 currently closed. There would be 1625 miles seasonally closed under this alternative as opposed to the 470 currently closed.

These changes would incorporate the roads and motorized trails to be closed during the important time periods for marten. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods coincide with the associated Resource Issue Code SW-1, it covers winter and early spring early denning activities; therefore, there may have fewer disturbances. However, this is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, the seasonal closure impact is expected to be minor to undetectable.

Cumulative Effects

The cumulative effects for the marten are discussed under the late seral closed canopy coniferous forest section. There are 477 miles of existing roads and motorized trails in marten habitat and 204 sq miles; therefore, there is a density of 2.3 mi/sq.mi of roads and motorized trails within the marten habitat.

Pacific Fisher – Affected Environment

The Pacific fisher is designated by the Regional Forester as a Sensitive Species. *Martes pennanti* is the only extant species of the fisher. On April 8, 2004, in a 12-month finding for a petition to list the west coast distinct population segment of the fisher, the USFWS added the fisher to the list of candidate species.

Fishers in the western United States are habitat specialists associated with mature and late-successional forests with an abundance of large trees, snags and logs (greater than 39 in), conifers and oaks with broken tops and cavities, coarse woody-debris, multiple canopy layers, high canopy closure and few openings (Aubry and Houston 1992; Buck et al. 1994; Buskirk and Powell 1994; Dark 1997; Freel 1991; Jones and Garton 1994; Powell and Zielinski 1994; Seglund 1995; Truex et al. 1998; Zielinski 1999). The fisher is among the most habitat-specific mammals in North America and changes in the quality, quantity and distribution of available habitat can affect their distributional range (Buskirk and Powell 1994). Forest type is probably not as important to fishers as the vegetative and structural aspects that lead to abundant prey populations and reduce their vulnerability to predation (Powell 1993).

California Wildlife Habitat Relationships (CWHR) structure classes 4M, 4D, 5M, 5D and 6 in ponderosa pine, montane hardwood-conifer, mixed conifer, montane riparian, aspen, red fir, Jeffrey pine, lodgepole pine, subalpine conifer and eastside pine have been identified as those most likely to provide suitable denning and resting fisher habitat (Freel 1991). Zielinski (pers. comm. 2006) minimized potential suitability of red fir, lodgepole pine, subalpine conifer and eastside pine habitats for use by fishers in the southern Sierra; therefore, the SNF modified the habitat classification to include CWHR types 4D, 5D and 6. In review with Zielinski (pers. comm. 2006), foraging definition was not applicable due to the generalist use of habitats by foraging fishers.

Part of the adaptive management conservation strategy for fisher (SNFPA, USDA 2001), a long-term status and trend monitoring program was implemented to assess fluctuations or declines in populations through time. The basic monitoring design and objective is to be able to detect a 20 percent decline in population abundance and habitat across the Sierra Nevada should it occur. This monitoring includes intensive sampling to detect population trends on the Sierra and Sequoia National Forests, where the fisher currently occurs, and is supplemented by less intensive sampling in suitable habitat in the central and northern Sierra Nevada specifically designed to detect population expansion. Based on this ongoing fisher population monitoring program, the portion of the southern Sierra fisher population occurring on the west slope of Sequoia National Forest has not shown changes in the observed occupancy rates from 2002 to 2008 (R.Truex 2009). These preliminary estimates are subject to change as the analysis continues, but it does not appear there has been a dramatic decline in either the observed occupancy rate or the spatial distribution of sites with detections, which include sites within the Greenhorn Mountains. Comparisons to survey data from the 1990s suggest that the occurrence for fisher may have expanded slightly in the southern Sierra during the past 10 years (R.Truex 2009).

The status and trend monitoring to date would suggest that current conditions (including existing motorized routes) have not led to decreases in fisher distribution or the index of occurrence. The monitoring data does not provide information regarding reproduction, and it is possible that the portions of the project area may actually be sink habitat being replenished by fishers dispersing from further north. However, the consistent detections of females within suitable habitat suggest this may be unlikely (pers. Com. R.Truex 2009).

In 2007, the Conservation Biology Institute developed a model predicting the probability of fishers occurring in areas of the southern Sierras (Spencer, et al. 2007). Table 3- 157 through Table 3- 161 displays, by each alternative, the miles of roads and motorized trails proposed for

addition by probability of fisher detection. The known maternal and natal den sites are in the following probability categories: 0-19 percent; 20-39 percent; 40-59 percent; 60-79 percent and 80-100 percent. As of 2009, there are seven, 700-acre areas established for the known den sites. There a total of 47 structures used as dens by reproductive female fishers (n = 14), including 18 natal dens, 28 maternal dens, and 1 unknown den (found late in the denning season) as of August 2009 (pers. comm. Purcell and Thompson 2009). Additional information can be found in the BE/BA (Sorini-Wilson, 2010).

The Southern Sierra Fisher Conservation area (SSFCA) is 720,609 acres across the SNF or 1108 square miles in size. There are 588,892 acres of the SSFCA in the analysis area, 306,488 acres of which are suitable habitat.

The standard and guideline # 87 for fisher den sites will be implemented which states "mitigate impacts where there is documented evidence of disturbance to the den site from existing recreation, off-highway vehicle route, trail and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes and recreational and other developments for their potential to disturb den sites." There is a 700-acre buffer fisher den site designation which has been applied to known den sites. Currently, under Alternative 1, there are roads and motorized trails within the 700-acre den site buffer.

Pacific Fisher – Environmental Consequences

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the fisher. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Miles of roads and motorized trails added to the NFTS within probability of fisher detection

  In 2007, the Conservation Biology Institute developed a model predicting the probability of fishers occurring in areas of the southern Sierras (Spencer, et al 2007). This model was used to evaluate the effects of proposed road and motorized trail additions and Open Areas based on the probability of detecting fishers in that area.

- Number of roads and motorized trails in SSFCA
- Miles of roads and motorized trails in SSFCA
- Density in SSFCA

  Adding roads and motorized trails to the NFTS has the potential to create direct and indirect effects to Pacific fishers, including reducing habitat quality and increasing the risk of collisions, disease and wildfire ignitions. Road and motorized trail-associated effects were measured at two scales. First, within the designated Southern Sierra Fisher Conservation Area, this encompasses the known occupied range of Pacific fishers in the Sierra Nevada and includes a variety of habitat types. As an additional measure of effects, the total miles of proposed roads and motorized trails in high suitability fisher habitat in the project area was also determined. High suitability fisher habitat was defined using the CWHR2.1 model, with classes 4M, 4D, 5M, 5D and 6 (stands with trees 11 inches diameter at breast height (DBH) or greater and greater than 40 percent cover) in Jeffrey pine, montane hardwood-conifer, Ponderosa pine, Sierran

mixed-conifer and white fir. Although fishers may forage in a wide range of habitats, these were viewed as most important to their survival.

- Miles of roads and motorized trails within 700-acre den site buffers
- Miles of roads and motorized trails within ¼ mile of den site buffers

The effects of the alternatives are analyzed for the impacts occurring in a "zone of influence" within ¼ mile of proposed roads and motorized trails. This "zone of influence" represents habitat fragmentation to fishers as it relates to habitat components, such as snag and down log removal along roads and motorized trails for public fuel wood and public safety hazards. It also is used as a rough measure of disturbance from noise. Absolute disturbance thresholds of concern for Pacific fishers have not been established, however, studies on other species indicate that noise disturbance may not be an important issue beyond ¼ mile (Delaney and Grubb 2001, 2003). Therefore, for this analysis, acres farther than ¼ mile from a roads and motorized trails were not considered to be subject to habitat fragmentation or disturbance by motor vehicles.

Direct and Indirect Effects

Gaines et al (2003) reviewed studies on the Pacific fisher and determined that road-associated factors that were likely to affect fishers were reductions in snags and down logs, edge effects, collisions, habitat loss or fragmentation, movement barrier and displacement or avoidance. In addition, the roads and motorized trails may influence the following factors that have been recently identified as concerns for Pacific fisher: route for competitors and predators, disease transmission, and habitat loss to wildfires (MacFarlane 2009).

Collisions: As road density increases there is increased opportunity for wildlife/vehicle collisions. Collisions with vehicles are known to be a source of mortality for Pacific fishers (Heinemeyer 1993, USDI 2004). Paved roads where vehicles can travel at high speeds are probably more likely to have collisions than where speeds are lower. Collision related mortality on the SNF has been reported, but the frequency this occurs in the project area is unknown. To date there have been three fisher that were killed on major highways (Highways 168 and 41).

Reduction in snags and down logs: Hazard tree removal occurs along existing system roads and motorized trails in the project area and would be expected to occur along roads and motorized trails added to the NFTS. The impacts are variable depending on the type of road or motorized trail, accessibility of the area and habitat type. (Wider roads and motorized trails open to all type of vehicles in heavily forested areas would be expected to have more hazard trees removed than single track trails in areas with only small trees). High levels of coarse woody debris (snags, downed logs, root masses, large branches) are an essential component of fisher habitat, and are utilized for rest and den sites. Activities that remove coarse woody debris are therefore likely to lower habitat suitability (Buskirk and Ruggiero 1994). Connected actions along roads and motorized trails include the need to remove down logs when blocking trails. These influences would likely not extend more than 300 feet from the actual road and motorized trail.

Disturbance: The linear effects of travel on roads and motorized trails can include disturbance, displacement and microclimate changes (Gaines et al., 2003). Disturbance can lead to physiological responses such as increased stress hormones (Wasser et al. 1997 as reported in Gaines et al., 2003).

Habitat loss, fragmentation and edge effects: Habitat connectivity is a key to maintaining fishers within a landscape. Roads in general contribute to habitat fragmentation, a reduction in habitat connectivity and potential for road kill of fishers and their prey. Noise, dust and associated

disturbance will be site specific and relatively short-term, but may extend into adjacent forest areas. Some research literature suggests that the loss and fragmentation of suitable habitat by roads and route proliferation may have played a role in the reduction of the fisher from the central Sierra Nevada and its failure to re-colonize there (USDI 2004). Large highways in this region such as Highway 80 in the central Sierra Nevada are of sufficient width and traffic volume to potentially represent a barrier to movement.

In general, fishers use forest or woodland landscape mosaics that include conifer-dominated stands and avoid entering Open Areas that have no overstory or shrub cover (Buskirk and Powell 1994). They select forests that have low and closed canopies. Late-successional coniferous or mixed forests provide the most suitable fisher habitat because they provide abundant potential den sites and preferred prey species (Allen 1987).

Habitat modification resulting from the removal of near ground vegetation and coarse woody material appears to be the primary potential effect of adding roads and motorized trails to the NFTS. There are two ZOIs used for fisher. The 700 acre den site buffer was used, in addition to the standard ¼ mile, because there are 18 natal dens and 28 maternal dens and one unknown den as of August 2009 on the SNF. Also the 700 acre buffer is management direction from the SNFPA 2004.

Displacement or Avoidance: The degree to which road and motorized trail density and noise disturbance influence how fisher utilize habitat are not well understood. Review of the research literature suggests that fisher commonly move through habitats that contain roads and trails, where at least some ambient level of noise disturbance appears to be tolerated.

The level of route density and associated noise disturbance may influence how fisher utilize available habitat. This notion seems to be supported by a few recent studies that imply that fisher may favor occupancy of landscapes with lower road use or road density. Dark (1997, *In* USDI 2004), for example, studied fisher in a well-roaded study area (i.e. areas without roads did not exist) on the Shasta-Trinity National Forest. Results suggested that fisher were detected more frequently at sites where roads were closed by the use of gates or otherwise designed to discourage vehicular traffic. Fishers used habitats with a greater density of low-use roads, and favored landscapes with more contiguous, unfrequented forests and less human activity. Campbell (2004, *In* USDI 2004) noted that sample units examined within the central and southern Sierra Nevada region occupied by fisher were negatively associated with road density. This relationship was significant at multiple spatial scales (from 494 to 7,413 acres).

Route for competitors and predators: Roads and motorized trails may provide access for competitors or predators that would not have existed otherwise. Habitat alterations favoring bobcats, mountain lions or coyotes could increase fisher mortalities (Macfarlane 2009).

Disease Transmission: Increased access provided by roads and motorized trails can provide an avenue for disease carried by domesticated animals, especially dogs, to spread to fisher. Canine distemper, parvoviruses and canine infectious hepatitis are all diseases associated with fisher (Brown et al. 2008) that may be transmitted by domestic dogs.

Habitat Loss to Wildfires: Uncharacteristically severe wildfire ranked as a high threat to fisher habitat in the southern Sierra Nevada (West Coast Fisher Conservation Assessment, in prep.). Increased access to fisher habitat provided by more roads and motorized trails may increase the likelihood of wildfire ignitions.

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Cross-country travel would not be prohibited under this alternative. Therefore, it is assumed the route proliferation would

continue over the short and long term and the effects of the unauthorized routes would be similar to those discussed under adding roads and motorized trails to the NFTS. Under Alternative 1, there are 2.9 miles of unauthorized routes that are within the 700 acre den site buffers (See Table 3- 157).

The amount of habitat affected is determined by the zone of influence (within ¼ mile) from the 700-acre den site buffer. Alternative 1 would have the greatest impact to fisher habitat because it has the largest number of roads and motorized trails open to the public, highest road density and would allow motor vehicle travel in all high suitability fisher habitat (Table 3- 157). There are 461 miles of unauthorized routes in the SSFCA under Alternative 1.

Although occasional direct mortality may occur from collisions with off-road vehicles, this appears to be an exceedingly rare event for the fisher and has not been reported to occur within the Forest. The mortalities that have occurred were on major highways (Highways 168 and 41). It is possible this could occur under this alternative; however, given existing use and mobility of the species within this group, such occurrences would remain rare and inconsequential to species population dynamics. At the long-term analysis point, it is assumed the rate of off-highway vehicle use will remain the same or have minimal change.

Included in cross-country travel are the effects from continuation of use on 552 miles of unauthorized routes and 125 acres of Open Areas, would continue to contribute to direct and indirect impacts to the SSFCA.

A larger impact, both in the short term and the long term, would be disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to fisher. The amount of disturbance that would affect any of the species is dependent on vehicle use, with more vehicles potentially being more disturbances. The information discussed below addresses fisher indicators.

Table 3- 157. Fisher Indicators – Alternative 1

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within probability of fisher detection	0-19 percent = 326.0 20-39 percent = 45.4 40-59 percent = 102.6 60-79 percent = 59.2 80-100 percent = 24.4
Number of roads and motorized trails in SSFCA	461 roads and motorized trails
Miles of roads and motorized trails in SSFCA	70.4 miles of roads and motorized trails
Density in SSFCA	0.07 mi/sq. mi
Miles of roads and motorized trails in fisher habitat	20.2 miles
Density in fisher habitat	0.12 mi/sq.mi
Miles of roads and motorized trails within 700 acre den site buffers	2.9 miles
Miles of roads and motorized trails within ¼ mile of den site buffers	0.83 miles/7 roads and motorized trails

Effects Due to Additions to the NFTS: There are no roads and motorized trails or Open Areas proposed for addition to the NFTS under this alternative; therefore, there will be no direct or indirect effects.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the current season of use on NFTS roads and motorized trails. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effects on fisher within the zone of influence for the species and associated habitat.

ALTERNATIVE 2 – PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: This alternative would prevent disturbance to the species within this group by prohibiting cross-country travel. In the long term (20 years), fisher habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The fisher would not be affected by disturbance, trampling or indirect impacts to prey or food resources from cross-country vehicle travel.

Effects Due to Additions to the NFTS: Under this alternative, 44 miles of roads and motorized trails are proposed for addition to the NFTS. Table 3- 158 displays the proposed roads and motorized trails within habitats used by the species. The addition of 44 miles of roads and motorized trails could affect fisher because there would be noise disturbance to the species. This alternative would contain 92 percent less roads and motorized trails (44/552) than Alternative 1.

Actions proposed in this alternative would result in some indirect effects through habitat modification. The addition of roads and motorized trails to the NFTS within preferred fisher habitat would result in minor amounts of habitat fragmentation. Since the majority of these roads and motorized trails are narrow native surfaced routes, they would only result in minor reductions in overhead cover and would not significantly reduce fisher movement between habitat patches.

There are 3.4 miles of roads and motorized trails to be added within the 60-100 percent probability under this alternative. At this time, there are no known den sites that are intersecting with the roads, motorized trail, or Open Areas that are proposed for this alternative. There are 130 roads and motorized trails proposed for addition to the NFTS under this alternative within the SSFCA, which is approximately 0.40 mi/sq mi. There are 11.62 miles of routes that are within fisher habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Under this alternative, there are changes to the seasonal open period for 986 miles of roads and motorized trails. Compared to Alternative 1, there would be 446 versus 236 miles closed year-round, and 986 miles versus 470 seasonally closed. These areas would have minimal disturbance from vehicles during the closure periods. Since the closure periods associated with SW-1 will cover winter and early spring, early denning activities may have fewer disturbances. However, this is also the period when roads and motorized trails are often blocked by snowdrifts and unavailable for wheeled travel. Therefore, the impact is expected to be variable by year and minor to undetectable. Closure and removal of roads has been found to effectively provide wildlife security and increase the amount of available wildlife habitat (Wildlands CPR 2006).

Table 3- 158. Fisher Indicators – Alternative 2

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within probability of fisher detection	0-19 percent = 29.7 20-39 percent = 4.0 40-59 percent = 5.4 60-79 percent = 3.4 80-100 percent = 3.4
Number of roads and motorized trails in SSFCA	130 roads and motorized trails
Miles of roads and motorized trails in SSFCA	44 miles of roads and motorized trails
Density in SSFCA	0.040 mi/sq. mi
Miles of roads and motorized trails in fisher habitat/acres	11.62 miles = 7437 acres
Density in fisher habitat	0.069 mi/sq. mi.
Miles of roads and motorized trails within 700 acre den site buffers	0 miles
Miles of roads and motorized trails within ¼ mile of den site buffers	0 miles

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Direct and indirect effects are the same as described in Alternative 2.

Effects Due to Additions to the NFTS: Under this alternative, there would be no new roads, motorized trails or Open Areas (Table 3- 159) proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to fisher.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS; therefore the effects are the same as Alternative 1.

Table 3- 159. Fisher Indicators – Alternative 3

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within probability of fisher detection	0-19 percent = 0 20-39 percent = 0 40-59 percent = 0 60-79 percent = 0 80-100 percent = 0
Number of roads and motorized trails in SSFCA	0 roads and motorized trails
Miles of roads and motorized trails in SSFCA	0 miles of roads and motorized trails
Density in SSFCA	0 mi./sq. mi
Miles of roads and motorized trails in fisher habitat	0 miles
Density in fisher habitat	0 mi./sq.mi.
Miles of roads and motorized trails within 700 acre den site buffers	0 miles
Miles of roads and motorized trails within ¼ mile of den site buffers	0 miles

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: This alternative would prevent disturbance or indirect impacts to prey or food resources to the fisher by prohibiting cross-country travel. In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 42 miles of motorized trails and 9 miles of roads are proposed for addition to the NFTS. These additions would have a minimum impact on the fisher because this alternative has the least number of additions to the NFTS. There are 11 Open Areas that will be added under this alternative. However, there is the potential that the fisher may not utilize the area because of noise disturbance. If the fishers leave the area it could cause them to expend more energy.

When comparing Alternative 4 (Table 3- 160) to Alternative 1, there is a decrease in the number of roads and motorized trails added to the system; therefore, within fisher habitat, there would be a decrease in direct or indirect effects to fisher. These decreases would result in fewer individuals being impacted and less habitat being fragmented as well as less noise disturbance.

Under this alternative, there are 5.7 miles of proposed additions to the NFTS within the 60-79 percent probability and 3 miles of routes proposed for addition to the NFTS within the 80-100 percent probability. At this time, there are no known den sites that are intersecting with proposed additions to the NFTS or Open Areas in this alternative. There are 23 roads and motorized trails proposed for addition to the NFTS under this alternative within the SSFCA, which are approximately 0.37 mi/sq mi.

There would be some effects to fisher, such as noise disturbance or displacement, because of roads being opened. However, as shown in Table 3- 158 through Table 3- 161 there are no roads or motorized trails within the den site buffers, which are core areas, used by fishers. There are 5.67 miles of roads and motorized trails to be added that are in fisher habitat.

There is one Open Area (Blucyn152) out of eleven that is within fisher habitat but resides in the 0-19 percent probability of finding a fisher in the area according to the CBI model.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads) Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Alternative 4 would close year-round use on 552 miles of NFTS roads and motorized trails. This is opposed to the 236 currently prohibited. Currently, there are 470 miles seasonally closed; however, under this alternative there would be 1568 miles seasonally closed. These changes would incorporate the roads to be closed during the important time periods for species. These areas would result in no disturbance from vehicles during the closure periods. Since the closure periods coincide with Resource Issue Code SW-1, it covers winter and early spring, early denning activities may have fewer disturbances. However, this is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, the seasonal closure impact is expected to be minor to undetectable.

Table 3- 160. Fisher Indicators – Alternative 4

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within probability of fisher detection	0-19 percent = 21.8 20-39 percent = 5.0 40-59 percent = 14.3 60-79 percent = 5.7 80-100 percent = 3.0
Number of roads and motorized trails in SSFCA	125 roads and motorized trails
Miles of roads and motorized trails in SSFCA	46 miles of roads and motorized trails
Density in SSFCA	0.042 mi/sq. mi
Miles of roads and motorized trails in fisher habitat/acres	5.67 miles = 3629 acres
Density in fisher habitat	0.033 mi/sq. mi.
Miles of roads and motorized trails within 700 acre den site buffers	0 miles
Miles of roads and motorized trails within ¼ mile of den site buffers	0 miles

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: This alternative would prevent disturbance to the species within this group by prohibiting cross-country travel. In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 85 miles of roads and motorized trails and 20 Open Areas equivalent to 105 acres are proposed for addition to the NFTS. Under this alternative, there would be the potential for the greatest effect because there are the most roads and motorized trails open within the SSFCA which in turn could be the greatest noise disturbance to the fisher. In addition, there are 9.3 miles in the 60-79 percent probability and 5.4 miles of roads and motorized trails within the 80-100 percent probability of detection added to the system, however none of the current known den sites are in these areas. There are three Open Areas (Blucyn 4, Bluecyn 6 and Blucyn152) that are in fisher habitat; however they are in the 0-19 percent probability according to the CBI model. There are 15.4 miles of roads and motorized trails that will be added within fisher vegetation.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Miles of NFTS roads and motorized trails to be prohibited would be 418. This is opposed to the 236 currently prohibited. Currently, there are 465 miles of seasonal closures; however, under this alternative there would be 1,626 miles of seasonal closures. These changes would incorporate the roads to be closed during the important time periods for the fisher. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods are associated with the Resource Issue Code SW-1 (covers winter and early spring), early denning activities may have fewer disturbances. However, this is also the period when roads and motorized trails are often blocked by snow drifts and unavailable for wheeled travel. Therefore, the seasonal closure impact is expected to be minor to undetectable.

Table 3- 161. Fisher Indicators – Alternative 5

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within probability of fisher detection	0-19 percent = 41.5 20-39 percent = 7.5 40-59 percent = 21.6 60-79 percent = 9.3 80-100 percent = 5.4
Number of roads and motorized trails in SSFCA	213 roads and motorized trails
Miles of roads and motorized trails in SSFCA	80 miles of roads and motorized trails
Density in SSFCA	0.073 mi/sq. mi
Miles of roads and motorized trails in fisher habitat/acres	15.46 miles = 9600 acres
Density in fisher habitat	0.091 mi/sq. mi.
Miles of roads and motorized trails within 700 acre den site buffers	0 miles
Miles of roads and motorized trails within ¼ mile of den site buffers	0 miles

Cumulative Effects

The cumulative effects geographic boundary for Pacific fishers is the section of Southern Sierra Fisher Conservation Area within the travel management project area. This is an appropriate scale for determining cumulative effects to Pacific fishers, since this 588,892 (portion within analysis area) acre area is sufficiently large to include many fisher home ranges, and encompasses the known range of fishers within the project area. In addition, the project area encompasses an array of habitat conditions from low elevation to high elevation, including several vegetation types from Sierran mixed conifer, ponderosa pine, red fir, and Jeffrey pine.

Table 3- 162. Cumulative Miles of Roads and Motorized Trails Proposed for Addition to the NFTS

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Miles of roads in SSFCA	2337	2337	2337	2337	2337
Miles of roads within 700 acre den site buffer	38+2.9=40.9mi	25.9+0=25.9mi	27.7+0=27.7mi	27.7+0=27.7mi	27.7+0=27.7
Miles of prohibited roads within 700 acre den site buffer	0	12	12	8	8
Miles of roads within ¼ mi den site buffer	15	15	15	15	15
Miles of prohibited roads within ¼ mi den site buffer	0	5	5	3	3
Number of dens (across Forest) affected by current roads	47	41	41	41	41
Miles of roads in Fisher Habitat*	3000 (557 unauthorized routes)	3000	3000	3000	3000

*road miles are the same because the differences show between seasons of use

Table 3- 163 Miles of Roads and Motorized Trails Proposed for Addition to the NFTS within Probability of Fisher Detection in Analysis Area

Probability of Fisher Detection in Analysis Area (acres per class)	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
0-19% (463,140 acres in this class)	326	29.7	0	21.8	41.5
20-39% (65,799 acres in this class)	45.4	4	0	5	7.5
40-59% (112,530 acres in this class)	102.6	5.4	0	14.3	21.6
60-79% (112,530 acres in this class)	59.2	3.4	0	5.7	9.3
80-100% (59,510 acres in this class)	24.4	3.4	0	5.4	5.4

When considering the cumulative effects of all roads and motorized trails, Alternative 1 (current condition) has the greatest cumulative miles of roads and motorized trails (2375 miles) within the SSFCA in the project area, and therefore, poses the greatest overall potential risk and cumulative impacts to fishers. Under Alternative 1, given the magnitude of potential effects upon unknown fisher den sites that may exist and foraging habitat it may cause adverse effects to fisher populations. Because Alternative 1 does not prohibit public motor vehicle cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon fishers.

Alternative 5 has the next highest cumulative impacts to fishers, with a cumulative total of 85.3 miles of motorized roads and motorized trails (Table 3- 161). Alternative 3 has the lowest cumulative impacts to fishers, with 0 miles of roads and motorized trails being added. Existing roads and motorized trails would be the sole impact. Table 3- 163 displays the cumulative miles of roads and motorized trails in high suitability fisher habitat.

ROUTE DENSITY IN HIGH SUITABILITY FISHER HABITAT

Route density effect thresholds for Pacific fishers are not readily available in the literature; however, Freel (1991) developed general road density guidelines, based on a compilation of best available science and specialist knowledge of fishers and their habitat use. The Freel model estimated that high capability habitat had road densities below 0.5 miles per square mile and moderate capability habitat had road densities from 0.5 to 2.0 miles per square mile. Values higher than 2.0 miles per square mile are considered low capability habitat and were anticipated to negatively influence this species. This model was based on information from other species, not specifically on Pacific fisher research.

CUMULATIVE EFFECTS OF ROADS AND MOTORIZED TRAILS ON PACIFIC FISHERS WITHIN THE ZONE OF INFLUENCE

When analyzing the cumulative effects to acres of the SSFCA within ¼ mile of a road or motorized trail, Alternative 1 has the highest cumulative impact. This alternative allows motorized travel throughout the SSFCA. Alternative 3 has the lowest cumulative impacts to acres in the SSFCA. Prohibited ZOI in ¼ mile fisher den buffer is 1797 acres for Alternative 2, 1435 for Alternative 4 and 5.

OVERALL CUMULATIVE EFFECTS FROM PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Table 3- 166 provides a summary of past, present, and reasonably foreseeable projects within high suitability fisher habitat in the travel management project boundary.

Past, present and future vegetation management projects affect less than 1 percent of high suitability fisher habitat in the project area. The negative effects of these projects are short-term, while the long-term cumulative effects are mostly beneficial to fisher (reducing the risk of stand-replacing wildfires). Wildfires have impacted around 5 percent of the suitability fisher habitat within its range. Moderate intensity fires have short term negative impacts, but are beneficial to fisher habitat in the long term.

All the action alternatives provide benefits over Alternative 1 by eliminating the negative effects of cross-country travel and reducing the number of unauthorized routes currently in the Southern Sierra Fisher Conservation Area and high suitability fisher habitat. Under the action alternatives, roads and motorized trails affect 9 percent of fisher habitat (9600 acres of suitable fisher habitat affected by roads and motorized trails per 107,523 of suitable fisher habitat acres) (Table 3- 161). Most of this impact is from existing system roads and motorized trails, with new additions to the NFTS contributing a relatively small amount in the alternatives. The effects of roads and motorized trails on fisher habitat are negative in both the short and long term by causing a reduction in habitat quality due to disturbance and fragmentation. However, given that two studies (Purcell and Thompson 2009 and Truex 2009) across the forest found female fishers successfully reproducing in areas with road and motorized trail densities far above that proposed in the action alternatives. Therefore, it is unlikely that this reduction in habitat quality will reduce the viability of the fisher population in the project area.

Late Seral Open Canopy Coniferous Forest Habitat– Affected Environment

Late seral open canopy coniferous forest on the SNF is composed of ponderosa pine, Sierran mixed conifer, white fir, and red fir stands that contain primarily medium to large trees (equal to or greater than 24 inches dbh) with canopy closures less than 40 percent. The entire analysis area contains about 2,098 acres of late seral open canopy coniferous forest habitat. About 1,652 of them are currently open to cross-country motorized travel. About 0.7 miles of unauthorized routes (encompassing 348 ZOI acres) were created by users within this habitat. About 0.3 of these miles (encompassing 64 ZOI acres) exist in areas where motorized cross-country travel is currently prohibited. (See Figure 1-3 for a map of those areas). About 7 miles of NFTS roads and motorized trails, private roads, and other public roads (state, county, other federal) (encompassing 1,410 ZOI acres) exist in late seral open canopy coniferous forest habitat within the analysis area. Including the roads, motorized trails, and unauthorized routes, the habitat has a route density of 2.67 mi./sq.mi. No managed Open Areas exist within the habitat, but about 0.6 acres of unauthorized Open Areas do. About 0.3 acres of the unauthorized Open Areas exist in prohibited areas. Overall, about 1,759 acres of late seral open canopy coniferous forest habitat is impacted by roads, motorized trails, and Open Areas. Nevertheless, because 1.3 miles of roads and motorized trails (encompassing 374 ZOI acres) in the habitat are closed year-round, acres of late seral open canopy habitat taken out of effective MIS use are closer to 1,385 or 66 percent.

Late Seral Open Canopy Coniferous Forest Habitat – Environmental Consequences

Direct and Indirect Effects

The following indicators were chosen to provide a relative measure of the direct and indirect effects to the habitat. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Acres of habitat available
- Acres of habitat open for cross-country motorized use
- Miles of unauthorized routes within the habitat, and acres of habitat encompassed by a ¼ mile ZOI
- Miles of NFTS, private, other public roads and motorized trails within the habitat, and acres of habitat encompassed by a ¼ mile ZOI
- Total density of roads, motorized trails and unauthorized routes that could continue to have use within the habitat
- Acres of Open Areas (FS managed and unauthorized) within the habitat

ALTERNATIVE 1 – NO ACTION

Effects due to Continued Cross-country Motor Vehicle Travel: Under the No Action alternative, 1,652 acres of late seral open canopy coniferous forest habitat would remain open for motorized cross-country travel. Occasional cross-country travel through habitat types on the SNF would not generate lasting impacts upon the habitats, nor would MIS likely avoid using areas that are only occasionally accessed by motor vehicles. However, where cross-country travel occurs in the same vicinity regularly, unauthorized routes and Open Areas are generated and impacts upon habitat and MIS use of habitat occurs. Under this alternative, cross-country travel would not be prohibited. It is assumed that the proliferation of unauthorized routes and Open Areas would continue and the effects would be similar to those discussed under adding roads, motorized trails, and Open Areas to the NFTS. There would be continued use of about 0.5 miles of unauthorized routes and 0.3 acres of unauthorized Open Areas in late seral open canopy habitat within the project area under this alternative.

Effects Due to Additions to the NFTS: Under this alternative, no roads, motorized trails, or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the NFTS; therefore, there would be no direct or indirect effect to the habitat. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effect upon late seral open canopy coniferous habitat effectiveness.

ALTERNATIVE 2 – PROPOSED ACTION

Effects due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails. The effects under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 44 miles of roads and motorized trails and 6 acres of Open Areas are proposed for addition to the NFTS. Of the 44 miles added, 0.01 mile is within late seral open canopy coniferous forest habitat. None of the Open Areas to be added are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat.

Under this alternative, mileage of roads and motorized trails closed year-round would increase by about 0.3, increasing the amount of roads and motorized trails closed year-round in the habitat by 19 percent. Human-caused disturbances are decreased immediately upon closure of roads and motorized trails. Nest parasitism, nest predation, and other edge effects are decreased once prohibited roads and motorized trails (roads and motorized trails closed year-round) become overgrown with vegetation. Thus, for the analysis of MIS, acres of habitat impacted by roads and motorized trails that are closed year-round will not be considered adversely affected.

Note: Habitat along roads and motorized trails that are seasonally closed during breeding seasons would have decreased human-caused disturbance, but nests would still be subject to increased nest predation and parasitism. Therefore, even though the impact is less, acres of habitat impacted by seasonally closed roads and motorized trails will still be considered adversely affected. This rationale is true for other MIS habitats and will not be addressed again, except for deer (as explained under the Ungulate section).

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas and NFTS, private and other public roads and motorized trails. Direct and indirect effects are the same as described in Alternative 2.

Effects Due to Additions to the NFTS: Under this alternative, no roads, motorized trails, or Open Areas are proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads). Under this alternative, there would be no changes to the NFTS. Effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas, and NFTS, private, and other public roads and motorized trails. The effects are the same as described in Alternative 2. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 51 miles of roads and motorized trails and 37 acres of Open Areas are proposed for addition to the NFTS. Of the 51 miles added, approximately 0.1 mile is within late seral open canopy coniferous forest habitat. None of the Open Areas to be added are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Changes to class of use are not expected to have any detectable impact on wildlife or their habitat, as discussed above under Alternative 2.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. Under this alternative, mileage of roads and motorized trails closed year-round would increase by about 0.7, increasing the amount of roads and motorized trails closed year-round in the habitat by 35 percent.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas, and NFTS, private, and other public roads and motorized trails. Direct and indirect effects are the same as described in Alternative 2. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 85 miles of roads and motorized trails and 105 acres of Open Areas are proposed for addition to the NFTS. Of the 85 miles added, approximately 0.2 mile is within late seral open canopy coniferous forest habitat. None of the Open Areas to be added are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Changes to class of use are not expected to have any detectable impact on wildlife or their habitat, as discussed above under Alternative 2.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. Under this alternative, mileage of roads and motorized trails closed year-round would increase by about 0.5, increasing the amount of roads and motorized trails closed year-round in the habitat by 28 percent.

Late Seral Open Canopy Coniferous Forest Habitat - Cumulative Effects

Note: Per direction in the LRMP, as amended by the SNF Bioregional MIS Report, determinations of project-level species impacts are not made for MIS. Instead a relationship of project-level habitat impacts to bioregional-scale habitat and population trends is provided for MIS.

As discussed above, roads, motorized trails, and Open Areas located within ¼ mile of the habitat likely increase: (1) nesting, resting, and foraging disturbance; (2) nest predation; and/or (3) habitat avoidance. Those impacts are most significant during the reproductive seasons and may reduce reproductive success. Reproductive season for the sooty grouse occurs from early April to late August. The periods of greatest sensitivity occurs during nest building and incubation when the individual is more likely to abandon the site (Gotmark 1992 in Knight and Gutzwiller 1995). Another period of sensitivity is the nestling/fledgling period since parental attentiveness may be disturbed; thereby, disrupting feeding patterns and increasing the chance that young may become stressed and/or predated upon.

The higher the road and motorized trail density, the greater the amount of habitat is taken out of effective MIS use. When route density exceeds a certain point, the habitat does not provide any place for undisturbed reproduction, foraging, or resting to occur. If route density remains too high, habitat is likely avoided. Species population can be reduced as a result. Existing motorized travel has created a route density of 2.76 mi./sq.mi within late seral open canopy coniferous forest habitat and has likely impacted as much as 66 percent of late seral open canopy habitat within the analysis area it by decreasing their effectiveness for MIS. A comparison of route densities and percent habitat impacted is provided in the table below.

Other activities within the analysis area cumulatively affect the habitat. There are 28 active cattle allotments, encompassing about 743,247 acres, and permitting 17,000 AUMs within the analysis area. Some of the cattle allotments encompass late seral open canopy coniferous forest habitat. CDFG (2005 *In* USDA-FS 2008) lists heavy grazing as one of the four major factors that may impact sooty grouse populations. Sooty grouse forage on shrubs, grasses, and coniferous trees; plucking off seeds and insects in the summer, and needles, buds, cones, and twigs in the winter (Ibid). Cattle may compete with sooty grouse for food in open canopy coniferous forest habitats since such stands provide grasses, forbs, and shrubs for forage in the understory. Furthermore, cattle may crush nests. Nevertheless, this is not likely the case under normal grazing practices. Cattle tend to utilize meadows and grasslands over coniferous habitat since they provide a greater amount of food, but if overgrazing is occurring, cattle would move into the understory of open stands searching for food. Grazing is limited on the SNF by standards and guidelines (S&Gs). Therefore, it is assumed that cattle would not significantly impact the quality of late seral open canopy coniferous forest habitat for MIS. The LRMP amendment (1995) limits use of woody shrubs to 20 percent annual leader growth when rangeland is in satisfactory condition and 10 percent if in unsatisfactory condition (USDA-FS 1995b, p. 2-15). SNFPA (2004a) S&G #121 limits browsing to no more than 20 percent of annual leader growth of mature riparian shrubs and no more than 20 percent in individual seedlings. In addition, livestock are to be removed from areas when browsing indicates a change in livestock preference from grazing herbaceous vegetation to browsing woody vegetation. SNFPA (2004a) S&G #120 limits livestock utilization of grass and grass-like plants to 30 percent (or a minimum 6-inch stubble height) in early seral meadows; and 40 percent (or a minimum 4-inch stubble height) in late seral meadows. It also requires ecological status to be determined in key areas every 3 to 5 years. If the area is in a downward trend, grazing has to be modified or suspended. Degraded meadows, such as those in early seral status with greater than 10 percent bare soil, have to be rested from grazing until they have recovered and have moved to mid or late seral status.

CDFG (2005 *In* USDA-FS 2008) lists newly cut timber sales as another factor that may impact sooty grouse populations. Not only are trees removed, but much of the understory vegetation is disturbed with timber management activities. Therefore, food supply is temporarily depleted and nests may be crushed. About 492 acres or 23 percent of late seral open canopy coniferous forest habitat have been or will be impacted by timber management activities within the analysis area. Nevertheless, impact is only for about a year since understory grasses and shrubs typically recover in that timeframe. Therefore, any habitat impacted in the past would have recovered. Few if any of the recent timber sales are or will be clearcuts and overstory trees would remain, providing sooty grouse with needles, buds, cones, and twigs for foraging opportunities. Therefore, it is assumed that while present and foreseeable timber management activities may directly impact sooty grouse by crushing nests, they will not significantly impact the quality of their habitat.

About 50,806 acres of plantations exist within the analysis area; however, none are in late seral open canopy coniferous forest habitat.

CDFG lists prescribed burns as another factor that may impact sooty grouse populations. Only about 157 acres or 7 percent of late seral open canopy coniferous forest habitat within the analysis area have/will be impacted by prescribed burns. Because burned shrubs and grasses typically recover in less than a year, impact of prescribed burns upon the habitat and sooty grouse is not anticipated to be significant.

Only about 27 acres or 1 percent of late seral open canopy coniferous forest habitat has been impacted by wildfires within the analysis area; and due to the openness of the habitat few additional acres are anticipated to burn within the foreseeable future. Therefore, impact of wildfire upon the habitat and sooty grouse is assumed to be insignificant.

Table 3- 164 below summarizes the differences that would occur within late seral open canopy habitat under each alternative.

Table 3- 164. Indicators per Alternative for Late Seral Open Canopy Coniferous Forest Habitat

	Acres Open to Motorized Cross-country Travel	Miles of NFTS Roads and Motorized Trail and other Private/ Public Roads and Motorized Trail (added miles included in total above)	Miles of NFTS Roads and Motorized Trails Closed Year-Round	Miles of Unauthorized Routes that Can Receive Motorized Travel	Density of Roads and Motorized Trails that Can Receive Use (mi./sq. mi.)	Acres of Managed Open Areas (added Open Areas included in total above)	Acres of Unauthorized Open Areas that Can Receive Motorized Travel	Acres and Percent Habitat Impacted by a Decrease in Effectiveness for MIS
Alt1	1,652	7 (+0)	1.3	0.5	2.50	0 (+0)	0.3	1,320 = 63%
Alt2	0	7 (+0)	1.6	0	2.33	0 (+0)	0	879 = 42%
Alt3	0	7 (+0)	1.3	0	2.33	0 (+0)	0	1,036 = 49%
Alt4	0	7 (+0)	2.0	0	2.33	0 (+0)	0	847 = 40%
Alt5	0	7 (+0)	1.8	0	2.33	0 (+0)	0	978 = 47%

Relationship of Late Seral Open Canopy Coniferous Forest Habitat to MIS

Sooty Grouse

The MIS chosen for this habitat type is the sooty grouse. 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 (blue) Grouse hooting sites are located in open, mature, fir-dominated forest, where particularly large trees are present (Bland 2006).

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trend

As determined in the MIS Report for Travel Management (Strand and Sanchez 2010), current motorized travel on the SNF is affecting up to 1,385 acres of late seral open canopy coniferous forest habitat or 2 percent of the acres available within the Sierra Nevada bioregion. Affected acres were derived by summing the acres of habitat impacted by existing and added roads, motorized trails and Open Areas. As reasoned in the MIS Report, acres of habitat that are only occasionally traversed by cross-country travel (i.e. no unauthorized routes exist) were not included in the calculation of affected acres. Acres of habitat impacted by roads and motorized trails were derived by placing a ¼ mile buffer along all roads and motorized trails that are open either year-round or seasonally. Roads and motorized trails that are closed year-round were not included in the calculation of affected acres, as reasoned in the MIS Report. A ¼ mile buffer is conservative and likely overestimates the percent of habitat affected. Therefore, it is likely that less than 2 percent of the habitat within the Sierra Nevada bioregion has likely been affected by motorized travel on the SNF. As such, motorized travel on the SNF has not likely affected habitat at a bioregional level, nor has it likely affected the distribution of sooty (blue) grouse across the bioregion.

The alternatives would continue to directly, indirectly, and cumulatively affect up to 847 acres of late seral open canopy coniferous forest habitat (lowest) under Alternative 4, and 1,320 acres (highest) under the No Action Alternative. As explained above, the acres affected would likely be less. The Travel Management Plan would **not** result in a change of: (1) habitat acres; (2) canopy cover class; or (3) CWHR size class. However, effectiveness of the habitat would be impacted due to: (1) human disturbance, (2) edge effects, and (3) habitat avoidance and abandonment. Nevertheless, because the acres affected would be less than 2 percent of the total Sierra Nevada-wide acreage, none of the alternatives would likely affect habitat at the bioregional level, nor would they likely affect the distribution of sooty grouse across the Sierra Nevada bioregion.

Late Seral Closed Canopy Coniferous Forest Habitat – Affected Environment

Late seral closed canopy coniferous forest on the SNF is composed of ponderosa pine, Sierran mixed conifer, white fir, and red fir stands that contain primarily medium to large trees (equal to or greater than 24 inches dbh) with canopy closures greater than 40 percent. The entire analysis area contains about 66,373 acres of late seral closed canopy coniferous forest habitat. About 58,731 of them are currently open to cross-country motorized travel. About 36 miles of unauthorized routes (encompassing about 18,406 ZOI acres) exist by users within this habitat. About 1.5 of these miles was created in areas where motorized cross-country travel is currently prohibited. (See Figure 1-3 for a map of those areas). About 247 miles of NFTS roads and

motorized trails, private roads, and other public roads (state, county, other federal) (encompassing about 47,967 ZOI acres) exist in late seral closed canopy coniferous forest habitat within the analysis area. Including the roads, motorized trails, and unauthorized routes, the habitat has a route density of 2.72 mi./sq.mi. About 1.2 acres of managed Open Areas and 17 acres of unauthorized Open Areas exist within the habitat. About 1.6 acres of the unauthorized Open Areas exist in prohibited areas. Overall, about 66,391 acres of late seral closed canopy coniferous forest habitat is impacted by roads, motorized trails and Open Areas. Nevertheless, because about 27 miles of roads and motorized trails (encompassing 10,455 ZOI acres) are closed year-round to vehicular traffic (except for necessary administrative use), the acres of late seral closed canopy coniferous forest habitat impacted is likely closer to 55,936 or 84 percent.

Late Seral Closed Canopy Coniferous Forest Habitat – Environmental Consequences

Direct and Indirect Effects

The following indicators were chosen to provide a relative measure of the direct and indirect effects to the habitat. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Acres of habitat available
- Acres of habitat open for cross-country motorized use
- Miles of unauthorized routes within the habitat, and acres of habitat encompassed by a ¼ mile zone of influence (ZOI)
- Miles of roads and motorized trails (NFTS, private, other public) within the habitat, and acres of habitat encompassed by a ¼ mile ZOI
- Total road and motorized trail density (NFTS, private, other public, and unauthorized routes that could receive use) within the habitat
- Acres of Open Areas (FS managed and unauthorized) within the habitat

ALTERNATIVE 1 – NO ACTION

Effects due to Continued Cross-country Motor Vehicle Travel: Under the No Action alternative, 58,731 acres of late seral closed canopy coniferous forest habitat would remain open for motorized cross-country travel. Occasional cross-country travel through habitat types on the SNF would not generate lasting impacts upon the habitats, nor would MIS likely avoid using areas that are only occasionally accessed by motor vehicles. However, where cross-country travel occurs in the same vicinity regularly, unauthorized routes and Open Areas are generated and impacts upon habitat and MIS use of habitat occurs. Under this alternative, cross-country travel would not be prohibited. It is assumed that the proliferation of unauthorized routes and Open Areas would continue and the effects would be similar to those discussed under adding roads and motorized trails to the NFTS. There would be continued use of about 34 miles of unauthorized routes and 15 acres of unauthorized Open Areas in late seral closed canopy habitat within the project area under this alternative.

Effects Due to Additions to the NFTS: There are no roads, motorized trails or areas proposed for addition to the NFTS under this alternative; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the NFTS. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effect upon late seral closed canopy coniferous habitat effectiveness.

ALTERNATIVE 2 – PROPOSED ACTION

Effects due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails.

Effects Due to Additions to the NFTS: Under this alternative, 44 miles of roads and motorized trails and 6 acres of Open Areas are proposed for addition to the NFTS. Of the 44 miles added, 3 miles are within late seral closed canopy coniferous forest habitat. None of the Open Areas to be added are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. About 17 more miles of roads and motorized trails within the habitat would be closed year-round under this alternative, increasing the amount of roads and motorized trails closed year-round in the habitat by 39 percent.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas and NFTS, private and other public roads and motorized trails. Direct and indirect effects are the same as described in Alternative 2.

Effects Due to Additions to the NFTS: Under this alternative, there would be no new roads, motorized trails or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads). Effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas and NFTS, private and other public roads and motorized trails. The effects are the same as described in Alternative 2. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 51 miles of roads and motorized trails and 37 acres of Open Areas are proposed for addition to the NFTS. Of the 51 miles of roads and motorized trails added, approximately 3 miles are within late seral closed canopy coniferous forest habitat. Of the 37 acres of Open Areas added, approximately 0.1 acre is within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat, as discussed above under Alternative 2.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. About 24 more miles of roads and motorized trails within the habitat would be closed year-round under this alternative, increasing the amount of roads and motorized trails closed year-round in the habitat by 47 percent.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas and NFTS, private and other public roads and motorized trails. Direct and indirect effects are the same as described in Alternative 2. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 85 miles of roads and motorized trails and 105 acres of Open Areas are proposed for addition to the NFTS. Of the 85 miles added, approximately 6 miles are within late seral closed canopy coniferous forest habitat. Of the 105 acres of Open Areas added, approximately 1 acre is within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat, as discussed above under Alternative 2.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. About 13 more miles of roads and motorized trails within the habitat would be closed year-round under this alternative, increasing the amount of roads and motorized trails closed year-round in the habitat by 33 percent.

Late Seral Closed Canopy Coniferous Forest Habitat - Cumulative Effects

Per direction in the LRMP, as amended by the SNF Bioregional MIS Report, determinations of project-level species impacts are not made for MIS. Instead a relationship of project-level habitat impacts to bioregional-scale habitat and population trends is provided for MIS.

As discussed above, roads, motorized trails and Open Areas that are within ¼ mile of the habitat likely increase: (1) nesting/denning, resting and foraging disturbance; (2) nest predation (for birds); and/or (3) habitat avoidance. Those impacts are most significant during the reproductive seasons and may reduce reproductive success. Reproductive seasons span from around the beginning of March to mid-August. The periods of greatest sensitivity occurs during nest/den building, and (for birds) incubation when the individual is more likely to abandon the site (Gotmark 1992 in Knight and Gutzwiller 1995). Another period of sensitivity is the nestling/fledgling periods (for birds), and the maternal period (for mammals) when parental attentiveness may be disturbed; thereby, disrupting feeding patterns and increasing the chance that young may become stressed and/or predated upon.

The higher the road and motorized trail density, the greater the amount of habitat taken out of effective MIS use. When route density exceeds a certain point, the habitat does not provide any place for undisturbed reproduction, foraging, or resting to occur. If route density remains too high, habitat is likely avoided. Species population can be reduced as a result. Existing motorized travel has created a route density of 2.72 mi./.sq.mi within late seral closed canopy coniferous forest habitat and has likely impacted as much as 66 percent of late seral open canopy habitat and as much as 84 percent of late seral closed canopy habitat within the analysis area by decreasing their effectiveness for MIS. A comparison of route densities and percent habitat impacted is provided in the table below (Table 3- 165).

Other activities within the analysis area cumulatively affect the habitat. CDFG (2005 *In:* USDA-FS 2008) lists loss of habitat via timber harvesting as a factor impacting all three MIS species. Within the analysis area, about 53,192 acres have been impacted by timber management activities. Some of the activities likely occurred in late seral closed canopy stands and likely reduced the amount of habitat available by converting the stands into early seral plantations or late seral open canopy stands. About 4,028 acres or 6 percent of late seral closed canopy habitat that currently exists within the analysis area has or will be impacted by timber management activities within the timeframe of this analysis. These sales have/will likely improved the growth, vigor, health, and resistance of the stands.

CDFG lists fuel reduction/prescribed fire activities as one of the factors that impacts late seral closed canopy MIS. Nevertheless, USFWS states that the short-term negative impacts are ameliorated by the longer-term benefit of reducing the greater risk of catastrophic wildfire. About 1,535 acres of prescribed burns have or will occur in late seral closed canopy coniferous forest habitat within the analysis area. Prescribed burns have or will likely benefit the habitat by removing excess fuel buildup and making the habitat less susceptible to wildfires.

About 2,104 acres of wildfires have occurred in late seral closed canopy coniferous forest habitat within the analysis area. Viewing historical fires records of the High Sierra Ranger District, it is foreseeable that about 1,866 additional acres would burn on the district in the foreseeable future. The same acreage is assumed for the Bass Lake RD. While many burned acres are replanted, it takes decades for late-seral habitat to re-establish. Some coniferous forest habitats do not re-establish either because the burned sites are no longer conducive to coniferous forest regeneration or budget constraints do not allow every acre to be replanted. Such acres typically convert to shrubland habitat. Under the current funding trend (last 10 years), only about 10 percent of burned coniferous forest habitats have been replanted (Rojas 2008). Nevertheless, it is anticipated that only around 9 percent of late seral closed canopy habitat within the analysis area has/will be impacted by wildfires.

Table 3- 165 below summarizes the differences that would occur within late seral closed canopy habitat under each alternative.

Table 3- 165. Indicators per Alternative for Late Seral Closed Canopy Coniferous Forest Habitat

	Acres Open to Motorized Cross-country Travel	Miles of NFTS and other Private/ Public Roads and Motorized (added miles included in total above)	Miles of NFTS Roads and Motorized Trails Closed Year-Round	Miles of Unauthorized Routes that Can Receive Motorized Travel	Route Density (mi./sq. mi.)	Acres of Managed Open Areas (added Open Areas included in total above)	Acres of Unauthorized Open Areas that Can Receive Motorized Travel	Acres and Percent Habitat Impacted by a Decrease in Effectiveness for MIS
Alt1	58,731	247 (+0)	27	34	2.70	1 (+0)	15	54,451 = 82%
Alt2	0	250 (+3)	44	0	2.40	1 (+0)	0	32,593 =49%
Alt3	0	247 (+0)	27	0	2.38	1 (+0)	0	37,513 =57%
Alt4	0	250 (+3)	51	0	2.40	1 (+0)	0	30,346 =46%
Alt5	0	253 (+6)	40	0	2.43	2 (+1)	0	36,375 =55%

Relationship of Late Seral Closed Canopy Coniferous Forest Habitat to MIS

California Spotted Owl

The California spotted owl was selected as an MIS for late seral closed canopy coniferous forest in the Sierra Nevada. The owl is strongly associated with forests that have a complex multi-layered structure, large-diameter trees, and high canopy closure (CDFG 2005, USFWS 2006). It uses dense, multi-layered canopy cover for roost seclusion; roost selection appears to be related closely to thermoregulatory needs, and the species appears to be intolerant of high temperatures (CDFG 2005). Mature, multi-layered forest stands are required for breeding (Ibid). The mixed-conifer forest type is the predominant type used by spotted owls in the Sierra Nevada: about 80 percent of known sites are found in mixed-conifer forest, with 10 percent in red fir forest (USDA-FS 2001). Refer to the California spotted owl section provided in Chapter 3 for species status information on the SNF.

American Marten

The American marten was selected as an MIS for late seral closed canopy coniferous forest in the Sierra Nevada. Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersion of riparian areas and meadows. Important habitat attributes are: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1987). Key components for westside and eastside marten habitat can be found in the Sierra Nevada Forest Plan Amendment FEIS (USDA-FS 2001), Volume 3, Chapter 3, part 4.4, pages 20-21. Refer to the American Marten section provided in Chapter 3 for species status information on the SNF.

Northern Flying Squirrel

The northern flying squirrel was selected as an MIS for late seral closed canopy coniferous forest habitat in the Sierra Nevada. The northern flying squirrel occurs primarily in mature, dense conifer habitats intermixed with various riparian habitats, using cavities in mature trees, snags, or logs for cover (CDFG 2005).

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trends

As determined in the MIS Report for Travel Management (Strand and Sanchez 2010), current motorized travel on the SNF is affecting up to 55,936 acres or 6 percent of late seral closed canopy coniferous forest habitat within the Sierra Nevada bioregion. Affected acres were derived by summarizing the acres of habitat impacted by existing and added roads, motorized trails and Open Areas. As reasoned in the MIS Report, acres of habitat that are only occasionally traversed by cross-country travel (i.e. no unauthorized routes exist) were not included in the calculation of affected acres. Acres of habitat impacted by roads and motorized trails were derived by placing a ¼ mile buffer along all routes that are open either year-round or seasonally. Roads and motorized trails that are closed year-round were not included in the calculation of affected acres, as reasoned in the MIS Report. A ¼ mile buffer is conservative and likely overestimates the percent of habitat affected. Therefore, it is likely that less than 6 percent of the habitat within the Sierra Nevada bioregion has likely been affected by motorized travel on the SNF. An assumption was made in the MIS Report that affects upon MIS habitats that are 5 percent or greater are significant and may affect habitat and population trends. As such, motorized travel on the SNF may have adversely affected late seral closed canopy coniferous forest habitat and the distribution of the California spotted owl, American marten, and northern flying squirrel at the bioregional level.

The Travel Management Project will directly, indirectly, and cumulatively affect up to 30,346 acres of late seral closed canopy coniferous forest habitat (lowest) under Alternative 4, and 54,451 acres (highest) under the No Action Alternative. The Motorized Travel Management Plan would **not** result in a change of: (1) habitat acres; (2) canopy cover class; or (3) CWHR size class. However, effectiveness of the habitat would be impacted due to: (1) human disturbance, (2) edge effects, and (3) habitat avoidance and abandonment. Nevertheless, acres impacted range from 3 to 5 percent of the total Sierra Nevada-wide acreage. The action alternatives would decrease impact of motorized travel to 3 and 4 percent. The No Action Alternative would continue to impact up to (but as reasoned above, likely less than) 5 percent of the habitat. Therefore, all of the alternatives would likely decrease impact of motorized travel on the SNF to the point that it would not affect the habitat nor the distribution of the California spotted owl, American marten, and northern flying squirrel at the bioregional level.

Table 3- 166. Summary of Acres of Past, Present and Reasonably Foreseeable Future Projects and Acres Affected for Late-successional Species

Disturbance	Total acres across the Analysis Area Per Disturbance	Reasonably Foreseeable Future (acres of activities)	Acres Affected Per Disturbance	Direct and Indirect Effects	Current Change in Amount of Habitat
Prescribed fire	19,191	2000	1535	Habitat quality reduction through removal of understory veg., some snags and downed logs	8 percent change
Wildfire	40,003	3600	2104	Habitat loss	5 percent change
Vegetation Management (Timber Sales included) *	526,689	Unknown	5498	Habitat reduction	1 percent change
Hazard Trees	6089	Unknown	6089	Short-tern noise disturbance	Unknown
Plantations	47,465	Unknown	3164	Long-term benefit future habitat for species	7 percent
Private land	95,725	Unknown	Unknown	Unknown	Unknown
Special Uses	1812	Unknown	Unknown	Unknown	Unknown
Livestock grazing	743,247	Unknown	Unknown	Potential habitat modification	Unknown
Recreation facilities	3242	Unknown	Unknown	Unknown	Unknown

*uneven age treatment, clear cutting, thinning, hand release, chemical release and planting in plantations <30 yrs. old.

Ungulates

Ungulates on the SNF are represented by the mule deer. Because the mule deer was selected as the MIS for oak-associated hardwood and hardwood/conifer habitat, this habitat is discussed under the ungulate section following the analysis of the deer. Oak-associated hardwood and hardwood/conifer habitat in the Sierra Nevada bioregion is comprised of montane hardwood (MHW) and montane hardwood-conifer (MHC) as defined by the CWHR (CDFG 2005). This habitat is addressed as montane hardwood habitat in the MTM MIS Report (Strand and Sanchez 2010) and will be address as such in this chapter.

Mule Deer – Affected Environment

The 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 SNF 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.

Some of the winter ranges, population centers and holding areas are interconnected and when they are shown on the LRMP maps they are shown as one large polygon; therefore, in the following tables they are recognized as one but are given two numbers because there are different standards and guidelines for particular areas. The population centers, holding areas and winter ranges encompass other habitat besides oak associated hardwood and hardwood/conifer habitat.

Mule deer are the most important big game species on the SNF. Yosemite, Huntington, Oakhurst, San Joaquin and North Kings are the principal deer herds. Although a few animals occupy winter ranges throughout the year, each herd is predominately migratory. The SNF provides the majority of summer and winter range for the San Joaquin, Huntington and North Kings herds. The forest also provides most of the summer range for the Oakhurst herd and a portion of winter range for the Yosemite herd.

There are 30 deer population centers (approximately 133,243 acres), 15 (17 if separate polygons) holding areas (approximately 48,363 acres) and 6 (7 if separate polygons) winter ranges (approximately 185,290 acres) that are identified on the wildlife element map in the LRMP. There are a number of migration routes that equate to approximately 133,257 acres. Of those areas, there are 13 deer population centers that are identified by the LRMP with standard and guideline #44 (minimize, during July, management activities). There are 13 holding areas that are identified in the LRMP with standard and guideline #45 (minimize management activities in particular deer holding areas on particular dates depending on elevation) and 4 deer winter ranges that are identified in the LRMP with standard and guideline #46 (keep vehicle travel at low levels in particular deer winter ranges).

Mule Deer – Environmental Consequences

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the mule deer. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Miles of roads and motorized trails added to migration corridors
- Acres of roads and motorized trails added to the NFTS within ZOI of migration corridors

- Miles of roads and motorized trails within winter range
- Acres of roads and motorized trails added to the NFTS within ZOI of winter range
- Density (miles of roads and motorized trails /sq mile of deer area) within winter range
- Miles of roads and motorized trails within population centers
- Acres of roads and motorized trails added to the NFTS within ZOI of population centers
- Density (miles of roads and motorized trails /sq mile of deer area) within population centers
- Miles of roads and motorized trails within holding areas
- Acres of roads and motorized trails added to the NFTS within ZOI of holding areas
- Density (miles of roads and motorized trails /sq mile of deer area) within holding areas

Direct and Indirect Effects

To assess the potential direct and indirect impacts to deer from road and motorized trail-associated disturbance, the miles of roads and motorized trails to be added to National Forest System were determined for each alternative by key deer types (population centers, holding areas and winter ranges) and by habitat type.

For all major deer herds occurring within the boundaries of the SNF, Alternative 1, with continued use of unauthorized routes under continued cross-country travel, would have the greatest road and motorized trail density compared to all the action alternatives within essential population centers, holding areas and winter ranges, especially on the west side of the Forest. Alternative 5 would have slightly greater road and motorized trail densities than all the remaining action alternatives. Within population centers and winter ranges, Alternative 1 poses a somewhat higher risk to all deer herds on the SNF 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 not significantly different in their road and motorized trail densities and, therefore, impacts to the Sierra deer herds within population centers and winter ranges do not vary greatly amongst the action alternatives. Alternative 1 road and motorized trail densities exceed the action alternatives by over 1 mile/square mile in some instances, where habitat effectiveness would be reduced.

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 motor vehicle 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 (656 feet and 2625 feet), depending upon the road type and traffic level and the surrounding habitat (Perry and Overly 1977, Rost and Bailey 1979). One study showed 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 coming within 200 meters (656 feet) of a road. Perry and Overly (1977) reported that deer were displaced up to 800 meters (2625 feet) from roads.

Main roads were found to reduce deer use up to 0.5 mile (800 m) from the road, whereas secondary and primitive roads reduced deer densities from between 200 to 400 meters (0.12 to 0.25 miles) 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, 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).

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 and in the rut. 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, and 5), where vehicle speeds are greatest, have the most potential to contribute to deer-vehicle collisions. Deer-vehicle collisions on roads and trails which are maintained for high clearance vehicles (maintenance level 2 roads) are probably not appreciable in number due to the lower speeds and the amount of use received by these roads.

In migration, the evidence indicates that wildlife avoids traffic on roads, but not that roads interrupt migrations (Bowles in Knight and Gutzwiller 1995, pg 135). Acute noise exposure does not affect the course of migration significantly, although it can cause short detours or an increase in the rate of travel (Ibid).

Edge and Marcum (1985) reported that elk leave a 0.3 to 0.6 mile (500-1000 m) buffer zone around logging roads when traffic is high (at a rate of a few transits per day), but not at other times. Similar observations have been made for deer (Dorrance et al 1975; Singer and Beattie 1986). The range at which animals avoided traffic was approximately the range at which they could detect traffic noise, suggesting that traffic noise was meaningful through association with human activity.

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Cross-country travel would not be prohibited under this alternative; therefore, it is assumed the route proliferation would continue over the short and long term.

Impacts of unauthorized routes are most significant in: (1) deer population centers during the reproductive season (July); (2) deer winter range from December through April; and/or (3) deer holding areas during migration seasons (May 15-June 15, Oct 1-Nov 30 above 5,000 feet; and May 1-June 1, Oct 15-Nov 30 below 5,000 feet).

Disturbance in population centers during July likely reduces reproductive success. Adequate foraging is critical for milk production. The greater the disturbances related to vehicular travel, the more time spent in alert or in flight and the less time foraging. Road traffic itself may not elicit much response, but when vehicles stop and people get out, disturbance level increases.

Disturbance in deer winter range likely affects an individual's survival. While the flight response of deer tends to be less in winter, when elicited, the impact is higher because it is critical to consume and conserve energy in winter.

Disturbance in holding areas during migration can indirectly impact an individual's reproductive success in summer and survivability in winter. During spring migration, it is important to conserve energy reserves because poor reserves affect fetal development and fawn survival (CDFG 1984). During fall migration, it is important to consume enough browse and/or acorns to pre-fatten for winter (Ibid); therefore, the less energy expended in flight and the more time grazing, the better.

Effects Due to Additions to the NFTS: There are no roads, motorized trails or Open Areas proposed for addition to the NFTS under this alternative; therefore, there would be no direct or indirect effects.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the NFTS. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effects on deer within the zone of influence for each area and associated habitat.

Table 3- 167. Alternative 1 – Deer Winter Range

Indicators	Measure
Miles of unauthorized roads and motorized trails within deer winter range	90 miles
Unauthorized road and motorized trail density	.31 mi/sq mi

Table 3- 168. Alternative 1 – Deer Population Centers

Indicators	Measure
Miles of unauthorized roads and motorized trails within deer population centers	20 miles
Unauthorized road and motorized trail density	.09 mi/sq mi

Table 3- 169. Alternative 1 – Deer Holding Area

Indicators	Measure
Miles of unauthorized roads and motorized trails within deer holding areas	16 miles
Unauthorized road and motorized trail density	.21 mi/sq mi

ALTERNATIVE 2 – PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited under this alternative. Therefore, it is assumed this would limit the proliferation of unauthorized routes within all types of mule deer habitat. This would reduce the risk of direct and indirect effects, which is a beneficial effect, to mule deer from motorized travel over the short and long term. Unauthorized routes that aren't added to the NFTS would eventually become ecologically adjusted and associated vegetative cover within the affected habitat would be increased. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Actions proposed in this alternative would likely decrease disturbance to some mule deer within the project area, compared to Alternative 1. Decreases in road and motorized trail densities and percentages of habitat influenced by motor vehicles on summer and winter range would likely result in decreased disturbance to some mule deer within the project area. The overall route density for deer winter range in this alternative is 0.12 miles/sq mile (Table 3- 174). There are two out of 30 population centers (7 percent) that are affected with added roads and motorized trails (Table 3- 172). The road and motorized trail density within the 30 population centers is .09 miles/sq mile (Table 3- 175). There are two deer holding area out of 15, which is 13 percent of all holding areas, affected by intersecting routes (Table 3- 173). The overall road and motorized trail density for deer holding areas are 1.87 miles/sq miles.

Under this alternative, 44 miles of roads and motorized trails and 1 Open Area (6 acres) are proposed for addition to the NFTS. The Open Area is not within any of the deer habitat areas.

Table 3- 170. Alternative 2 – Deer Migration Corridors

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer migration corridors	7.8 miles
Acres of roads and motorized trails added to the NFTS within ZOI of migration corridors	819 acres

Table 3- 171. Alternative 2 – Deer Winter Range

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer winter range	3 miles
Acres of roads and motorized trails added to the NFTS within ZOI of winter range	1186 acres
Number of winter range areas that intersect with roads and motorized trails	2

Table 3- 172. Alternative 2 – Deer Population Centers

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer population centers	1 miles
Acres of roads and motorized trails added to the NFTS within ZOI of population centers	415 acres
Number of population centers that intersect with roads and motorized trails	2

Table 3- 173. Alternative 2 – Deer Holding Areas

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer holding areas	3 miles
Acres of roads and motorized trails added to the NFTS within ZOI of holding areas	1186 acres
Number of holding areas that intersect with roads and motorized trails	2

Table 3- 174. Alternative 2 – Route Density within Winter Range

Indicators	Density (miles of roads and motorized trails/sq mile) of deer area
Winter range	
2 South Fork Merced River	0.04
3 Miami Mountain	0.08
Total	**0.12**

Table 3- 175. Alternative 2 – Route Density within Population Centers

Indicators	Density (miles of roads and motorized trails/sq mile) of deer area
Population Center	
2-3 Grizzly Beasore	0.04
12 Markwood	0.05
Total	**0.09**

Table 3- 176. Alternative 2 – Route Density within Deer Holding Areas

Indicators	Density (miles of roads and motorized trails/sq mile) of deer area
Holding areas	
8 Glen Meadow	1.34
11 Big Fir-Dinkey-Lower Dinkey	0.03
Total	**1.37**

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** Alternative 2 would decrease impacts occurring from current management of the NFTS. It would increase miles of NFTS roads and motorized trails that are closed year-round from 236 to 446 miles, and would increase miles that are seasonally closed from 470 to 986 miles.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Motorized cross-country travel and use of all the unauthorized routes and Open Areas created by past cross-country travel would be prohibited on the SNF.

It would prevent disturbance to the species within this group by prohibiting cross-country travel. In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur.

Effects Due to Additions to the NFTS: Under this alternative, no roads, motorized trails or Open Areas are proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to mule deer.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS. Effects would be the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited under this alternative. Therefore, it is assumed this would limit the proliferation of unauthorized routes within all types of mule deer habitat. This would reduce the risk of direct and indirect effects, which is a beneficial effect, to mule deer from motorized travel over the short and long term. Unauthorized routes that aren't added to the NFTS would eventually become ecologically adjusted and associated vegetative cover within the affected habitat would be increased. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: There are four winter ranges out of six affected by additional roads and motorized trails (Table 3- 191). (The overall route density in deer winter range is .0741 mi/sq mi (Table 3- 181)). There are 3 population centers out of 30 that are intersected with additional roads and motorized trails. There are 3 out of 30 population centers that have approximately 0.09 miles of routes being added to the NFTS (Table 3- 182). There are 2 holding area out of 15 (13 percent) affected by the addition to the NFTS, under this alternative. The route density is 0.87 mi/sq mi respectively out of 15 deer holding areas (Table 3- 183). In this alternative, 11 Open Areas, totaling 37 acres are proposed for addition to the NFTS. Of the 11, 3 Open Areas are in deer winter range totaling 3.78 acres (approximately 10 percent of the Open Areas and 0.002 percent of the total winter range). Also design feature WL-5 addresses the season of use by applying the closure to roads and motorized trails so there would be less disturbance to deer. Roads accessing the areas would not open until May 1 or June 1; therefore, there should be less direct and indirect effects to deer. There are no Open Areas proposed in the population centers or holding areas under this alternative.

Table 3- 177. Alternative 4 – Deer Migration Corridors

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer migration corridors	3.9 miles
Acres of roads and motorized trails added to the NFTS within ZOI of migration corridors	1439 acres

Table 3- 178. Alternative 4 – Deer Winter Range

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer winter range	3 miles
Acres of roads and motorized trails added to the NFTS within ZOI of winter range	1053 acres
Number of winter range areas that intersect with roads and motorized trails	4

Table 3- 179. Alternative 4 – Deer Population Centers

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer population centers	1.5 miles
Acres of roads and motorized trails added to the NFTS within ZOI of population centers	1285 acres
Number of population centers that intersect with roads and motorized trails	3

Table 3- 180. Alternative 4 – Deer Holding Areas

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer holding areas	2 miles
Acres of roads and motorized trails added to the NFTS within ZOI of holding areas	1186 acres
Number of holding areas that intersect with roads and motorized trails	2

Table 3- 181. Alternative 4 – Route Density (miles of roads and motorized trails per sq. mile of deer area) within Winter Range Areas

Indicators	Density
Winter range	
2 South Fork Merced River	0.03
3 Miami Mountain	0.02
5 Kinsman Flat	0.02
6-7 Secata-Cottonwood/Rodgers Ridge	0.0041
Total	**0.0741**

Table 3- 182. Alternative 4 – Route Density (miles of roads and motorized trails per sq. mile of deer area) within Population Centers

Indicators	Density
Population Center	
2-3 Grizzly/Beasore	0.04
7 Little Shuteye	0.03
12 Markwood	0.02
Total	**0.09**

Table 3- 183. Alternative 4 – Route Density (miles of roads and motorized trails per sq. mile of deer area) within Holding Areas

Indicators	Density
Holding areas	
8 Glen Meadow	0.78
9-10 Summit/Blue Canyon-Providence	0.09
Total	**0.87**

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads) Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1).

There are 1568 miles that are seasonally closed in this Alternative which is 1098 miles more than what is currently seasonally closed. There are 552 miles closed year-round which is a little more than twice as much as currently closed (236 miles).

Wet weather seasonal restrictions of native surface motorized roads and trails are analyzed for the project alternatives. Alternatives 4 and 5 provide additional wet weather seasonal restrictions, which may benefit deer that may be using areas that are not currently under existing LRMP deer seasonal restrictions. In areas outside current LRMP closure areas, the wet weather seasonal closures would provide an additional four months wet weather closure and would reduce the effects of motor vehicles upon deer using these areas.

Also Resource Issue Code WL-5 addresses the season of use by applying the closure to roads and motorized trails so there would be fewer disturbances to deer; therefore, there should be less direct and indirect effects to deer.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited under this alternative. Therefore, it is assumed this would limit the proliferation of unauthorized routes within all types of mule deer habitat. This would reduce the risk of direct and indirect effects, which is a beneficial effect, to mule deer from motorized travel over the short and long term. Unauthorized roads and motorized trails that aren't added to the NFTS would eventually become ecologically adjusted and associated vegetative cover within the affected habitat would be increased. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Alternative 5 proposes the highest amount of roads and motorized trails (85 miles) and 20 Open Areas for addition to the NFTS (see Table 3- 139, pg. 3-344 in the beginning of this chapter). Approximately 15 miles would become NFTS roads and 70 miles would become NFTS motorized trails. Overall, there is approximately 0.2 mi/sq mi within the deer winter range across the SNF (Table 3- 188).

There are 3 out of 30 population centers that have approximately 0.24 mi/sq mi of roads and motorized trails being added to the NFTS (Table 3- 189). There is approximately 1.25 mi/sq mi of roads and motorized trails within 2 out of 15 holding areas (Table 3- 185). In this alternative, there are 20 proposed Open Areas, totaling 105 acres. Of the 20 areas, 5 Open Areas are in deer winter range totaling 5.34 acres (approximately 4.7 percent of the Open Areas and 0.002 percent of the total winter range). Also design feature WL-5 addresses the season of use by applying the closure to roads and motorized trails so there would be less disturbance to deer, the roads accessing the areas would not open until May 1 or June 1; therefore, there should be less direct and indirect effects to deer. There are two Open Areas, totaling 68.9 acres (approximately 61 percent of the Open Areas and 0.05 percent of the total population center being affected), proposed in one population center (Table 3- 191). There are no Open Areas proposed in the holding areas under this alternative.

Table 3- 184. Alternative 5 – Deer Migration Corridors

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer migration corridors	13 miles
Acres of roads and motorized trails added to the NFTS within ZOI of migration corridors	4120 acres

Table 3- 185. Alternative 5 – Deer Winter Range

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer winter range	7.9 miles
Acres of roads and motorized trails added to the NFTS within ZOI of winter range	2818 acres
Number of winter range areas that intersect with roads and motorized trails	5

Table 3- 186. Alternative 5 – Deer Population Centers

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer population centers	3.5 miles
Acres of roads and motorized trails added to the NFTS within ZOI of population centers	2085 acres
Number of population centers that intersect with roads and motorized trails	3

Table 3- 187. Alternative 5 – Deer Holding Areas

Indicators	Measure
Miles of roads and motorized trails added to the NFTS within deer holding areas	3 miles
Acres of roads and motorized trails added to the NFTS within ZOI of holding areas	1186 acres
Number of holding areas that intersect with roads and motorized trails	2

Table 3- 188. Alternative 5 – Route Density (miles of roads and motorized trails per sq. mile of deer area) within Winter Range Areas

Indicators	Measure
Winter Range	
2 South Fork Merced River	0.05
3 Miami Mountain	0.08
4 Taylor Mountain	0.02
5 Kinsman Flat	0.03
6-7 Secata-Cottonwood/Rodgers Ridge	0.02
Total	**0.2**

Table 3- 189. Alternative 5 – Route Density (miles of roads and motorized trails per sq. mile of deer area) within Population Centers

Indicators	Measure
Population Center	
2-3 Grizzly_Beasore	0.05
7 Little Shuteye	0.10
12 Markwood	0.09
Total	**0.24**

Table 3- 190. Alternative 5 – Route Density (miles of roads and motorized trails per sq. mile of deer area) within Holding Areas

Indicators	Measure
Holding areas	
8 Glen Meadow	1.20
9-10 Summit_Blue Canyon-Providence	0.05
Total	**1.25**

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads) Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1).

Wet weather seasonal restrictions would be the same as discussed under Alternative 4. There would be a slightly higher adverse effect than Alternative 4 because fewer roads and motorized trails would be closed. The wet weather restrictions encompass the design features for season of use so there are fewer disturbances to some of the deer areas as recognized in the LRMP.

Alternative 5 would also decrease impacts to habitats within the analysis area from currently existing NFTS roads and motorized trails. There is an increase of miles on NFTS roads and motorized trails that are seasonally closed from 470 to 1625 miles. Under Alternative 5, 63 percent of the roads that are seasonally closed compared to 17 percent seasonally closed under Alternative 1. There are more roads and motorized trails with a season of use applied versus open year-round. This alternative would increase miles of NFTS roads and motorized trails that are closed year-round from 236 to 418 miles.

Summary of Deer Areas

Four (4) deer holding areas out of 15 (26 percent of all holding areas) are affected by the action alternatives. Five (Kinsman Flat, Rodgers Ridge, Secata Cottonwood, South Fork Merced River and #3), out of six (83 percent) deer winter range areas are affected and intersect with roads and motorized trails proposed for addition to the NFTS. There are 3 out of 30 (10 percent) population centers on the SNF that are affected and intersect with roads and motorized trails proposed for addition to the NFTS.

Table 3- 191. Deer Areas that are Intersecting with Existing (Alt 1), Added Roads, Motorized Trails (Alts 2, 4 and 5) or Open Areas

Route	District	Alternative	Analysis Unit	Holding Area	Winter Range	Population Center
AE-14z	BLRD	1,4,5	Mammoth		Kinsman Flat 5	
AE-18z	BLRD BLRD	1,4,5	Gaggs		Kinsman Flat 5	
BP133	BLRD	1, 5	Mammoth		Kinsman Flat 5	
BP21	BLRD	1,5	Gaggs			Little Shuteye 7
BP24	BLRD	1, 5	Gaggs			Little Shuteye 7
BP37	BLRD	1,4,5	Gaggs			Little Shuteye 7
BP48	BLRD	1,4,5	Gaggs			Little Shuteye 7
ES10	HSRD	1,5	Jose Chawanakee		Kinsman Flat 5	
JG10	BLRD	1,5	Gaggs		Rodgers Ridge 7	
JH-11	HSRD	1, 2, 5	Tamarack-Dinkey	Glen Meadow 8		
JH-12	HSRD	1, 2, 4, 5	Tamarack-Dinkey	Glen Meadow 8		
JH-125	HSRD	1,2	Tamarack-Dinkey	Big Fir-Dinkey-Lower Dinkey 11		
JH-126	HSRD	1,2	Tamarack-Dinkey	Big Fir-Dinkey-Lower Dinkey 11		
JH-15	HSRD	1,2,4,5	Tamarack-Dinkey	Glen Meadow 8		
JH-18	HSRD	1,2,4,5	Tamarack-Dinkey	Glen Meadow 8		
JH-18b	HSRD	1,2,4,5	Tamarack-Dinkey	Glen Meadow 8		
JH-40	HSRD	1,2,5	Tamarack-Dinkey	Glen Meadow 8		
JM-16z	BLRD	1,5	Gaggs			Little Shuteye 7
JM-18	BLRD	1,4,5	Gaggs			Little Shuteye 7
JM-21z	BLRD	1,5	Tamarack-Dinkey			Markwood 12
JM-36	BLRD	1,2,5	Westfall		Miami Mtn 3	
JM-41	BLRD	1,5	Westfall		Miami Mtn 3	
JM-44	BLRD	1,5	Westfall		Miami Mtn 3	
KD-20	HSRD	1,2,4,5	Tamarack-Dinkey	Glen Meadow 8		
KD-21	HSRD	1,	Tamarack-Dinkey	Glen Meadow 8		

Route	District	Alternative	Analysis Unit	Holding Area	Winter Range	Population Center
KD-94	HSRD	1,4,5	Tamarack-Dinkey	Summit_ Blue Canyon-Providence 9_10		
PK-01z	HSRD	1,2,4,5	Tamarack-Dinkey	Glen Meadow 8		
PK-01zh	HSRD	1,2,5	Tamarack-Dinkey			Markwood 12
PK-01zk	HSRD	1,2,4,5	Tamarack-Dinkey			Markwood 12
PK-04	HSRD	1,2,4,5	Tamarack-Dinkey	Glen Meadow 8		
PK-37	HSRD	1,2,4,5	Tamarack-Dinkey			Markwood 12
PK-48	HSRD	1,2,5	Tamarack-Dinkey	Glen Meadow 8		
PK-51x	BLRD	1,2,4,5	Globe			Grizzly_Beasore 2_3
PK-51xa	BLRD	1,5	Globe			Grizzly_Beasore 2_3
PK-54	HSRD	1,2	Tamarack-Dinkey	Glen Meadow 8		
PK-5	BLRD	1,2,4,	Westfall		Miami Mtn 3	
PK47	BLRD	1.5	Westfall		Taylor Mtn 4	
PUB-07	BLRD	1,4,5	Gaggs		Kinsman Flat 5	
SR-13z	BLRD	1,2,5	Westfall		Miami Mtn 3	
SV-6	BLRD	1,2,4,5	Westfall		Miami Mtn 3	
TH-10z	HSRD	1,5	Dinkey-Kings		Secata-Cottonwood/Rodgers Ridge 6_7	
TH-161z	BLRD	1,5	Globe			Little Shuteye 7
TH-28z	BLRD	1,4,5	South Fork		South Fork Merced River 2	
TH-29z	BLRD	1,5	South Fork		South Fork Merced River 2	
TH-41y	BLRD	1,2,4,5	Westfall		South Fork Merced River 2	
TH-60z	BLRD	1,4,5	Westfall		South Fork Merced River 2	
TH-67y	BLRD	1,2,4,5	Westfall		South Fork Merced River 2	
TH-67z	BLRD	1,2,5	Westfall		South Fork Merced River 2	
TH-68z	BLRD	1,2,5	Westfall		South Fork Merced River 2	
TH-69y	BLRD	1,4,5	Westfall		South Fork Merced River 2	
TH-74	BLRD	1,5	Westfall		South Fork Merced River 2	

Route	District	Alternative	Analysis Unit	Holding Area	Winter Range	Population Center
ZZ20	HSRD	1,4,5	Dinkey-Kings		Secata-Cottonwood/Rodgers Ridge 6_7	
TH-87	BLRD	1,5	Westfall		South Fork Merced River 2	
ZZ21	HSRD	1,4,5	Dinkey-Kings		Secata-Cottonwood/Rodgers Ridge 6_7	
ZZ25	HSRD	1,4,5	Dinkey		Secata-Cottonwood/Rodgers Ridge 6_7	
ZZ26	HSRD	1,4,5	Dinkey		Secata-Cottonwood/Rodgers Ridge 6_7	
Open Areas	**District**	**Alternative**	**Analysis Unit**	**Holding Area**	**Winter Range**	**Population Center**
BLKRC77	HSRD	4,5	Dinkey-Kings		Secata-Cottonwood/Rodgers Ridge 6_7	
MCLD FLT375	BLRD	4,5	Westfall		Taylor Mtn 4	
CHPO SDDL390	BLRD	4,5	Westfall		Taylor Mtn 4	
BLKR7 CK8	HSRD	5	Dinkey-Kings		Secata-Cottonwood/Rodgers Ridge 6_7	
SGRLF HL223	HSRD	5	Jose Chawanakee		Kinsman Flat 5	
CNTRL CMPS PR345	BLRD	5	Gaggs			Little Shuteye 7
RCKC RKSP R391	BLRD	5	Gaggs			Little Shuteye 7

Cumulative Effects

Table 3- 192. Road Density (mi/sq mi) (NFTS Plus Roads and Motorized Trails Proposed for Addition) for Each of the Three Deer Areas per Alternative

Road Density per deer area (mi/sq mi.)	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Winter range	1.78	1.59	1.47	1.49	1.67
Population centers	1.43	1.43	1.34	1.44	1.57
Holding areas	2.96	4.12	2.75	3.63	3.99

Past, present and reasonably foreseeable actions leading to effects on 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; and recreational activities including hunting, camping and general recreation activities including all forms of motorized use including four-wheel drive vehicles, ATVs and motorcycles.

When considering all the cumulative effects of past, present and reasonably foreseeable future impacts from the activities listed above, Alternative 1 poses the greatest risk to the 4 major deer herds on the SNF, where key winter ranges are influenced by unauthorized roads and motorized trails and key summer ranges would be 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 four major deer herds on the SNF. Alternative 3 does not add any roads and motorized trails, so does not add to existing cumulative impacts. All the action alternatives will result in a beneficial impact to all deer ranges across the SNF from the closure of cross-country travel. Degree of benefit depends on the alternative (Alternative 5 most miles added to the NFTS, Alternative 3 least miles added to the NFTS). It is expected that non-motorized use may occur on the unauthorized roads and motorized trails that are not added to the NFTS which would likely result in disturbance to mule deer. Some studies indicate that certain non-motorized activities (hiking, mountain bicycling, equestrian, etc.) could actually result in greater disturbance to mule deer. The amount of disturbance caused by non-motorized use will depend on the type, intensity, timing and duration of the use. As unauthorized motorized routes which are not added to the NFTS become revegetated and recover over time, either through active or passive restoration efforts, overall mule deer disturbance from human activity is expected to diminish in the future.

In addition, Alternatives 3, 4, 5 would benefit deer on winter ranges through the implementation of wet weather closures on native surfaced roads and trails as well as seasonal closures associated with Resource Issue Codes, WL-4 and WL-5.

The same activities listed in Table 3- 193 apply to the alternatives; however, Alternative 4 when overlayed with the other activities would have less of an impact to the deer because there would be more seasonal closures and an increase on the number of roads prohibited. It is a benefit to wildlife because overall there would be fewer disturbances to the species and the habitat.

The effects of cattle grazing can result in a loss of hiding cover for deer which is an important habitat component that is used when fawning occurs (Loft et al. 1987). Because cover is a basic need of wildlife it is concluded that loss of cover does not maximize deer fitness. Historically, the competitive effects of livestock on deer were likely overshadowed by the tremendous level of habitat disturbance that took place between 1849 and the early 1900s. There was likely enough early successional habitat available on forested ranges that livestock and deer did not significantly compete. Since that time, the acreage and quality of deer habitat has declined to the extent cattle and deer may now be competing for resources on summer ranges in mutually preferred meadow-riparian and aspen habitats (Loft and Menke 1988). Also as stated in CDFG 1998, mountain meadows and riparian zones are highly preferred by deer and other wildlife. These and associated aspen habitats are often regarded as key fawning areas and population centers, critical for female deer to nurture young fawns at this most nutritionally demanding time of the year. Overuse of herbaceous and shrub vegetation through the summer reduces hiding and escape cover, and leaves little in terms of quality forage in September-October as deer attempt to build reserves for the winter period.

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.

Currently, there is a high demand for recreational use on the SNF due to its close proximity to urban centers. The SNF 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 motor vehicle use, winter OSV use and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the SNF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, recreational use on the SNF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting and motor vehicle use. Generally, the increase in recreational use on the SNF has the potential to cause an increase in negative interactions between humans and mule deer. Future increase in recreational use on the SNF is expected and therefore, increased disturbance to mule deer would be expected, particularly during the summer months.

Table 3- 193 summarizes direct, indirect and cumulative impacts from reasonably foreseeable projects and a description of the potential impact to mule deer and their habitat.

Table 3- 193. Direct, Indirect and Cumulative Impact to Mule Deer from Reasonably Foreseeable Future Projects

Project Type	Mule Deer Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning,	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in oak habitats.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Controlled burning and mastication in chaparall habitat	Short-term impact from displacement	Long-term improvement to deer forage condition
Hazard tree removal	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Special Use permit renewal	N/A administrative action	None
Non-motorized Trail development	Short-term disturbance during trail construction, some increased public use may increase disturbance.	Slight increase in cumulative impact.

Oak-Associated Hardwood and Hardwood/Conifer Habitat– Affected Environment

The entire analysis area contains about 204,400 acres of montane hardwood habitat. About 202,836 of them are currently open to cross-country motorized travel. About 112 miles of unauthorized routes (encompassing 49,233 ZOI acres) exist within this habitat. About 0.2 of these miles were created in areas where motorized cross-country travel is currently prohibited. (See Figure 3-1for a map of those areas). About 576 miles of NFTS roads and motorized trails, private roads, and other public roads (state, county, other federal) (encompassing about 121,814 ZOI acres) exist in montane hardwood habitat within the analysis area. Including the roads, motorized trails, and unauthorized routes, the habitat has a route density of 2.16 mi./sq.mi. About

1.8 acres of managed Open Areas exist within the habitat. Furthermore, about 57.5 acres of unauthorized Open Areas exist within the habitat. About 0.8 acre of these is in prohibited areas. All in all, about 171,107 acres of montane hardwood habitat are impacted by roads, motorized trails and Open Areas. Nevertheless, because about 52 miles of roads and motorized trails (encompassing 17,458 ZOI acres) are closed year-round to vehicular traffic (except for necessary administrative use), the acres of montane hardwood habitat taken out of effective MIS use is closer to 153,649 or 75 percent.

Oak-Associated Hardwood and Hardwood/Conifer Habitat-Environmental Consequences

Direct and Indirect Effects

The following indicators were chosen to provide a relative measure of the direct and indirect effects to the habitat. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Acres of habitat available
- Acres of habitat open for cross-country motorized use
- Miles of unauthorized routes within the habitat, and acres of habitat encompassed by a ¼ mile zone of influence (ZOI)
- Miles of NFTS private, other public roads and motorized trails, within the habitat, and acres of habitat encompassed by a ¼ mile ZOI
- Total density of roads and motorized trails and unauthorized routes that could continue to receive use within the habitat
- Acres of Open Areas (FS managed and unauthorized) within the habitat

ALTERNATIVE 1 – NO ACTION

Effects due to Continued Cross-country Motor Vehicle Travel: Under the No Action alternative, 202,836 acres of montane hardwood habitat would remain open for motorized cross-country travel. Occasional cross-country travel through habitat types on the SNF would not generate lasting impacts upon the habitats, nor would MIS likely avoid using areas that are only occasionally accessed by motor vehicles. However, where cross-country travel occurs in the same vicinity regularly, unauthorized routes and Open Areas are generated and impacts upon habitat and MIS use of habitat occurs. Under this alternative, cross-country travel would not be prohibited. It is assumed that the proliferation of unauthorized routes and Open Areas would continue and the effects would be similar to those discussed under adding roads and motorized trails to the NFTS. There would be continued use of about 112 miles of unauthorized routes and 57 acres of unauthorized Open Areas in montane hardwood habitat within the project area under this alternative.

Effects Due to Additions to the NFTS: Under this alternative, there would be no new roads, motorized trails or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads: Under this alternative, there are no proposed changes to the NFTS. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effect upon montane hardwood habitat effectiveness.

ALTERNATIVE 2 – PROPOSED ACTION

Effects due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 44 miles of roads and motorized trails and 6 acres of Open Areas are proposed for addition to the NFTS. Of the 44 miles added, 12 miles are within montane hardwood habitat. None of the Open Areas to be added are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round and seasonal closures. About 37 more miles of roads and motorized trails within the habitat would be closed year-round, and about 6 more miles of roads and motorized trails within the habitat would be seasonally closed during deer use. This would increase the amount of roads and motorized trails closed year-round and seasonally within the habitat by 42 percent.

Note: Unlike other habitats, seasonal closures are as effective in reducing impacts upon MIS use of habitats as year-round closures are. The reason for this is twofold. First, deer tend to utilize specific areas at specific times of the year, and closing roads and motorized trails in areas when they are being used by deer is equally effective as year-round closures. Second, the primary impacts of roads and motorized trails upon deer are related to the human influence (i.e. noise disturbance, hunting, vehicular collisions). Deer are not affected by nest predators/parasites that thrive along road edges.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized roads and motorized trails and Open Areas. Motor vehicle use would be limited to managed Open areas and NFTS, private, and other public roads and motorized trails. Direct and indirect effects are the same as described in Alternative 2. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, no roads, motorized trails or Open Areas are proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS; therefore, the effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized roads and motorized trails and Open Areas. Motor vehicle use would be limited to managed Open Areas and NFTS, private and other public roads and

motorized trails. The effects are the same as described in Alternative 2. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 51 miles of roads and motorized trails and 37 acres of Open Areas are proposed for addition to the NFTS. Of the 51 miles of roads and motorized trails added, approximately 8 miles are within montane hardwood habitat. Of the 37 acres of Open Areas added, approximately 2 acres are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat, as discussed above under Alternative 2.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round and seasonal closures. About 61 more miles of roads and motorized trails within the habitat would be closed year-round, and about 14 more miles of roads and motorized trails within the habitat would be seasonally closed during deer use. This would increase the amount of roads and motorized trails closed year-round and seasonally within the habitat by 56 percent.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized roads, motorized trails and Open Areas. Motor vehicle use would be limited to managed Open Areas and NFTS, private, and other public roads and motorized trails. Direct and indirect effects are the same as described in Alternative 2. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 85 miles of roads and motorized trails and 105 acres of Open Areas are proposed for addition to the NFTS. Of the 85 miles added, approximately 19 miles are montane hardwood habitat. Of the 105 acres of Open Areas added, approximately 29 acres are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat, as discussed above under Alternative 2.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round and seasonal closures. About 39 more miles of roads and motorized trails within the habitat would be closed year-round, and about 15.5 more miles of roads and motorized trails within the habitat would be seasonally closed during deer use. This would increase the amount of roads and motorized trails closed year-round and seasonally within the habitat by 48 percent.

Oak-Associated Hardwoods and Hardwood/Conifer Habitat - Cumulative Effects

As discussed above, motor vehicle use on roads, motorized trails and Open Areas within ¼ mile of the habitat is likely to increase: (1) fawning, resting and foraging disturbance; and/or (2) habitat avoidance. Impacts are most significant in: (1) deer population centers during the reproductive season (July); (2) deer winter range from December through April; and/or (3) deer holding areas during migration seasons (May 15-June 15, Oct 1-Nov 30 above 5,000 feet; and May 1-June 1, Oct 15-Nov 30 below 5,000 feet).

The higher the road and motorized trail density, the greater the amount of habitat taken out of effective MIS use. When density exceeds a certain point, the habitat does not provide any place for undisturbed reproduction, foraging, or resting to occur. If density remains too high, habitat is likely avoided. Species population can be reduced as a result. Existing motorized travel has created a route density of 2.16 mi./sq.mi within montane hardwood habitat and has likely impacted as much as 75 percent of it by decreasing its effectiveness for MIS. A comparison of route densities and percent habitat impacted is provided in the table below (Table 3- 194).

Other activities within the analysis area cumulatively affect the habitat. There are 28 active cattle allotments, encompassing about 743,247 acres, and permitting 17,000 AUMs within the analysis area. Some montane hardwood habitat within the analysis area is utilized for cattle grazing. Cattle impact this habitat by browsing oak saplings and young shrubs, newly emerging oak sprouts, new leader growth of oaks and shrubs, acorns, grass, and forbs. They decrease the availability of food for deer within the habitat. Nevertheless, cattle utilization is limited by standards and guidelines in the 1995 LRMP amendment which limits use of woody shrubs to 20 percent annual leader growth when rangeland is in satisfactory condition and 10 percent if in unsatisfactory condition (USDA-FS 1995b, p. 2-15). The Sierra Nevada Forest Plan Amendment (SNFPA) limits grazing, as well. SNFPA S&G #51 (pp.55-56) mandates that grazing utilization in annual grasslands will maintain a minimum of 60 percent cover, and provides residual dry matter (RDM) retention levels based upon range condition and annual precipitation. By preventing over-utilization of annual grasslands, the amount of cattle browse on woody plants and acorns should be limited, and enough residual matter should be left to provide adequate seed stock for the next growing season. This should ensure that both winter and spring forage is left for the deer. Therefore, cattle should not significantly degrade the quality of montane hardwood habitat for MIS.

About 6,123 acres or 3 percent of montane hardwood habitat within the analysis area have/will be treated with timber sale activities, and about 7,380 acres or 15 percent have/will be treated with plantation activities. The above totals may reflect some double counting of acres since both harvesting and planting may have occurred on the same piece of land during the timeframe of the analysis. Nevertheless, the totals are assumed to be representative. Treatments do not remove hardwood but impact the habitat in two ways. The first way is to reduce the amount of shrubs and small coniferous trees in the understory of the habitat. This degrades the quality of the habitat by reducing cover and browse for deer. Nevertheless, this impact is temporary. If the area was previously high in shrubs, adequate cover would likely be provided within a year since shrubs tend to sprout back in that timeframe. The resulting habitat would be improved since young shrubs are more palatable and may provide better cover. The second way montane hardwood habitat can be impacted by timber activities is by removing conifers that are competing with hardwoods. This improves the vigor of oaks and can ultimately provide more acorn mast and browse for deer consumption.

About 22,274 acres of prescribed burns have occurred in the analysis area, with about 7,974 acres occurring in montane hardwood habitat. Treated acres have and will benefit the habitat by: (1) releasing oaks from competing conifers; (2) controlling the buildup of fuels, acorn destroying insects, and root-rotting fungi; and (3) preparing a favorable seedbed. Only about 4 percent of the habitat within the analysis area has/will benefit with prescribed burn treatments.

Finally, about 55,605 acres of wildfires have occurred in the analysis area, with about 21,352 acres occurring in montane hardwood habitat. The wildfires likely burned hot enough to completely consume the above ground portion of trees and even kill the below ground portion of sprouting species such as oaks. It is likely that up to about 10 percent of the habitat may have been lost. Nevertheless, favorable seed beds were likely created, allowing the habitat to re-establish. However, it will take many decades for the large oak component of the habitat to

return. While beneficial large snags would have been created, these snags have/will eventually fall over and replacements will not be available for many decades. According to historical fire records of the High Sierra Ranger District, it is likely that about 1,866 additional acres of wildfire will occur on the district in the foreseeable future. This acreage is assumed for the Bass Lake RD, as well. Nevertheless, considering past trends, foreseeable wildfires are not anticipated to impact a significant portion of the habitat.

Table 3- 194 below summarizes the differences that would occur within montane hardwood habitat under each alternative.

Table 3- 194. Indicators per Alternative for Montane Hardwood Habitat

	Acres Open to Motorized Cross-country Travel	Miles of NFTS and Other Private/ Public Roads and Motorized Trails (added miles included in total above)	Miles of NFTS Roads and Motorized Trails Closed Year-round and Seasonally	Miles of Unauthorized Routes that Can Receive Motorized Travel	Route Density (mi./sq. mi.)	Acres of Managed Open Areas (added Open Areas included in total above)	Acres of Unauthorized Open Areas that Can Receive Motorized Travel	Acres and Percent Habitat Impacted by a Decrease in Effectiveness for MIS
Alt 1	202,836	576 (+0)	59.5	112	2.16	2 (+0)	57	150,928 =74%
Alt 2	0	588 (+12)	102.5	0	1.84	2 (+0)	0	91,013 = 45%
Alt 3	0	576 (+0)	59.5	0	1.81	2 (+0)	0	101,671 =50%
Alt 4	0	584 (+8)	134.5	0	1.83	4 (+2)	0	79,819 = 39%
Alt 5	0	595 (+19)	114	0	1.87	31 (+29)	0	93,038 = 46%

Mule Deer

The MIS chosen for this habitat type is the mule deer. The mule deer is found in oak-associated hardwood and hardwood/conifer in the Sierra Nevada, comprised of montane hardwood (MHW) and montane hardwood-conifer (MHC) as defined by the California Wildlife Habitat Relationships System (CWHR) (CDFG 2005). Mule deer range and habitat includes coniferous forest, foothill woodland, shrubland, grassland, agricultural fields, and suburban environments (CDFG 2005). Many mule deer migrate seasonally between higher elevation summer range and low elevation winter range (Ibid). On the west slope of the Sierra Nevada, oak-associated hardwood and hardwood/conifer areas are an important winter habitat (CDFG 1998).

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trend

As determined in the MIS Report for Travel Management (Strand and Sanchez 2010), current motorized travel on the Sierra National Forest is affecting up to 153,649 acres of montane hardwood habitat or 19 percent of the acres available within the Sierra Nevada bioregion. The result is reduced habitat effectiveness for mule deer through disturbance, avoidance, and abandonment of habitat. As previously discussed, affected acres were derived by summing the acres of habitat impacted by existing and added motorized roads, motorized trails and Open Areas. As reasoned in the MIS Report, acres of habitat that are only occasionally traversed by cross-country travel (i.e. no unauthorized routes exist upon them) were not included in the calculation of affected acres. Acres of habitat impacted by roads and motorized trails were derived by placing a ¼ mile buffer along all roads and motorized trails that are open year-round. Roads and motorized trails that are closed either year-round or seasonally were not included in the calculation of affected acres for deer, as reasoned in the MIS Report. A ¼ mile buffer is conservative and likely overestimates the percent of habitat affected. Therefore, it is likely that less than 19 percent of the habitat within the Sierra Nevada bioregion has been affected by motorized travel on the SNF. An assumption was made in the MIS Report that effects upon MIS habitats that are 5 percent or greater are significant and likely affect habitat and population trends. As such, motorized travel on the SNF has likely affected habitat effectiveness, and may have affected distribution of mule deer at the bioregional level.

The Travel Management Project would continue to directly, indirectly, and cumulatively affect up to 79,819 acres of montane hardwood habitat (lowest) under Alternative 4 and 150,928 acres (highest) under the No Action Alternative. As discussed above, the acres affected are likely less since a conservative approach was taken for the calculation of affected acres. Alternative 4 would have the least effect (likely less than 10 percent), followed by the Proposed Action alternative (likely less than 11 percent), Alternative 5 (likely less than 12 percent), and Alternative 3 (likely less than 13 percent). The No Action alternative would have the greatest effect (likely less than 19 percent). Because all of the alternatives would continue to affect more than 5 percent of the habitat, it is assumed that the Motorized Travel Management Plan would continue to adversely affect habitat effectiveness, and may affect the distribution of mule deer at the bioregional level. The majority of effects would occur from existing roads, motorized trails and Open Areas (and under Alternative 1, unauthorized routes that could receive use). Only an insignificant amount (1 percent or less) would be due to added roads, motorized trails and Open Areas.

The Motorized Travel Management Plan would **not** result in a change of: (1) habitat acres; (2) canopy cover class; or (3) CWHR size class. However, as mentioned above, effectiveness of the habitat would be impacted due to: (1) human disturbance upon the deer, and (2) habitat avoidance and abandonment. Nevertheless, NFTS roads and motorized trails in areas determined to be critical to deer by the California Department of Fish and Game (winter range, holding areas, and population centers) currently are and would continue to be closed either year-round or

seasonally during periods of deer use. Because of this, and because montane hardwood habitat is not the only habitat utilized by deer, impact upon mule deer at the bioregional level is likely less than the impact determined for montane hardwood habitat. Therefore, the Motorized Travel Management Plan may not significantly affect the distribution of mule deer at the bioregional level even though it likely affects montane hardwood habitat effectiveness at the bioregional level.

Riparian-Associated Species

The bald eagle, great gray owl, willow flycatcher, western red bat, Townsend's big-eared and yellow warbler will all be addressed under this section. However, it is important to note that these species represent different types of riparian habitat. The SNF MIS Amendment (2007) classifies riparian habitat as montane riparian vegetation (MRI) and valley riparian vegetation (VRI). Only MRI exists on the SNF. Such vegetative types typically occur along streams: Therefore, throughout the remainder of this section, this type of riparian habitat will be referred to as streamside riparian habitat. Gaines et al (2003) considers meadows and habitat that occurs along large bodies of water as being riparian habitat, as well. Therefore, data provided for the species below is a compilation of the streamside riparian habitat and meadow habitat types analyzed in the MIS Report (Strand and Sanchez 2010), as well as other data compiled from GIS wildlife and vegetative layers. As explained in the MIS Report, the acres of streamside riparian habitat underestimate the amount of habitat available because it is impossible to discern all the little slivers of MRI that exist.

Bald Eagle – Affected Environment

The bald eagle requires large bodies of water or free-glowing rivers with abundant fish, and adjacent snags or other perches. It nests in large old growth or dominant live trees with open branchwork. It nests most frequently in stands with less than 40 percent canopy cover. In California, 87 percent of nest sites are within 1 mile of water (Zeiner et al 1990).

The bald eagle was delisted from the list of Federally-threatened and endangered animal species in August 2007 and subsequently placed on the Regional Forester's Sensitive Species list. The bald eagle continues to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (MBTA). There are five known bald eagle nests on the SNF at this time (Bass Lake (2 nests), Shaver Lake (SCE), Huntington Lake and Lake Edison). Additional information can be found in the BE/BA (Sorini-Wilson, 2010).

Bald Eagle – Environmental Consequences

The following indicators were chosen to provide a relative measure of the direct and indirect effects to the bald eagle. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Miles of roads and motorized trails added to the NFTS adjacent to current nest sites.
- Miles of roads and motorized trails added to the NFTS within ¼ mile of known bald eagle sites.
- Number of eagle nests within 1/4 mile of roads and motorized trails added to NFTS.
- Number of Open Areas added to the NFTS adjacent to current nest sites.

Direct and Indirect Effects

Disturbance: The U.S. Fish and Wildlife Service developed National Bald Eagle Management Guidelines (2007) to advise land managers and others of protective provisions to minimize impacts to bald eagles, particularly where there may constitute "disturbance," which is prohibited by the Bald and Golden Eagle Protection Act.

The bald eagle guidelines do not provide protection provisions for general motorized use, but it does provide the following guidelines for off-road vehicle use. During the breeding season, do not operate off-road vehicles within 300 feet of the nest. In Open Areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet (USFWS 2007).

Habitat loss, fragmentation and edge effects: Roads may affect an animal's reproductive success. Productivity of bald eagles in Oregon and Illinois declines with proximity to roads and they preferentially nest away from roads. The reduced nesting success of eagles in proximity to roads may be more a function of the presence of humans than of the road itself (Trombulak and Frissell 2000).

The ZOI used for bald eagle is 1/4 mile buffer around known nest sites.

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Cross-country travel would not be prohibited under this alternative. Therefore, it is assumed the route proliferation would continue over the short and long term. Under this alternative the riparian associated species would have habitat degraded or removed because cross-country travel would continue and not be confined to particular roads and motorized trails. The protection measures that are set up for bald eagle would not be effective because cross-country use would continue.

There are nine roads and motorized trails in Alternative 1 that are within the ZOI of 1/4 mi of two different bald eagle nests. The actual nest is ¾ mile from the roads and motorized trails locations.

For the Bass Lake nest site, a current Forest Order to close the route from January 1 to August 31 or 3 weeks after chicks are known to have fledged would continue to be enacted on an annual basis. This action has been sufficient to protect the nesting activity over several years as evidence by this pair's successful fledging of one to two young per year.

Nevertheless, unless cross-country use is repeated in the same area, creating unauthorized routes and Open Areas, impact would not likely be high enough to cause avoidance behaviors or reduce reproductive success.

Effects Due to Additions to the NFTS: There are no roads, motorized trails or Open Areas proposed for addition to the NFTS under this alternative; therefore, there would be no direct or indirect effects.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the current season of use on NFTS roads and motorized trails. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effects on eagle within the zone of influence for each eagle area and associated habitat.

ALTERNATIVE 2 - PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the Forest under this alternative. Prohibition of cross-country would limit motor vehicle use to current NFTS roads. It would limit the proliferation of unauthorized routes.

Prohibition of cross-country motor vehicle travel would allow habitat to recover where degradation may be occurring. If it is prohibited, 446 miles of roads and motorized trails would have the potential to be restored. On some roads and motorized trails, recovery will achieve conditions similar to undisturbed areas within 5 to 30 years (see Soil Resource section). There are no unauthorized routes within bald eagle habitat. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: To reduce disturbance to nesting bald eagles, land management agencies typically implement restrictions on certain activities within a buffer of nests. Latest recommendations in the design criteria from USFWS (2007) suggest 660 feet where there is increased visibility and exposure to noise. To minimize disturbance to foraging bald eagles, roads and motorized trails should be minimized or not allowed between nesting or roosting sites and foraging sites.

No roads, motorized trails or Open Areas will be added in bald eagle habitat; therefore, there will be no direct or indirect effects to the bald eagle under this alternative.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** Alternative 2 would decrease impacts occurring from current management of the NFTS. It would increase miles of roads and motorized trails that are closed year-round from 236 to 446 miles, and increase miles of NFTS roads and motorized trails that are seasonally closed from 470 to 986 miles. Combined, closure periods would be changed on 709 miles of prohibited or seasonally-closed roads. The changes listed above should not affect the known bald eagles because they are not in these areas at this time.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Direct and indirect effects are the same as described in Alternative 2.

Effects Due to Additions to the NFTS: Under this alternative, there would be no roads and motorized trails or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to bald eagles.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS; therefore, the effects would be the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibited cross-country travel would limit the proliferation of unauthorized routes near bald eagles. This would reduce the risk of direct and indirect effects to bald eagles from motorized travel over the short and long term. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: There are no roads or motorized trails proposed for addition to the NFTS near known bald eagle nests sites; however, when the ZOI is applied there is one route (PK-06y) that is within 1/4 mile. None of the proposed Open Areas are within bald eagle habitat.

The bald eagle measures from Fish and Wildlife Service (U.S. Fish and Wildlife Service 2007) will be implemented which will provide further protection and are listed in the project record and under 'disturbance' on the previous page for bald eagle.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Seasonal closures and roads and motorized trails closed year-round would decrease human-caused disturbances to birds during this critical time.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibited cross-country travel would limit the proliferation of unauthorized routes near bald eagles. This would reduce the risk of direct and indirect effects to bald eagles from motorized travel over the short and long term. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: There are no roads and motorized trails proposed for addition to the NFTS near known bald eagle nests sites; however, when the ZOI is applied there is one route (PK-06y) that is within 1/4 mile. There are no Open Areas within bald eagle habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** Alternative 5 would be the same as Alternative 4.

Cumulative Effects

Additional effects upon bald eagles occur from timber and fuels management activities and wildfires in late seral coniferous forest habitats that are within a mile of large bodies of water or free-flowing water with abundant fish. Management activities create noise disturbance, and may remove some roosting trees or snags. However, mitigation and design measures minimize this impact. Refer to the cumulative effects section for late seral open and closed canopy coniferous forest habitats provided above under the late-successional forest associated species for degree of impact.

Great Gray Owl

Great gray owls use meadows for foraging and typically nest within 600 feet of meadow edge. Effects upon both foraging and nesting habitat are discussed above under late-successional forest associated species.

Willow Flycatcher – Affected Environment

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-FS 2001). Historically, willow flycatchers were once common throughout the Sierra Nevada. The current distribution of the willow flycatcher has been drastically reduced compared to historic distributions. A ten year demographic analysis indicates that 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 one to two 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) indicated that meadow wetness may assist in successful nesting of 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. Additional information can be found in the BE/BA (Sorini-Wilson, 2010).

Willow Flycatcher - Environmental Consequences

The following indicators were chosen to provide a relative measure of the direct and indirect effects to the willow flycatcher. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Miles of roads and motorized trails added to the NFTS that intersect with willow flycatcher occupied and emphasis meadows, and willow flycatcher habitat (meadows and streamside riparian habitat).
- Number of Open Areas added to the NFTS that intersect with willow flycatcher occupied and emphasis meadows, and willow flycatcher habitat (meadows and streamside riparian habitat).
- Number of roads and motorized trails within ¼ mile of an occupied willow flycatcher meadow.

Direct and Indirect Effects

Disturbance: Wildlife species associated with riparian habitats are particularly vulnerable to the effects of recreation activities on their habitat because of the concentration of these activities in riparian areas. Riparian habitats occur in narrow, linear configuration that is often traversed by roads and trails. Because of the availability of open water, cover and concentrated food sources, these habitats are used by wildlife disproportionately to their availability (Gaines et al. 2003, USDA-FS 1996).

Habitat loss, fragmentation and edge effects: 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 which 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.

There are unauthorized roads and motorized trails within the Riparian Conservation Area (RCAs) as described in the hydrology section. This could be a potential impact to the habitat because vegetation is possibly being trampled and destroyed. RCAs cover a larger area than is assigned to the Riparian habitat under MIS (see MIS report, Strand and Sanchez 2010). The RCA buffer can

range from 150 to 300 feet depending on the class of stream. When a creek has year-round water there will be a larger buffer than one that is ephermal or intermittent.

Recreation activities in willow flycatcher habitat can have effects similar to livestock grazing, although to a lesser extent and intensity in many cases. In addition, the supplemental food provided by developed and dispersed recreation in close proximity to riparian areas and meadows, as well as movement corridors provided by trails, may indirectly affect willow flycatchers through an increase in local abundance of brown headed cowbirds as well as nest predators, both native (such as jays, squirrels and chipmunks) and non-native (cats, dogs) (SNFPA FEIS, USDA-FS 2001 Ch 3 Part 4, pg. 156-157).

Table 3- 195 below summarizes differences in the amount of roads and motorized trails that intersect occupied willow flycatcher (WIFL) under each alternative.

Table 3- 195. Roads and Motorized Trails that Intersect with Willow Flycatcher (WIFL) Occupied Meadow Sites

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
0.51 miles or 9 intersecting roads and motorized trails	0 mi	0 mi	0 mi	0 mi

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Cross-country travel would not be prohibited under this alternative. Therefore, it is assumed the route proliferation would continue over the short and long term and the effects of the unauthorized routes would be similar to those discussed under adding roads and motorized trails to the NFTS. Under Alternative 1, there are 179 miles of unauthorized routes in RCAs (see hydrology section). The riparian associated species would have habitat degraded or removed because cross-country travel would continue and not confined to particular roads and motorized trails.

Alternative 1 would allow continued cross-country travel within 10,330 acres of wet meadow. Additional information can be found in the MIS report (Strand and Sanchez 2010).Willow flycatchers utilize meadows as part of their habitat. It is assumed a portion would be within suitable willow flycatcher habitat.

Effects Due to Additions to the NFTS: There are no roads, motorized trails or Open Areas proposed for addition to the NFTS under this alternative; therefore, there would be no direct or indirect effects.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the current season of use on NFTS roads and motorized trails. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be a negative effect on willow flycatchers within the zone of influence and associated habitat.

ALTERNATIVE 2 – PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country would limit motor vehicle use to NFTS roads and motorized trails. It would limit the proliferation of unauthorized routes. Prohibition of cross-country motor vehicle travel would allow habitat to recover where degradation may be occurring. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: None of the roads and motorized trails proposed for addition to the NFTS would be within or adjacent to streamside riparian habitat. Less than 0.1 mile would be added to meadow habitat. There are no occupied or emphasis meadows within ¼ mile of roads and motorized trails to be added. There would be no Open Areas within willow flycatcher habitat; therefore, there are no direct or indirect effects.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** Changes to year-round roads and motorized trails closures would not decrease impacts upon streamside riparian habitat. On the contrary, less roads and motorized trails within and adjacent to the habitat would be closed. Only 4 versus 5 acres would be protected with year-round roads and motorized trails closures. Note: Effects of roads and motorized trails upon streamside riparian habitat are discussed in terms of acres rather than miles because the mileage involved is small and does not always reflect the differences among alternatives. Changes to seasonal closures may decrease impacts since 519 more miles would be seasonally closed. Closure and removal of roads has been found to effectively provide wildlife security and increase the amount of available wildlife habitat (Wildlands CPR 2006).

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: This alternative would prevent disturbance to the species within this group by prohibiting cross-country travel. In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur.

Effects Due to Additions to the NFTS: Under this alternative, there would be no roads, motorized trails or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to willow flycatchers.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS; therefore, the effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibited cross-country travel would limit the proliferation of unauthorized routes near willow flycatcher habitat. This would reduce the risk of direct and indirect effects to willow flycatcher from motorized travel over the short and long term. Restricting cross-country travel would reduce incidence of meadow encroachment by OHVs and associated impacts. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: An insignificant amount of roads and motorized trails encompassing 0.001 ZOI acres would be added to streamside riparian habitat, and less than 0.1 miles would be added to meadow habitat. There are no occupied or emphasis WIFL sites affected by roads and motorized trails in this alternative; therefore, there would be no direct or indirect effects to the willow flycatcher. Eleven Open Areas are being added under this alternative; however, none are within willow flycatcher habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see

assumptions in Section 3.13.1)**.** This alternative would benefit 22 versus 5 acres of streamside riparian habitat by closing more miles of NFTS roads and motorized trails within and adjacent to the habitat year-round. Furthermore, more seasonal closures would occur since this alternative would impose season of use on 1568 versus 470 miles of NFTS roads and motorized trails. As stated in the MIS Report (Strand and Sanchez 2010) year-round and seasonal closures under this alternative would provide higher levels of protection to meadows, as well. Zones of influence would be significantly decreased, and less acres of habitat would be taken out of effective wildlife use. Seasonal closures would decrease human-caused disturbances to wildlife during reproductive time.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibited cross-country travel would limit the proliferation of unauthorized routes near willow flycatcher habitat. This would reduce the risk of direct and indirect effects to willow flycatcher habitat from motorized travel over the short and long term.

Effects Due to Additions to the NFTS: Approximately 0.02 miles (9 ZOI acres) of roads and motorized trails are proposed for addition to the NFTS within streamside riparian habitat. Less than 0.1 miles would be added to meadow habitat. There is one motorized trail (JM-21z) that is within ¼ mile of an occupied meadow for the willow flycatcher. There are 838 acres of occupied willow flycatcher affected by Alt 5 with roads and motorized trails proposed for addition to the NFTS within ¼ mile of an occupied willow flycatcher meadow (Markwood meadow). No emphasis habitat would be affected. There would be no Open Areas within willow flycatcher habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). More roads and motorized trails within and adjacent to streamside riparian habitat (encompassing 21 versus 5 ZOI acres) would be closed year-round. More roads and motorized trails would have a season of use (1625 versus 470). Zones of influence would be significantly decreased on these roads and motorized trails and less acres of habitat would be taken out of effective MIS use. Seasonal closures would decrease human-caused disturbances to wildlife during this critical time.

Cumulative Effects

Wildfire, fuels reduction, and cattle grazing are the primary activities/events that may cause cumulative effects upon willow flycatchers. Impacts from management activities should be minimized by standards and guidelines and/or mitigation and design measures. Refer to the cumulative effects section for the MIS streamside riparian habitat (provided below) and the MIS meadow habitat (provided in the aquatics section) for degree of impact.

Western Red Bat – Affected Environment

Western red bats appear to be highly associated with intact riparian habitat, particularly willows, cottonwoods and sycamores. Winter habitat includes western lowlands and coastal regions south of San Francisco Bay. This bat roosts in tree foliage and occasionally shrubs along edge habitats adjacent to streams, fields or urban areas. Preferred roosts (for all roost types) are protected from above and located above dark ground cover and generally from 2 to 40 feet above ground. Roosts are generally hidden from view from all directions except below (to allow free flight from the

roost). Red bats tend to roost out on the edge of the foliage at approximately one third of the height of the tree and mostly in the largest cottonwoods. Red bats prefer edge or habitat mosaics that have trees for roosting and Open Areas for foraging. Red bats have also been recorded using caves and mines or buildings (USDA-FS 2001).

Foraging occurs over grasslands, shrublands, open woodlands and forest and croplands; ridgetops to densely wooded timber stands, regeneration areas, powerline rights-of way, highways and old logging roads. Prey items mostly include moths, crickets, beetles and cicadas and may be taken from high above treetops to nearly ground level. They appear to have high foraging site fidelity. They have been recorded foraging under orchard and hardwood trees where understory is open. They require water (USDA-FS 2001). Additional information can be found in the BE/BA (Sorini-Wilson 2010).

Western Red Bat – Environmental Consequences

The following indicators were chosen to provide a relative measure of the direct and indirect effects to Western red bat. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

Miles of roads and motorized trails within riparian habitat

Direct and Indirect Effects

Disturbance: As discussed above, wildlife species associated with riparian habitats are particularly vulnerable to the effects of recreation activities on their habitat because of the concentration of these activities in riparian areas. Riparian habitats occur in narrow, linear configuration that is often traversed by roads and trails. Because of the availability of open water, cover and concentrated food sources, these habitats are used by wildlife disproportionately to their availability (Gaines et al. 2003, USDA-FS 1996).

Habitat loss, fragmentation and edge effects: The western red bat utilizes riparian habitat similar to the type delineated for MIS (streamside riparian). Therefore, impacts upon that habitat (as discussed below) would also impact the bat. Of the 264 acres of streamside riparian habitat delineated for MIS, there are 210 acres that are within the elevation band 3000 feet or below and considered suitable habitat for the Western red bat.

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Cross-country travel would not be prohibited under this alternative; therefore, it is assumed the route proliferation would continue over the short and long term. Under Alternative 1, there are 179 miles of unauthorized routes in RCAs (see Water Resources section). The riparian associated species would have habitat degraded or removed because cross-country travel would continue and not confined to particular roads and motorized trails.

Alternative 1 would allow continued cross-country travel within 10,330 acres of wet meadow. Additional information can be found in the MIS report (Strand and Sanchez 2010). It is assumed a portion would be within suitable Western red bat habitat.

Effects Due to Additions to the NFTS: There are no roads, motorized trails or Open Areas proposed for addition to the NFTS under this alternative; therefore, there would be no direct or indirect effects.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the current season of use

on NFTS roads. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effects on Western red bat within the zone of influence and associated habitat.

ALTERNATIVE 2 – PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country use would limit motor vehicle use to NFTS roads and motorized trails. It would limit the proliferation of unauthorized routes. Prohibition of cross-country motor vehicle travel would allow habitat to recover where degradation may be occurring. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: No roads and motorized trails would be added to streamside riparian habitat. No Open Areas would exist within Western red bat habitat; therefore, there would be no direct or indirect effects.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** The Western red bat forages in riparian habitat; therefore, the bat would benefit by closing roads and motorized trails within streamside riparian habitat. Under this alternative, less acreage (4 versus 5 acres) would benefit by year-round closures. Nevertheless, more miles of roads and motorized trails would be seasonally closed since this alternative imposes a season of use on 986 versus 470 miles of roads and motorized trails.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: This alternative would prevent disturbance to the species within this group by prohibiting cross-country travel. In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur.

Effects Due to Additions to the NFTS: Under this alternative, there would be no roads, motorized trails or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to Western red bat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS; therefore, the effects would be same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibited cross-country travel would limit the proliferation of unauthorized routes near Western red bat habitat. This would reduce the risk of direct and indirect effects to Western red bat from motorized travel over the short and long term. Restricting cross-country travel would reduce incidence of meadow and streamside encroachment by OHVs and associated impacts.

Effects Due to Additions to the NFTS: Fifty-one (51) miles of NFTS roads and motorized trails and 11 Open Areas, totaling 37 acres are proposed for addition to the NFTS under this alternative; however an insignificant amount of roads and motorized trails would be added to streamside riparian habitat impacting only 0.001 acres of the habitat. No Open Areas exist within

the habitat and none would be added. There is no suitable habitat being affected by roads and motorized trails in this alternative; therefore, there would be no direct or indirect effects to the Western red bat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** This alternative would benefit 22 versus 5 acres of streamside riparian habitat by closing more miles of NFTS roads and motorized trails within and adjacent to the habitat year-round. Furthermore, more seasonal closures would occur since this alternative would impose season of use on 1568 versus 470 miles of NFTS roads and motorized trails. Seasonal closures would decrease human-caused disturbances to wildlife during this critical time.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibited cross-country travel would limit the proliferation of unauthorized routes near Western red bat habitat. This would reduce the risk of direct and indirect effects to Western red bat habitat from motorized travel over the short and long term. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Approximately 0.02 miles (9 ZOI acres) of roads and motorized trails are proposed for addition to the NFTS within streamside riparian habitat. No Open Areas exist and none would be added.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** This alternative would benefit from 21 versus 5 acres of streamside riparian habitat by closing more miles of NFTS roads and motorized trails within and adjacent to the habitat year-round. Furthermore, more seasonal closures would occur since this alternative would impose season of use on 1625 versus 470 miles of NFTS roads and motorized trails. Seasonal closures would decrease human-caused disturbances to wildlife during this critical time.

Cumulative Effects

Recreational activities, special uses, fuels reduction, and timber management may create noise disturbance. They may also disturb the bat during winter hibernation, since these bats have been noted to roost in leaf litter. This impact does not apply to logging since it does not occur during winter months. As explained under the cumulative effects section for the streamside riparian habitat, cattle may impact the habitat (and thereby the bat) but not significantly so. They are removed from allotments during winter months; therefore, they do not disturb bats roosting in leaf litter. Timber and fuels management activities likely benefit the habitat (as explained under the cumulative effects section for the streamside riparian habitat). Thereby, they likely provide some benefit to the bat. Wildfire imposes cumulative effects, as well. Refer to the cumulative effects section for streamside riparian habitat for a discussion of the degree of impacts from these activities/events.

Townsend's Big-eared Bat – Affected Environment

The Townsend's big-eared bat requires roosting habitat that is inaccessible to humans because individual bats roost on walls or ceilings often near entrances. They rarely seek shelter in crevices as many other bat species do. If undisturbed, individuals will frequently roost less than three

meters off the ground, and have been found in air pockets under boulders on cave floors. Populations of this species are threatened by habitat loss, vandalism, and disturbance by cave explorers at maternity and hibernation roosts. Human disturbance can cause permanent abandonment of roost sites. Within a few years of publication of a guidebook to the caves of Colorado, human visitation to one particular cave increased so much that the colony of *C. townsendii* found there eventually disappeared.

Their most typical habitat is arid western desert scrub and pine forest regions. In terms of dominant vegetation type, this bat occurs in a variety of habitats, including desert scrub, sagebrush, chaparral, deciduous and coniferous forests. Their distribution is strongly associated with the availability of caves or cave-like roosting habitat such as old mines. They may also use hollow trees. Because of this, some of the green forest snag habitat information (following the riparian section) is brought forward. In general, the most serious factor leading to population declines in bats is loss and/or disturbance of suitable roosting habitat, and Townsend's big-eared bats appear to be among the most dependent of all North American bats on abandoned or inactive mines. Concentrations also occur in areas with substantial surface exposures of cavity forming rock such as limestone, but such areas are rare in the West. The species is occasionally found in old, mostly abandoned buildings and other human made cave-like structures, but these areas are mostly used at night while the animals are foraging. The bats are inactive during the day, and stay mostly in caves or mine tunnels. There are no known caves within the analysis area, but mines exist within it.

These bats require habitat for day roosts, night roosts, and hibernation roosts. Surveys have not been conducted to determine if there are known roosts on the Sierra National Forest. The most significant roosts, which have the largest aggregations and are most critical to the survival of populations, are the winter hibernacula (both sexes), and the summer maternity roosts (entirely adult females and their young). Additionally, there are other summer roosts: Those used in the day time by males and non-reproductive females (usually containing no more than a few animals per roost), night roosts (generally at a different site than the day roost), used by both sexes as a place to rest and digest food during the night, and interim roosts (sites used in the spring before the young are born and in the fall before moving to hibernating sites.

According to a study conducted in 1997 (Fellers and Pierson 2002), bats typically followed the edge of the forest, often along riparian corridors where vegetation was predominantly Douglas-fir, California bay, and occasionally willows (*Salix*). They usually flew 10-30 m off the ground between midcanopy and near the top of the canopy. Bats favored riparian habitat long streams and smaller tributaries. Occasionally bats were found in more open habitats, typically in close association with scattered trees or large shrubs. Bats avoided grassland, both when foraging and when traveling between the roost and foraging areas. There is a high degree of fidelity to the roost site.

The big-eared bat feeds on moths, caddisflies, and other insects, detecting them by echolocation, and capturing them in flight. They forage frequently over water, and also pick insects from leaves. This bat is particularly maneuverable in flight, varying from swift darting movements to slow deliberate and hovering moves. This makes the species difficult to capture, which is one reason why so little is known about locations in Colorado and other states. Townsend's big-eared bats are late flyers. They emerge from the roost primarily after dark, an average of 45.5 minutes after sunset, and forage until the early morning hours. Additional information can be found in the BE/BA (Sorini-Wilson 2010).

As shown in USDA 2001, the species has declined due to direct killing by people and because of abandonment of roosts caused by disturbance due to explorers and vandals.

Townsend's Big-eared Bat – Environmental Consequences

The following indicator was chosen to provide a relative measure of the direct and indirect effects to the Townsend's big-eared bat. The bat utilizes riparian areas for foraging and caves and snags for roosting. The information presented below will be addressed according to riparian information as well as green snag information where appropriate. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Miles of roads and motorized trails added to the NFTS within streamside riparian and green forest snag habitat or near cave or cave-like structures

Direct and Indirect Effects

Habitat loss, fragmentation and edge effects: Snag and log reduction occurs as an indirect effect of managing roads or trails for public use. Trees posing a potential safety hazard ("hazard trees") are removed along roads and trails open for public use, as well as roads receiving concentrated use during implementation of a specific project. Hazard trees are typically dead or dying trees that occur within a 300 feet from either side of the road. This safety policy results in a reduction in snags within a zone of 300 feet from the edge of a road. This, in turn, reduces habitat quality and availability for the Townsend's big-eared bat within these roadside corridors. Hazard tree removal adjacent to lower standard roads (e.g. maintenance level 2) or motorized trails is not as common as it is adjacent to more heavily traveled roads and motorized trails (e.g. paved roads, main road corridors on the SNF).

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Cross-country travel would not be prohibited under this alternative. Therefore, it is assumed the route proliferation would continue over the short and long term and the effects of the unauthorized routes would be similar to those discussed under adding roads and motorized trails to the NFTS. Under this alternative, the Townsend's big-eared bat would have habitat degraded if cross-country travel were able to access cave sites and vehicles were not confined to particular roads and motorized trails.

If cross-country motorized use continued, it would be a direct effect to this bat because the public could potentially disturb habitat. It may allow access to roost sites yet undiscovered which could be subject to disturbance and potentially cause roost site abandonment.

While cross-country travel does not have significant effect upon use of habitat for this species, unauthorized routes and Open Areas associated with cross-country travel can. Open Areas that are within the habitat and roads and motorized trails that are in or less than ¼ mile from the habitat likely increase: (1) roosting and maternal sites disturbance; and/or (2) habitat avoidance. The period of greatest sensitivity occurs when bats are in their winter hibernaculum or maternal colonies. Disturbance during hibernation depletes valuable reserves. Disturbance in maternal roosts may disrupt parental attentiveness and feeding patterns; thereby increasing the chance that young may become stressed or predated upon.

Effects Due to Additions to the NFTS: There are no roads, motorized trails or Open Areas proposed for addition to the NFTS under this alternative; therefore, there will be no direct or indirect effects to the species or the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the NFTS. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease

in the negative effects on Townsend's big-eared bat within the zone of influence and associated habitat.

ALTERNATIVE 2 – PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to current NFTS roads. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 44 miles of roads and motorized trails and one Open Area (6 acres) proposed for addition to the NFTS. None are within streamside riparian habitat. The 21 miles of NFTS roads and motorized trails that would be added to green forest snag habitat are not expected to impact Townsend's big-eared bat. While hazard tree removal would reduce the amount of snag habitat available for roosting, snags are typically not used for roosting by this species. Caves and cave-like structures are the primary roosting habitat. Therefore, there are no expected direct or indirect effects to the species. If any roads and motorized trails are added which lead to where caves or mines are located, that is where there is potential for disturbance to the species; however the only known caves and mines on the Forest exist in wilderness, where roads and motorized trails would not be added.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Changes to year-round roads and motorized trail closures would not decrease impacts upon streamside riparian habitat. On the contrary, less roads and motorized trails within and adjacent to the habitat would be closed. Only 4 versus 5 acres would be protected with year-round roads and motorized trail closures. Changes to seasonal closures may decrease impacts since 519 more miles would be seasonally closed. Closure and removal of roads has been found to effectively provide wildlife security and increase the amount of available wildlife habitat (Wildlands CPR 2006).

Changes to the season of use and open and closed status are not expected to have any detectable benefit upon species that utilize green forest snag habitat. Regardless of season of use or open or closed status, hazard trees (thereby green snags) are removed along NFTS roads and motorized trails for safety purposes. Therefore, snags that could potentially be used for roosting by Townsend's big-eared bat would still be removed. Nevertheless, as explained above, these bats tend to use caves and cave-like structures for roosting.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: This alternative would prevent disturbance to the species within this group by prohibiting cross-country travel. In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic especially if roads and motorized trails go by mine areas.

Effects Due to Additions to the NFTS: Under this alternative, no roads, motorized trails or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to Townsend's big-eared bat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS. The effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibited cross-country travel would limit the proliferation of unauthorized routes. This would reduce the risk of direct and indirect effects to Townsend's big-eared bats from motorized travel over the short and long term due to noise disturbance. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 51 miles of NFTS roads and motorized trails and 11 Open Areas, totaling 37 acres are proposed for addition to the NFTS; however an insignificant amount would affect foraging Townsend's big-eared bats since only 0.001 acres of streamside riparian habitat would be impacted. The 27 miles of NFTS roads and motorized trails and 13 acres of Open Areas that would be added to green forest snag habitat are not expected to impact the bat as explained above. If any roads and motorized trails are added which lead to where caves or mines are located, that is where there is potential for disturbance to the species; however the only known caves and mines on the SNF exist in wilderness, where roads and motorized trails are not occurring and would not be added.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). This alternative would benefit 22 versus 5 acres of streamside riparian habitat by closing more miles of NFTS roads and motorized trails within and adjacent to the habitat year-round. Furthermore, more seasonal closures would occur since this alternative would impose season of use on 1568 versus 470 miles of NFTS roads and motorized trails. Zones of influence would be significantly decreased, and less acres of habitat would be taken out of effective MIS use. Seasonal closures would decrease human-caused disturbances to wildlife during this critical time.

Changes to the season of use and open and closed status are not expected to have any detectable impact upon species that utilize green forest snag habitat. Regardless of season of use or open and closed status, hazard trees (thereby green snags) are removed along NFTS roads and motorized trails for safety purposes. Therefore, snags that could potentially be used for roosting by Townsend's big-eared bat would still be removed. Nevertheless, as explained above, these bats tend to use caves and cave-like structures for roosting rather than snags.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibited cross-country travel would limit the proliferation of unauthorized routes near Townsends big-eared bat habitat which would reduce the risk of direct and indirect effects to bat habitat from motorized travel over the short and long term. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 85 miles of roads and motorized trails and 105 acres of 20 Open Areas are proposed for addition to the NFTS. Of the 85 miles of roads and motorized trails added, only 0.02 would be within streamside riparian habitat. Of the 105 acres of Open Areas added, 52 acres would be within the habitat. The largest amount of this habitat would be affected because the highest amount of roads and motorized trails and Open Areas would be added. The 42 miles of NFTS roads and motorized trails and 52 acres of Open Areas that would be added to green forest snag habitat are not expected to impact the bat as explained above. If any roads and motorized trails are added which lead to where caves or mines are located, that is where there is potential for disturbance to the species; however the only known

caves and mines on the SNF exist in wilderness, where roads and motorized trails would not be added.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** This alternative would benefit from 21 versus 5 acres of streamside riparian habitat by closing more miles of NFTS roads and motorized trails within and adjacent to the habitat year-round. Furthermore, more seasonal closures would occur since this alternative would impose season of use on 1625 versus 470 miles of NFTS roads and motorized trails. Seasonal closures would decrease human-caused disturbances to wildlife during this critical time.

Changes to the season of use and open and closed status are not expected to have any detectable impact upon species that utilize green forest snag habitat. Regardless of season of use or open and closed status, hazard trees (thereby green snags) are removed along NFTS roads and motorized trails for safety purposes. Therefore, snags that could potentially be used for roosting by Townsend's big-eared bat would still be removed. Nevertheless, as explained above, these bats tend to use caves and cave-like structures for roosting rather than snags.

Cumulative Effects

Wildfires in streamside riparian habitat and green forest snag habitat pose cumulative effects upon the bat. Refer to the cumulative effects section for these habitat types for the degree of impact.

Timber management and fuels reduction activities that occur in streamside riparian habitat likely benefit the bat indirectly by modifying the habitat (Refer to the cumulative effects section for this habitat type for degree of impact). When they occur in green forest snag habitat, they remove snag roosts, but this is not believed to be a significant impact upon the bat since snags are only occasionally used for roosting by this bat. These activities may pose noise disturbance to snag-roosting bats, but as reasoned above, are not believed to be a significant impact upon the bat. They would not pose noise disturbance to bats utilizing streamside riparian habitat since the bat utilizes this habitat type at night for foraging when such activities do not occur.

Cattle may impact streamside riparian habitat (and thereby the bat) but not significantly so, as discussed in the cumulative effects section for the streamside riparian habitat.

Streamside Riparian Habitat – Affected Environment

Riparian habitat on the Sierra National Forest as designated for MIS is comprised only of montane riparian habitat (MRI). Using the 2001 vegetation coverage for the SNF, 264 acres of riparian habitat were delineated within the analysis area. It is important to note that acres are likely underrepresented since it is impossible to discern all the little slivers of this habitat type with vegetative imagery alone. Nevertheless, as explained in the MIS report (Strand and Sanchez 2010), a vegetative coverage was used to delineated acres of riparian habitat in the analysis area since that is how they were computed for the Sierra Nevada bioregion. By using the same methodology, forest data could be related to bioregional trends. The 2001 coverage revealed 264 acres of riparian habitat within the analysis area. Only 0.18 of these acres are in prohibited areas. (See Figure 1-3 for a map of those areas). Therefore, essentially the entire riparian habitat within the analysis area is currently open to cross-country motorized travel. Only about 0.05 miles of unauthorized routes (encompassing 21 ZOI acres) exist within this habitat. None were created in prohibited areas. About 1.5 miles of NFTS roads, other public roads, and private roads (encompassing 182 ZOI acres) exist in the delineated riparian habitat. Including the roads,

motorized trails, and unauthorized routes, the delineated habitat has a route density of 3.78 mi/sq.mi. No managed Open Areas exist within the habitat, and only 0.10 acres of unauthorized Open Areas exist. The unauthorized Open Areas do not exist in prohibited areas. All in all, about 203 acres of riparian habitat is impacted by roads and motorized trails and Open Areas. Nevertheless, because those acres include the ZOI of roads and motorized trails that are closed year-round (which are not considered to cause significant impacts as previously discussed), acres of riparian habitat impacted is likely closer to 198 or 75 percent.

Streamside Habitat – Environmental Consequences

Direct and Indirect Effects

The following indicators were chosen to provide a relative measure of the direct and indirect effects to the habitat. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

- Acres of habitat available
- Acres of habitat open for cross-country motorized use
- Miles of unauthorized roads and motorized trails within the habitat, and acres of habitat encompassed by a ¼ mile zone of influence (ZOI)
- Miles of NFTS, private, other public roads and motorized trails within the habitat, and acres of habitat encompassed by a ¼ mile ZOI
- Total density (mi/sq mi) of roads and motorized trails and unauthorized routes that could continue to receive use within the habitat
- Acres of Open Areas (FS managed and unauthorized) within the habitat

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Under the No Action alternative, all 264 acres of the delineated riparian habitat would remain open for motorized cross-country travel. Occasional cross-country travel through habitat types on the SNF would not generate lasting impacts upon the habitats, nor would MIS likely avoid using areas that are only occasionally accessed by motor vehicles. However, where cross-country travel occurs in the same vicinity regularly, unauthorized routes and Open Areas are generated and impacts upon habitat and MIS use of habitat occurs. Under this alternative, cross-country travel would not be prohibited. It is assumed that the proliferation of unauthorized routes and Open Areas would continue and the effects would be similar to those discussed under adding roads and motorized trails and Open Areas to the NFTS. There would be continued use of about 0.05 miles of unauthorized routes and 0.10 acres of unauthorized Open Areas in streamside riparian habitat within the project area under this alternative.

Effects Due to Additions to the NFTS: There are no roads and motorized trails or Open Areas identified to add to the NFTS under this alternative; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads: Under this alternative, there are no proposed changes to the current season of use on NFTS roads. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effect upon streamside riparian habitat effectiveness.

ALTERNATIVE 2 – PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 44 miles of roads and motorized trails and 6 acres of Open Areas are proposed for addition to the NFTS. None of the roads, motorized trails or Open Areas proposed to be added are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads: Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. Under this alternative, less acreage (4 versus 5 acres) would benefit by year-round closures.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails.

Effects Due to Additions to the NFTS: Under this alternative, there would be no roads, motorized trails or areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS. Effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 51 miles of roads and motorized trails and 37 acres of Open Areas are proposed for addition to the NFTS. Of the 51 miles of roads and motorized trails added, only an insignificant amount (encompassing only 0.001 ZOI acres) are within or adjacent to streamside riparian habitat. None of the Open Areas added are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. About 77 percent more roads and motorized trails within and adjacent to the

habitat would be closed year-round under this alternative; therefore, about 17 acres of streamside riparian habitat would benefit by increased effectiveness for MIS.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, there are 85 miles of roads and motorized trails and 105 acres of Open Areas proposed for addition to the NFTS. Of the 51 miles of roads and motorized trails added, about 0.02 miles would be added to riparian habitat. None of the Open Areas added are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. About 64 percent more roads and motorized trails within and adjacent to the habitat would be closed year-round under this alternative; therefore, about 16 acres of streamside riparian habitat would benefit by increased effectiveness for MIS.

Streamside Riparian Habitat – Cumulative Effects

As discussed above, roads, motorized trails and Open Areas within ¼ mile of the habitat are likely to increase: (1) nesting, resting, and foraging disturbance; (2) nest predation; and/or (3) habitat avoidance. Those impacts are most significant during the reproductive seasons and may reduce reproductive success. The reproductive season of the yellow warbler occurs between mid-April to early August. The period of greatest sensitivity occurs during nest building, and incubation when the individual is more likely to abandon the site (Gotmark 1992 in Knight and Gutzwiller 1995). Another period of sensitivity is the nestling/fledgling period when parental attentiveness may be disturbed; thereby, disrupting feeding patterns and increasing the chance that young may become stressed and/or predated upon.

The higher the road and motorized trail density, the greater the amount of habitat taken out of effective MIS use. When density exceeds a certain point, the habitat does not provide any place for undisturbed reproduction, foraging, or resting to occur. If density remains too high, habitat is likely avoided. Species population can be reduced as a result. Existing motorized travel has created a route density of 3.78 mi/sq.mi. within the delineated streamside riparian habitat and has likely impacted as much as 75 percent of it by decreasing its effectiveness for MIS. A comparison of route densities and percent habitat impacted is provided in the table below.

Other activities within the analysis area cumulatively affect the habitat. There are currently about 100 developed campgrounds and day use sites; other developed sites such as boat launches, and trailheads; and recreational special use sites such as pack stations, resorts, camps, and summer home tracts that exist within the analysis area. Together, they encompass roughly 3,242 acres. Because recreational use of riparian habitat is disproportionately high in comparison to the amount of acres available, it is reasonable to assume that a significant portion of the recreational and special use sites exist in riparian habitat. Nevertheless, the amount of habitat impacted is not likely significantly higher than that identified for roads and motorized trails since a ¼ ZOI was

analyzed for all roads and motorized trails. In addition to recreational and special use sites, about 489 miles of non-motorized trails exist within the analysis area. They likely impact MIS use of riparian habitat to some degree. Studies show that wildlife flush more readily by foot travel than by motorized travel Knight and Gutzwiller 1995).

There are 28 active cattle allotments, encompassing 743,247 acres, within the analysis area. They permit 17,000 animal unit months (AUMs). Cattle could potentially cause cumulative effects upon streamside riparian habitat within the analysis area. They trail along portions of streams and natural lakes and disrupt vegetative growth by grazing/trampling riparian forbs and grasses, and browsing new growth of woody riparian vegetation. Browse and trampling is limited, however, by grazing utilization standard and guidelines (S&Gs). S&G #121 (SNFPA ROD, p.66) protects woody riparian vegetation by allowing browse on: (1) no more than 20 percent of annual leader growth on mature plants and (2) no more than 20 percent of individual seedlings. Furthermore, S&G #121 requires livestock to be removed when browsing indicates a change in preference from herbaceous vegetation to woody riparian vegetation. S&G #103 (SNFPA ROD, p.63) protects riparian vegetation from trampling by preventing disturbance from exceeding 20 percent of a stream reach, natural lake, or pond shoreline. Both of these S&Gs limit impact upon riparian vegetation to 20 percent. While impact to streamside riparian habitat could be as high as 20 percent, it is likely less. The upper 20 percent limit would likely be attained in meadows well before it is attained in streamside riparian habitat. Thus cattle would likely be removed from the allotments well before streamside riparian habitat could be impacted by 20 percent or more. Therefore, cattle are not expected to cause a significant cumulative impact upon streamside riparian habitat.

None of the streamside riparian habitat that was delineated within the analysis area has/will be treated with timber sale activities, and only about 10 acres or 4 percent have/will be treated with plantation activities. Impact from management activities is minimized in streamside riparian habitat through SMZ protection measures and project design measures. No mechanical equipment is allowed in SMZs, 50 percent ground cover must be maintained, and shade canopy cannot be modified in such a manner as to adversely affect water temperature. Thus, disturbance to riparian vegetation is minimized. The limited amount of treatment that does occur in streamside riparian habitat likely benefits individual woody riparian plants by opening up the canopy. Woody riparian vegetation is shade intolerant, and vegetative competition decreases its growth, vigor, and regeneration.

About 22,279 acres of prescribed burns have occurred in the analysis area. While prescribed burns are not started in SMZs, and typically go out before reaching them, they are typically encouraged to creep into about 10 percent of SMZs within a burn unit. Creeping is encouraged in steep drainages where wildfires may make a run. Within the 10 percent where creeping is encouraged, only about 15 percent of the vegetation is typically scorched because ground and fuel moisture levels are higher when underburns are implemented (McCandliss 2008). All in all, it is likely that only about 2 percent of streamside riparian habitat within the analysis area has/will be impacted by prescribed fires (Note: The 2 percent was derived by taking 15 percent of 10 percent). Treatments that do occur within the habitat would likely be beneficial since woody riparian vegetation is not shade tolerant and prescribed burns would open up the area so they could readily sprout and grow.

Finally, about 55,605 acres of wildfires have occurred in the analysis area. Only about 37 acres of streamside riparian habitat has been impacted by wildfires since 1988, and these occurred in the Dinkey-Kings area. It is likely that additional wildfires could impact some portion of the habitat. According to historical fire records of the High Sierra Ranger District, it is likely that about 1,866 additional acres of wildfire will occur on the district in the foreseeable future. This acreage is assumed for the Bass Lake RD, as well. Impact could be detrimental or beneficial

depending on post-fire conditions. If the fire is not too hot and a favorable seed bed is established, habitat would re-establish (provided a nearby seed source is available) and be rejuvenated. Where such conditions do not exist, habitat would be lost. Based upon wildfire records, it is not anticipated that future fires would impact a significant amount of streamside riparian habitat. Table 3- 196 below summarizes the differences that would occur within the streamside riparian habitat that was delineated under each alternative.

Table 3- 196. Riparian Habitat Indicators by Alternative

	Acres Open to Motorized Cross-country Travel	Miles of NFTS and other Private/ Public Roads and Motorized Trails (added miles included in total above)	Miles of NFTS Roads and Motorized Trails Closed Year-round	Miles of Unauthorized Routes that Can Receive Motorized Travel	Route Density (mi./sq. mi.)	Acres of Managed Open Areas (added Open Areas included in total above)	Acres of Unauthorized Open Areas that Can Receive Motorized Travel	Acres and Percent Habitat Impacted by a Decrease in Effectiveness for MIS
Alt1	264	1.5 (+0)	5	0.05	3.78	0 (+0)	0.10	198 = 75%
Alt2	0	1.5 (+0)	4	0	3.66	0 (+0)	0	178 = 67%
Alt3	0	1.5 (+0)	5	0	3.66	0 (+0)	0	177 = 67%
Alt4	0	1.5 (+0)	22	0	3.66	0 (+0)	0	160 = 61%
Alt5	0	1.5 (+0)	21	0	3.66	0 (+0)	0	170 = 64%

Table 3- 197. Acres of ZOI by Alternative for Streamside Riparian Habitat

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
203 ac	182 ac	182 ac	182 ac	191 ac

Relationship of Riparian Habitat to MIS

Yellow Warbler

The MIS chosen for this habitat type is the yellow warbler. This species 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).

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trend

As determined in the MIS Report for Travel Management (Strand and Sanchez 2010), current motorized travel on the SNF is affecting up to 198 acres of riparian habitat or 1 percent of the acres available within the Sierra Nevada bioregion. Affected acres were derived by summarizing the acres of habitat impacted by existing and added roads, motorized trails and Open Areas. As reasoned in the MIS Report, acres of habitat that are only occasionally traversed by cross-country travel (i.e. no unauthorized routes exist upon them) were not included in the calculation of affected acres. Acres of habitat impacted by roads and motorized trails were derived by placing a ¼ mile buffer along all roads and motorized trails that are open either year-round or seasonally. Roads and motorized trails that are closed year-round were not included in the calculation of affected acres, as reasoned in the MIS Report. A ¼ mile buffer is conservative and likely overestimates the percent of habitat affected. Therefore, it is likely that less than 1 percent of the habitat within the Sierra Nevada bioregion has likely been affected by motorized travel on the SNF. As such, motorized travel on the SNF has not likely affected habitat at a bioregional level, nor has it likely affected the distribution of the yellow warbler across the bioregion.

The alternatives would continue to directly, indirectly, and cumulatively affect up to 160 acres of streamside riparian habitat (lowest) under Alternative 4, and 198 acres (highest) under the No Action alternative. As explained above, the acres affected would likely be less. The Travel Management Plan would **not** result in a change of: (1) habitat acres; (2) canopy cover class; or (3) CWHR size class. However, effectiveness of the habitat would be impacted due to: (1) human disturbance, (2) edge effects, and (3) habitat avoidance and abandonment. Nevertheless, because the acres affected would be less than 1 percent of the total Sierra Nevada-wide acreage, none of the alternatives would likely affect habitat at the bioregional level, nor would they likely affect the distribution of the yellow warbler across the Sierra Nevada bioregion.

Cavity-dependent Species – Affected Environment

The pallid bat and hairy woodpecker will be addressed under this section. The hairy woodpecker tends to utilize snags in green (non-burned) forest snag habitat. The pallid bat is a generalist, and as such, utilizes snags in green forest as well. The Townsend's big-eared bat occasionally utilizes snags but primarily uses caves and mines for roosting and streamside riparian habitat for foraging. It is assumed the use of snags is insignificant, thus Townsend's big-eared bat is addressed solely under riparian habitat (provided above).

Other cavity dependent species utilize snags in burned forests, but these species will not be addressed because such habitat does not currently exist on the SNF.

Bat surveys were conducted on the High Sierra Ranger District in June 2006 between the elevations of 5300 to 6500 feet. In the survey results there were three different categories identified; expected to occur, netting surveys and acoustic surveys. The Pallid bat was inferred in one particular area but the other two species were not found or heard but were expected to occur.

The sample time was very narrow and may not accurately represent what it actually in the area. These surveys are conducted in a small portion of the analysis areas of Dinkey-Kings and Tamarack-Dinkey.

Pallid bat – Affected Environment

Pallid bats are found in a variety of habitats below 10,000 feet elevation throughout California. In the SNF, they can be associated with oak woodlands, ponderosa pine, mixed conifer, rock crevices and giant sequoia habitats. Tree roosting has been documented in large conifer snags (e.g. ponderosa pine) inside basal hollows of redwoods and giant sequoias and bole activities in oaks (Sherwin 1998). The pallid bat tends to be a roosting habitat generalist that utilizes many different natural and manmade structures (USDA-FS 2001, Ch. 3 part 4.4, page 55). Pallid bats commonly roost under bridges at night, but can also use caves and mines. Day roosts are more varied and include rock outcrops, tree hollows, buildings, bridges, caves and mines. Roost temperatures are important and must be below 104 degrees Fahrenheit (40 degrees Celsius). Foraging habitat requirements appear to be more restrictive. The pallid bat forages close to the ground, often crawling across the ground, preying on large, ground dwelling arthropods such as beetles, scorpions and Jerusalem crickets. Large moths and grasshoppers are consumed to a lesser degree. Pallid bats appear to be more prevalent within edges, open stands, particularly hardwoods and Open Areas without trees (USDA-FS 2001, Ch. 3 part 4.4, page 55). Additional information can be found in the BE/BA (Sorini-Wilson 2010).

Pallid bat –Environmental Consequences

The following indicator was chosen to provide a relative measure of the direct and indirect effects to the Pallid bat. Although thresholds for these indicators have not been established, they provide general measures for comparing the effects of the project alternatives.

Miles within Green snag habitat

Number of Open Areas in green snag habitat

Direct and Indirect Effects

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Under the No Action alternative, 298,507 acres of green forest snag habitat would remain open for motorized cross-country travel. However, less than 232,134 acres are likely impacted by motorized cross-country travel since a portion of the habitat is likely too dense for cross-country travel to occur off roads and motorized trails. Occasional cross-country travel through habitat types on the SNF would not generate lasting impacts upon the habitats, nor would wildlife likely avoid using areas that are only occasionally accessed by motor vehicles. However, where cross-country travel occurs in the same vicinity regularly, unauthorized routes and Open Areas are generated and impacts upon habitat and wildlife use of habitat occurs. Under this alternative, cross-country travel would not be prohibited. It is assumed that the proliferation of unauthorized routes and Open Areas would continue and the effects would be similar to those discussed under adding roads, motorized trails and Open Areas to the NFTS. There would be continued use of about 227 miles of unauthorized routes and 144 acres of unauthorized Open Areas in green forest snag habitat within the project area under this alternative.

While cross-country travel does not have significant effect upon use of green forest snag habitat, unauthorized routes and Open Areas associated with cross-country travel do. Open Areas and roads and motorized trails that are in or less than ¼ mile from the habitat likely increase: (1)

roosting and maternal sites disturbance; and/or (2) habitat avoidance. The period of greatest sensitivity occurs when bats are in their winter hibernaculum or maternal colonies. Disturbance during hibernation depletes valuable reserves. Disturbance in maternal roosts may disrupt parental attentiveness and feeding patterns; thereby increasing the chance that young may become stressed and/or predated upon.

Effects Due to Additions to the NFTS: Under this alternative, no roads, motorized trails or Open Areas are proposed for addition to the NFTS; therefore, there will be no direct or indirect effects to the species or the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the current NFTS. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effects on Pallid bat within the zone of influence and associated habitat. Therefore, there would be no direct and indirect effects to Pallid bat.

ALTERNATIVE 2 – PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to NFTS roads and motorized trails. It would limit the proliferation of unauthorized routes and allow habitat to recover where degradation may be occurring. This would affect green forest snag habitat by prohibiting vehicular use on all unauthorized routes within the habitat except for about 21 out of the 263 currently existing miles.

Effects Due to Additions to the NFTS: Under this alternative, 44 miles of roads and motorized trails and 6 acres of Open Areas are proposed for addition to the NFTS. Of the 44 miles of roads and motorized trails added, 21 miles would be added to green forest snag habitat. None of the Open Areas to be added are within the habitat.

The added NFTS roads and motorized trails and Open Areas would eliminate potential snag roosts within 300 feet of the added roads and motorized trails since hazard trees would be removed along them. Roads and motorized trails added to non-forested habitats may cause noise disturbance to the bat and decrease habitat effectiveness.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Changes to the season of use and open and closed status of roads and motorized trails within green forest snag habitat are not expected to have any detectable impact on the Pallid bat. Regardless of season of use or open and closed status, hazard trees (thereby green snags) are removed along NFTS roads and motorized trails for safety purposes. Therefore, habitat would still be removed within a 300–foot corridor of NFTS roads and motorized trails. Year-round and seasonal closure of roads and motorized trails within non-forested habitats would benefit the bat since it would minimize disturbance to the bat and increase habitat effectiveness.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: This alternative would prevent disturbance to the species within this group by prohibiting cross-country travel. In the long term (20 years), species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur.

Effects Due to Additions to the NFTS: Under this alternative, no roads, motorized trails or Open Areas are proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the Pallid bat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS. Effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibited cross-country travel would limit the proliferation of unauthorized routes. This would reduce the risk of direct and indirect effects, which is a beneficial effect to Pallid bats over the short and long term. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 51 miles of NFTS roads and motorized trails and 37 acres of 11 Open Areas are proposed for addition to the NFTS. Of the 51 miles of roads and motorized trails added, 27 miles would be added to green forest snag habitat. Of the 37 acres of Open Areas added, 13 acres are within the habitat. There would be snag habitat lost because hazard trees would be removed within 300 feet of added roads, motorized trails and Open Areas. Roads and motorized trails added to non-forested habitats may cause noise disturbance to the bat and decrease habitat effectiveness.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Changes to the season of use and open and closed status to roads and motorized trails within green forest snag habitat are not expected to have any detectable impact upon the bat. Regardless of season of use or open and closed status, hazard trees (thereby green snags) are removed along NFTS roads and motorized trails for safety purposes. Therefore, habitat would still be removed within a 300–foot corridor of NFTS roads and motorized trails. Year-round and seasonal closure of roads and motorized trails within non-forested habitats would benefit the bat since it would minimize disturbance to the bat and increase habitat effectiveness.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibited cross-country travel would limit the proliferation of unauthorized routes near Pallid bat habitat. This would reduce the risk of direct and indirect effects, which is a beneficial effect to Pallid bat habitat over the short and long term. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Eighty-five miles (85) of roads and motorized trails and 105 acres of Open Areas are proposed to be added to the NFTS, under this alternative. Of the 85 miles of roads and motorized trails added, 42 miles would be added to green forest snag habitat. Of the 105 acres of Open Areas added, 52 acres would be within this habitat. The largest amount of habitat would be affected because the highest amount of roads, motorized trails and Open Areas would be added. Snag habitat would be reduced because hazard trees would be removed within 300 feet of added roads and motorized trails and Open Areas. Roads and motorized trails added to non-forested habitats may cause noise disturbance to the bat and decrease habitat effectiveness.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to

wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Changes to the season of use and open and closed status to roads and motorized trails within green forest snag habitat are not expected to have any detectable impact upon the Pallid bat. Regardless of season of use or open and closed status, hazard trees (thereby green snags) are removed along NFTS roads and motorized trails for safety purposes. Therefore, habitat would still be removed within a 300–foot corridor of NFTS roads and motorized trails. Year-round and seasonal closure of roads and motorized trails within non-forested habitats would benefit the bat since it would minimize disturbance to the bat and increase habitat effectiveness.

Cumulative Effects

Wildfires in shrubland, montane hardwood, streamside riparian, early seral coniferous forest habitat, and green forest snag habitat pose cumulative effects upon the bat. Refer to the cumulative effects section for these habitat types for the degree of impact.

Timber management and fuels reduction activities that occur in shrubland, montane hardwood, streamside riparian, and coniferous forest habitats may generate noise disturbance upon the bat, (Refer to the cumulative effects section for these habitats for the degree of impact). Those that occur in green forest snag habitat may remove snag roosts, but this is not believed to be a significant impact upon the bat since it is a generalist and utilized many different types of roosts.

Green Forest Snag Habitat – Affected Environment

Habitat for snag associated species (cavity nesting birds and bats) is considered forest vegetation types with snags larger than 15 inches in diameter. The entire analysis area contains about 417,307 acres of coniferous forest stands. Of these, 40,364 acres are classified as early seral coniferous forest habitat. While there are likely some medium to large diameter trees within this habitat, the majority of trees are less than 15 inches in diameter at breast height (dbh). Therefore, it is assumed that the amount of suitable snags greater than 14.9 inches dbh provided by this habitat is insignificant. Thus, these acres will not be included in the computation of snags in green forest habitat. For the purpose of this report, it will be assumed that all mid seral coniferous forest stands provide snags in green forest habitat (even though it includes trees would be as small as 11 inches dbh, as well as those as large as 23.9 inches dbh). Adding up all acres of mid and late seral coniferous forest stands; the analysis area provides about 376,943 acres of green forest snag habitat. (**Note:** This is a conservative approach and likely overestimates that amount of green forest snag habitat available). Mid seral stands include trees as small as 11 inches dbh. Therefore, some stands may not provide appropriate-sized snags. Furthermore, some mid seral and late seral closed canopy stands include stands with canopy covers greater than 60 percent, and may be too dense for utilization by the MIS. Adding up all acres of mid seral and late seral open and closed canopy coniferous forest stands, the analysis area provides about 376,943 acres of green forest snag habitat. The number of snags per acre was estimated by plot data and computer simulation for two watersheds (encompassing about 131,500 acres on the High Sierra Ranger District) as part of the Kings River Project. Assuming that the numbers found for the Kings River Project are representative of the entire forest, there are currently 3.1 snags per acre within the analysis area.

About 298,507 of the available habitat acres are currently open to cross-country motorized travel. About 263 miles of unauthorized routes (encompassing 27,043 zone of influence (ZOI) acres) were created by users within this habitat. About 36 of these miles were created in areas where motorized cross-country travel is currently prohibited (See Figure 1-3 for a map of these areas). About 1,550 miles of NFTS roads and motorized trails, private roads, and other public roads

(state, county, other federal) (encompassing 126,144 ZOI acres) exist in green forest snag habitat within the analysis area. Including the roads, motorized trails, and unauthorized routes, the habitat has a route density of 3.08 mi./sq.mi. About 13 acres of managed Open Areas exist within the habitat. Furthermore, about 172 acres of unauthorized Open Areas exist. About 28 acres of unauthorized Open Areas exist in prohibited areas.

Snags and snag replacements (hazard trees) are generally removed within 300 feet of NFTS roads and motorized trails and managed Open Areas. While they are removed along maintenance level 1 and 2 roads and motorized trails and roads and motorized trails closed year-round less often (since such roads and motorized trails are typically not accessible to logging equipment without pre-maintenance work), such roads and motorized trails may be treated if there is a hazard sale in the vicinity and there are a high number of hazards along them. Therefore, for the purpose of this analysis, it will be assumed that all NFTS roads and motorized trails may have hazard sale treatments along them. As such, about 126,157 acres or 34 percent of the habitat is foreseeable lost through hazard tree removal along NFTS roads and motorized trails and managed Open Areas**.** (**Note:** This is a conservative approach and likely overestimates the amount of habitat lost through hazard tree removal).

Snags and snag replacements are not removed along unauthorized routes and Open Areas; therefore, unauthorized routes and Open Areas do not have associated loss of habitat. Nevertheless, they do have a negative effect upon MIS use of the habitat within their ZOI. Therefore, in addition to a foreseeable 34 percent loss of habitat, there is a decrease in effectiveness on about 27,215 acres or 7 percent of the habitat due to current motorized travel.

Green Forest Snag Habitat – Environmental Consequences

Direct and Indirect Effects

The following indicators were chosen to provide a relative measure of the direct and indirect effects to the habitat. Although thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Acres of habitat available
- Acres of habitat open for cross-country motorized use
- Miles of unauthorized routes within the habitat, and acres of habitat encompassed by a ¼ mile zone of influence (ZOI)
- Miles of NFTS, private, other public roads and motorized trails within the habitat, and acres of habitat encompassed by a ¼ mile ZOI
- Total density (mi/sq mi) of roads and motorized trails (authorized and unauthorized) that could continue to have use within the habitat
- Acres of Open Areas (FS managed and unauthorized) within the habitat

ALTERNATIVE 1 – NO ACTION

Effects Due to Continued Cross-country Motor Vehicle Travel: Under the No Action alternative, 298,507 acres of green forest snag habitat would remain open for motorized cross-country travel. However, not all of these acres are likely utilized as such. The 66,373 acres of late seral closed canopy coniferous forest habitat that is open for motorized cross-country use is likely too dense for vehicular travel off routes. Furthermore, some of the mid seral stands are likely too dense. Therefore, less than 232,134 acres of green forest snag habitat are likely impacted by motorized cross-country travel. Occasional cross-country travel through habitat

types on the SNF would not generate lasting impacts upon the habitats, nor would MIS likely avoid using areas that are only occasionally accessed by motor vehicles. However, where cross-country travel occurs in the same vicinity regularly, unauthorized routes and Open Areas are generated and impacts upon habitat and MIS use of habitat occurs. Under this alternative, cross-country travel would not be prohibited. It is assumed that the proliferation of unauthorized routes and Open Areas would continue and the effects would be similar to those discussed under adding roads and motorized trails and Open Areas to the NFTS. There would be continued use of about 227 miles of unauthorized routes and 144 acres of unauthorized Open Areas in green forest snag habitat within the project area under this alternative.

Effects Due to Additions to the NFTS: There are no roads, motorized trails or Open Areas proposed for addition to the NFTS under this alternative; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads: Under this alternative, there are no proposed changes to the current season of use on NFTS roads. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effect upon green forest snag habitat effectiveness.

ALTERNATIVE 2 – PROPOSED ACTION

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 44 miles of roads and motorized trails and 6 acres of Open Areas are proposed for addition to the NFTS. Of the 44 miles of roads and motorized trails added, 21 miles would be added to green forest snag habitat. None of the Open Areas to be added are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat.

Changes to the season of use and open and closed status are not expected to have any detectable impact on snag-associated species or their habitat. Regardless of season of use or open and closed status, hazard trees (thereby green snags) are removed along NFTS roads and motorized trails for safety purposes. Therefore, habitat would be removed within a 300–foot corridor of NFTS roads and motorized trails, as explained above.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails.

Effects Due to Additions to the NFTS: Under this alternative, no roads, motorized trails or use areas are proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there would be no changes to the NFTS. Effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 51 miles of roads and motorized trails and 37 acres of Open Areas are proposed for addition to the NFTS. Of the 51 miles of roads and motorized trails added, 27 miles would be added to green forest snag habitat. Of the 37 acres of Open Areas added, 13 acres are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat.

Changes to the season of use and open and closed status are not expected to have any detectable impact on snag-associated species or their habitat. Regardless of season of use or open and closed status, hazard trees (thereby green snags) are removed along NFTS roads and motorized trails for safety purposes. Therefore, habitat would be removed within a 300–foot corridor of NFTS roads and motorized trails, as explained above.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails. The effects described under Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 85 miles of roads and motorized trails and 105 acres of Open Areas are proposed for addition to the NFTS. Of the 51 miles of roads and motorized trails added, 42 miles would be added to green forest snag habitat. Of the 105 acres of Open Areas added, 52 acres are within the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat.

Changes to the season of use and open and closed status are not expected to have any detectable impact on snag-associated species or their habitat. Regardless of season of use or open and closed status, hazard trees (thereby green snags) are removed along NFTS roads and motorized trails for safety purposes. Therefore, habitat would be removed within a 300–foot corridor of NFTS roads and motorized trails, as explained above.

Green Forest Snag Habitat - Cumulative Effects

Cavity nesting species are typically more secure from predation and recreational disturbance is not known to be a limiting factor for these species as it is for other forest birds (Gaines et al.

2003). Motorized route factors that likely to affect cavity-associated species are edge effects and the reduction of snags and down logs. The higher the road and motorized trail density, the greater the amount of habitat taken out of effective MIS use. When density exceeds a certain point, the habitat does not provide any place for undisturbed reproduction, foraging, or resting to occur. If density remains too high, habitat is likely avoided. Species population can be reduced as a result. Existing motorized travel has created a route density of 3.08 mi./sq.mi within green forest snag habitat. It has likely contributed a loss of up to 34 percent of the habitat within the analysis area and has likely impacted an additional 7 percent by decreasing its effectiveness for MIS. A comparison of route densities and percent habitat impacted is provided in the table below.

Other activities have likely contributed cumulative effects upon the habitat. There are currently about 100 developed campgrounds and day use sites; other developed sites such as boat launches, and trailheads; and recreational special use sites such as pack stations, resorts, camps, and summer home tracts that exist within the analysis area. Together, they encompass roughly 3,242 acres. Furthermore, powerlines, communication systems, water systems, the Sugar Pine Railroad, and other special use lands encompass about 1,812 acres within the analysis area. Snags are removed from these recreational and administrative areas as well. Together, they have likely removed 5,054 acres or 1 percent of the snag habitat from the analysis area. There are also about 489 miles of non-motorized trails within the analysis area. While snags are removed along such trails, habitat is not reduced a significant amount at any one time because they must be accessed by foot and treated by hand.

About 28,517 acres of mid and late seral coniferous forest stands have been impacted by timber management activities within the analysis area. They have removed snags and snag replacements within the habitat. Nevertheless, S&Gs require a certain number of snags per acre be left behind to ensure the sustainability of green forest snag habitat. Therefore, while the quality may have been degraded, habitat was not likely reduced. Prior to 2004, the forest implemented standards and guidelines (S&Gs) from the Sierra National Forest Land and Resource Management Plan (LRMP) (1991) which called for maintaining an average of 1.5 snags per acre in sizes 15-24 inches dbh and an average of 0.5 snags per acre in sizes 25 inches dbh or greater. All countable snags had to be 20 feet or greater in height (S&G #64, p. 4-16). Additionally, a sufficient number of live trees had to be left in appropriate sizes to serve as replacement snags. The Sierra Nevada Forest Plan Amendment (SNFPA) (2004), modified the LRMP with the followings guidelines: (1) in westside mixed conifer and ponderosa pine types, Forests should maintain 4 of the largest snags per acre, (2) in red fir forest type, they should maintain 6 of the largest snags per acre, (3) in eastside pine and mixed conifer forest types, they should maintain 3 of the largest snags per acre, and (4) in westside hardwood ecosystems, they should maintain 4 of the largest snags (hardwood or conifer) per acre, or if standing live hardwood trees lack dead branches, they should maintain 6 of the largest snags per acre (S&G #11, p. 51).

About 8,319 acres of mid and late seral coniferous forest stands have/will be impacted by prescribed burns within the analysis area. While burns include design measures to protect the required number of snags per acre, many existing snags are consumed. Nevertheless, snags lost are quickly replaced since burned trees are more susceptible to diseases. Fuel models run for the Kings River Project analysis revealed that snags were anticipated to increase after proposed burn treatments by (Parks and Rojas 2006):

+ 0.7 snags per acre that are between 15 and 24 inches

+ 0 snags per acre that are between 24 and 35 inches

- 0.1 snags per acre that are greater than 35 inches

The same results are assumed for the prescribed burns implemented within the analysis area. Therefore, it is anticipated that the prescribed burns have/will improve the habitat by increasing the number of snags and decreasing the habitat's susceptibility to wildfire.

About 7,940 acres or 2 percent of mid and late seral coniferous forest habitat has been burned in wildfires within the analysis area. Green forest snag habitat has been lost as a result. Viewing historical fires records of the High Sierra Ranger District, it is foreseeable that about 1,866 additional acres would burn on the district in the foreseeable future. The same acreage is assumed for the Bass Lake RD, as well. Therefore, it is reasonable to assume that additional habitat will be lost to wildfires.

Table 3- 198 below summarizes the differences that would occur within green forest snag habitat under each alternative.

Table 3- 198. Green Forest Snag Habitat Indicators by Alternative

	Acres Open to Motorized Cross-country Travel	Miles of NFTS and other Private/ Public Roads and Motorized Trails (added miles included in total above)	Miles of NFTS Roads and Motorized Trails Closed Year-round*	Miles of Unauthorized Routes that Can Receive Motorized Travel	Route Density (mi./sq. mi.)	Acres of Managed Open Areas (added Open Areas included in total above)	Acres of Unauthorized Open Areas that Can Receive Motorized Travel	Acres and Percent Habitat Lost	Acres and Percent Habitat Impacted by a Decrease in Effectiveness for MIS
Alt1	298,507	1,550 (0)	0	227	3.02	13 (0)	144	126,157= 34%	23,486 = 6%
Alt2	0	1,571 (21)	0	0	2.67	13 (0)	0	128,393= 34%	0
Alt3	0	1,550 (0)	0	0	2.63	13 (0)	0	126,157= 34%	0
Alt4	0	1,577 (27)	0	0	2.68	26 (13)	0	128,881= 34%	0
Alt5	0	1,592 (42)	0	0	2.70	65 (52)	0	130,623= 35%	0

*This column data is 0 miles because if there is a snag there is an assumption it would be removed for safety purposes if route was accessed for administrative use. Miles of NFTS roads and motorized trails closed year-round are not considered as an indicator for this habitat as it is for other habitats. If roads and motorized trails were closed year- round in other habitats, it was assumed that impacts would not result since there would be little human disturbance or edge effects. Therefore, roads and motorized trails closed year-round were not considered in the calculation of affected acres and needed to be separated out. Thus, they were displayed in the indicator tables for the other habitats. However, impacts would result along **all** roads and motorized trails in green forest snag habitat because hazard trees (thereby snag habitat) would be removed regardless of the open or closed status of a route.

Relationship of Green Forest Snag Habitat to MIS

Hairy Woodpecker

The MIS chosen for this habitat type is the hairy woodpecker. 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).

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trend

Assuming that the numbers found within the Kings River Project boundary are representative of the entire forest, there are currently 3.1 snags per acre within the analysis area. Broken into specific forest types, there are 2.3 snags per acre in ponderosa pine, 3.5 snags per acre in mixed conifer, and 4.0 snags per acre in red fir. This is within the range (1.4 to 8.3 snags per acre) identified for the Sierra Nevada bioregion. Motorized travel does not affect the number of snags per acre that are found within green forest snag habitat, but rather impacts the amount of green forest snag habitat that is available and the degree of its effectiveness for MIS. Therefore, to determine how motorized travel on the SNF has/will impact the bioregional trends for this habitat and associated MIS, acres of green forest snag habitat have to be determined for the bioregion.

For the purpose of this analysis, the bioregional-wide acres of green forest snag habitat were assumed to be the sum of the bioregional-wide acres of mid seral, late seral open canopy, and late seral closed canopy coniferous forest habitats. (**Note:** This is how acres of green forest snag habitat were computed for the analysis area). Under this assumption, there are 3,835,000 acres of green forest snag habitat within the Sierra Nevada bioregion. As determined in the MIS Report for Travel Management (Strand and Sanchez 2010), current motorized travel on the SNF has lead to a loss of about 126,157 acres or 3 percent of green forest snag habitat within the Sierra Nevada bioregion, and has impacted up to an additional 23,486 or 1 percent by decreasing its effectiveness for MIS. Acres lost were derived by summarizing the acres of habitat impacted by existing and added roads, motorized trails and Open Areas. Acres of habitat lost along NFTS roads and motorized trails were derived by placing a 300 foot buffer along all NFTS roads and motorized trails. This is the distance that hazard trees are removed along roads and motorized trails. Acres of habitat with decreased effectiveness were derived by summing the acres of unauthorized roads, motorized trails and Open Areas. Acres of unauthorized roads and motorized trails were determined by placing a ¼ mile buffer along all unauthorized roads and motorized trails. The ¼ mile buffer is conservative and likely overestimates the percent of habitat with decreased effectiveness. Therefore, it is likely that less than 1 percent of the bioregional habitat has been affected with decreased effectiveness due to motorized travel on the SNF. As reasoned in the MIS Report, acres of habitat that are only occasionally traversed by cross-country travel (i.e. no unauthorized routes exist upon them) were not included in the calculation of lost or adversely affected acres. Considering the amount of habitat lost and adversely affected, current motorized travel on the SNF has likely affected less than 153,372 or 4 percent of the bioregional-wide habitat. Therefore, motorized travel on the SNF has not likely affected habitat at a bioregional level, nor has it likely affected the distribution of the hairy woodpecker across the bioregion.

The Sierra National Forest Motorized Travel Management Project will directly, indirectly, and cumulatively affect between 126,157 acres of green forest snag habitat (lowest) under Alternative

3, and 149,643 acres (highest) under the No Action alternative. Because the acres affected range from only 3 to 4 percent of the total Sierra Nevada-wide acreage, none of the alternatives would likely affect habitat at the bioregional level, nor would they likely affect the distribution of hairy woodpecker across the Sierra Nevada bioregion.

MIS Habitats and Associated Species not Covered under the Wildlife Categories Listed Above

Early and Mid Seral Coniferous Forest Habitat– Affected Environment

Early and mid seral coniferous forest on the SNF is composed of ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine habitat in the Sierra Nevada. Early seral coniferous forest habitat is comprised primarily of seedlings (less than 1 inch dbh), saplings (1 to 5.9 inches dbh), and pole-sized trees (6 to 10.9 inches dbh). Mid seral coniferous forest habitat is comprised primarily of small-sized trees (11 to 23.9 inches dbh). The entire analysis area contains about 40,364 acres of early seral coniferous forest habitat and 308,472 acres of mid seral coniferous forest habitat. Acres of these habitats that are currently open to cross-country motorized travel are 33,284 and 238,124, respectively. Miles of unauthorized routes in these habitats are 57 and 226, respectively. They encompass about 33,873 and 228,864 zone of influence (ZOI) acres. About 8 miles of the unauthorized routes in early seral and 34 miles of the unauthorized routes in mid seral coniferous forest habitats exist in areas that are currently prohibited to motorized cross-country travel. (See Figure 1-3 for a map of those areas). Miles of roads and motorized trails within the two habitats are 241 and 1,296, respectively. They encompass about 16,364 and 95,360 ZOI acres. Together, the unauthorized routes, roads, and motorized trails form route densities of 4.73 mi./sq.mi. in early seral coniferous forest habitat and 3.16 mi./sq.mi. in mid seral coniferous forest habitat. There are 40 and 12 acres of managed Open Areas in early and mid seral coniferous forest habitats, respectively. As well, there are 23 and 154 acres of unauthorized Open Areas in the two habitats, respectively. Of the unauthorized Open Areas, about 3.5 and 26 acres exist in prohibited areas, respectively. Total acres impacted within these two habitats are about 50,300 and 324,390 acres, respectively. (**Note:** These totals are about 20 and 5 percent more than the acres available for these habitats. This is due, in majority, to overlapping ZOIs. Acres of ZOI were computed separately for unauthorized routes and roads/motorized trails. Where ZOIs overlapped, acres were double counted. While this presents a flaw in the methodology used, results are considered representative). About 26 miles of roads and motorized trails (encompassing 7,453 ZOI acres) are closed year-round (prohibited) in early seral habitat, and about 126 miles (encompassing 43,861 ZOI acres) are closed year-round (prohibited) in mid seral habitat. Considering this, the acres of habitat taken out of effective MIS use are closer to 42,847 and 280,529 acres, respectively. This means that about 100 percent of the early seral and 91 percent of the mid seral coniferous forest habitats have been impacted by motorized travel.

Early and Mid Seral Coniferous Forest Habitat – Environmental Consequences

Direct and Indirect Effects

The following indicators were chosen to provide a relative measure of the direct and indirect effects to the habitat. Although thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Acres of habitat available

- Acres of habitat open for cross-country motorized use
- Miles of unauthorized routes within the habitat, and acres of habitat encompassed by a ¼ mile zone of influence (ZOI)
- Miles of NFTS, private, other public roads and motorized trails within the habitat, and acres of habitat encompassed by a ¼ mile ZOI
- Total density (mi/sq mi) roads and motorized trails and unauthorized routes that could continue to receive use within the habitat
- Acres of Open Areas (FS managed and unauthorized) within the habitat

ALTERNATIVE 1 – NO ACTION

Effects due to Continued Cross-country Motor Vehicle Travel: Under the No Action alternative, 33,284 acres of early seral coniferous forest habitat and 238,124 acres of mid seral coniferous forest habitat would remain open for motorized cross-country travel. Nevertheless, cross-country travel does not likely occur on all of these acres. Dense mid seral stands would likely be difficult to traverse, and cross-country travel in dense early seral habitat would be prohibited since it would likely damage young trees.

Occasional cross-country travel through habitat types on the SNF would not generate lasting impacts upon the habitats, nor would MIS likely avoid using areas that are only occasionally accessed by motor vehicles. However, where cross-country travel occurs in the same vicinity regularly, unauthorized routes and Open Areas are generated and impacts upon habitat and MIS use of habitat occurs. Under this alternative, cross-country travel would not be prohibited. It is assumed that the proliferation of unauthorized routes and Open Areas would continue and the effects would be similar to those discussed under adding roads, motorized trails and Open Areas to the NFTS. This means that respectively, about 49 and 192 miles of unauthorized routes and 19 and 128 acres of unauthorized Open Areas could receive use in early and mid seral coniferous forest habitats under the No Action alternative.

Effects Due to Additions to the NFTS: There are no roads, motorized trails or Open Areas proposed for addition to the NFTS under this alternative; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the NFTS. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effect upon early and mid seral coniferous habitat effectiveness.

ALTERNATIVE 2 – PROPOSED ACTION

Effects due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails. The effects described Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 44 miles of roads and motorized trails and 6 acres of Open Areas are proposed for addition to the NFTS. Of the 44 miles of roads and motorized trails added, about 8 and 18 miles of would be added to early and mid seral coniferous forest habitats, respectively. Of the 6 acres of Open Areas added, none would be added to early seral, but 3 would be added to mid seral coniferous forest habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to

wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. About 14 more miles of roads and motorized trails within early seral coniferous forest habitat would be closed year-round under this alternative, increasing the amount of roads and motorized trails closed year-round in the habitat by 35 percent. About 78 more miles of roads and motorized trails within mid seral coniferous forest habitat would be closed year-round, increasing the amount of roads and motorized trails closed year-round in the habitat by 38 percent.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas and NFTS, private, and other public roads and motorized trails. Direct and indirect effects are the same as described in Alternative 2. The effects described Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, no roads, motorized trails or Open Areas proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads). Under this alternative, there would be no changes to the NFTS. Effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas and NFTS, private and other public roads and motorized trails. The effects are the same as described in Alternative 2. The effects described Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 51 miles of roads and motorized trails and 37 acres of Open Areas are proposed for addition to the NFTS. Of the 51 miles added, about 7 and 24 miles would be added to early and mid seral coniferous forest habitats, respectively. Of the 37 acres of Open Areas added, approximately 3 and 13 acres would be added to early and mid seral habitats, respectively.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat, as discussed above under Alternative 2.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. About 23 more miles of roads and motorized trails within early seral coniferous forest habitat would be closed year-round under this alternative, increasing the amount of roads and motorized trails closed year-round in the habitat by 47 percent. About 121 more miles of roads and motorized trails within mid seral coniferous forest habitat would be closed year-round, increasing the amount of roads and motorized trails closed year-round in the habitat by 49 percent.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas, and NFTS, private, and other public roads and motorized trails. Direct and indirect effects are the same as described in Alternative 2. The effects described Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 85 miles of roads and motorized trails and 105 acres of Open Areas are proposed for addition to the NFTS. Of the 85 miles added, about 11 and 36 miles would be added to early and mid seral coniferous forest habitats, respectively. Of the 105 acres of Open Areas added, about 6 and 51 acres would be added to early and mid seral coniferous forest habitats, respectively.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat, as discussed above under Alternative 2.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. About 7 more miles of roads and motorized trails within early seral coniferous forest habitat would be closed year-round under this alternative, increasing the amount of roads and motorized trails closed year-round in the habitat by 21 percent. About 57 more miles of roads and motorized trails within mid seral coniferous forest habitat would be closed year-round under this alternative, increasing the amount of roads and motorized trails closed year-round in the habitat by 31 percent.

Early and Mid Seral Coniferous Forest Habitat - Cumulative Effects

As discussed above, roads, motorized trails and Open Areas within ¼ mile of the habitat likely increase: (1) nesting, resting and foraging disturbance; (2) nest predation; and/or (3) habitat avoidance. Those impacts are most significant during the reproductive seasons and may reduce reproductive success. Reproductive season for the mountain quail begins in late March and ends in late August. The periods of greatest sensitivity occurs during nest building, and incubation when the individual is more likely to abandon the site (Gotmark 1992 in Knight and Gutzwiller 1995). Another period of sensitivity is the nestling/fledgling period when parental attentiveness may be disturbed; thereby, disrupting feeding patterns and increasing the chance that young may become stressed and/or predated upon.

The higher the road and motorized route density, the greater the amount of habitat taken out of effective MIS use. When density exceeds a certain point, the habitat does not provide any place for undisturbed reproduction, foraging, or resting to occur. If density remains too high, habitat is likely avoided. Species population can be reduced as a result. Existing motorized travel has created a route density of 4.73 mi./sq.mi in early seral coniferous forest habitat and has likely impacted as much as 100 percent of the habitat by decreasing its effectiveness for MIS. It has created a route density of 3.16 mi./sq.mi in mid seral coniferous forest habitat and has likely impacted as much as a 91 percent of this habitat. A comparison of route densities and percent habitat impacted is provided in the table below.

There are 28 active cattle allotments, encompassing about 743,247 acres, and permitting 17,000 AUMs within the analysis area. Some of the cattle allotments encompass early and mid seral coniferous forest habitat. The primary impact of cattle is upon the mountain quail, itself, and not

the habitat [i.e. Nests can be trampled by cattle (CDFG 200 *In:* USDA-FS 2008); and quail can drown in livestock watering devices that do not have escape ramps (Ibid)]. However, cattle can impact early seral coniferous forest habitat. They enter young plantations to browse on newly emerging shrubs and young leader growth, and therefore, occasionally trample seedlings. Nevertheless, this impact tends to be insignificant (Helm 2008).

About 53,192 acres within the analysis area have been impacted by timber management activities, with about 14,104 acres (4 percent) and 23,997 acres (1 percent) occurring in early and mid seral coniferous forest habitats, respectively. Furthermore, there are about 50,805 acres of plantations within the analysis area, with about 10,602 (3 percent) and 16,587 (1 percent) occurring in early and mid seral coniferous forest habitats respectively. Some double counting of impacted acres likely occurs since both harvesting and planting occurs on the same piece of land over the long run. Nevertheless, the acres of impacted habitat are thought to be a fair representation. One of the five causes of mountain quail mortality listed by CDFG (1995 *In* USDA-FS 2008) was nest loss due to logging activities. It is assumed that plantation activities cause equal disturbance. Timber management and plantation treatments cause other impacts, as well. Immediately after treatment, the habitats are not as effective for MIS because understory cover and food sources (grass seed and buds/flowers/berries of shrubs) are significantly reduced or lacking altogether. Nevertheless, grasses and shrubs typically recover in less than a year. Time can be greater, however, depending upon the sprouting nature of the shrub species and the treatment used. Chemical treatments can delay shrub recovery for around 5 years. Despite the temporary reduction in cover and food, the overall effect of plantation and timber management activities is to improve the quality of early and mid seral habitats. Recovered shrubs in the understory are rejuvenated, and treatments (such as thinning) improve the health, vigor, growth, and resistance of trees in the overstory.

About 693 and 6,627 acres of prescribed burns, respectively, have/will occur in early and mid seral coniferous forest habitats within the analysis area. Prescribed burns have/will likely benefit the habitats by removing excess fuel buildup and making the habitat less susceptible to wildfires. While the understory shrub component is decreased immediately after prescribed burn treatments, shrubs typically sprout back within a year and are rejuvenated.

About 693 and 5,809 acres of wildfires, respectively, have occurred in early and mid seral coniferous forest habitats within the analysis area. Viewing historical fires records of the High Sierra Ranger District, it is foreseeable that about 1,866 additional acres would burn on the district in the foreseeable future. The same acreage is assumed for the Bass Lake RD, as well. While many burned acres are replanted and provide habitat again, it is likely that a significant portion are converted to shrubland habitat. Some coniferous forest habitats do not re-establish, either because the burned sites are no longer conducive to coniferous forest regeneration or budget constraints do not allow every acre to be replanted. Under the current funding trend (last 10 years), only about 10 percent of burned coniferous forest habitats have been replanted (Rojas 2008). Nevertheless, it is anticipated that only around 3 percent of early seral and 2 percent of mid seral habitat within the analysis area have/will be impacted by wildfires.

Table 3- 199 below summarizes the differences that would occur within early and mid seral coniferous forest habitats under each alternative.

Table 3- 199. Indicators per Alternative for Early and Mid Seral Coniferous Forest Habitats

	Acres Open to Motorized Cross-country Travel	Miles of NFTS and other Private/ Public Roads and Motorized Trails (added miles included in total above)	Miles of NFTS Roads and Motorized Trails Closed Year-round*	Miles of Unauthorized Routes that Can Receive Motorized Travel	Route Density (mi./sq. mi.)	Acres of Managed Open Areas (added Open Areas included in total above)	Acres of Unauthorized Open Areas that Can Receive Motorized Travel	Acres and Percent Habitat Impacted by a Decrease in Effectiveness for MIS
Early Seral Coniferous Forest Habitat								
Alt1	33,284	241 (+0)	26	49	4.60	40 (+0)	19	40,642 =100%
Alt2	0	249 (+8)	40	0	3.95	40 (+0)	0	24,992 = 62%
Alt3	0	241 (+0)	26	0	3.83	40 (+0)	0	26,460 = 66%
Alt4	0	248 (+7)	49	0	3.94	43 (+3)	0	22,767 = 56%
Alt5	0	252 (+11)	33	0	4.00	46 (+6)	0	28,146 = 70%
Mid Seral Coniferous Forest Habitat								
Alt1	238,124	1,296 (+0)	126	192	3.09	12 (+0)	128	265,455 =86%
Alt2	0	1,314 (+18)	204	0	2.73	15 (+3)	0	163,864 =53%
Alt3	0	1,296 (+0)	126	0	2.69	12 (+0)	0	185,015 =60%
Alt4	0	1,320 (+24)	247	0	2.74	25 (+13)	0	152,699 =50%
Alt5	0	1,332 (+36)	183	0	2.76	63 (+51)	0	184,593 =60%

Relationship of Early and Mid Seral Coniferous Forest Habitat to MIS

Mountain Quail

The MIS chosen for this habitat type is the mountain quail. 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).

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trend

As determined in the MIS Report for Travel Management (Strand and Sanchez 2010), current motorized travel on the SNF is affecting up to 42,847 acres (8 percent) and 280,529 acres (10 percent) of early and mid seral coniferous forest habitat within the Sierra Nevada bioregion, respectively. The result is reduced habitat effectiveness for mountain quail through disturbance, edge effects, avoidance, and abandonment of habitat. As previously discussed, affected acres were derived by summing the acres of habitat impacted by existing and added roads, motorized trails and Open Areas. As reasoned in the MIS Report, acres of habitat that are only occasionally traversed by cross-country travel (i.e. no unauthorized routes exist upon them) were not included in the calculation of affected acres. Acres of habitat impacted by roads and motorized trails were derived by placing a ¼ mile buffer along all roads and motorized trails that are open year-round. Roads and motorized trails that are closed year-round were not included in the calculation of affected acres for mountain quail, as reasoned in the MIS Report. A ¼ mile buffer is conservative and likely overestimates the percent of habitat affected. Therefore, it is likely that less than 8 percent of early seral and less than 10 percent of mid seral coniferous forest habitats within the Sierra Nevada bioregion have likely been affected by motorized travel on the SNF. An assumption was made in the MIS Report that effects upon MIS habitats that are 5 percent or greater are significant and likely affect habitat and population trends. As such, motorized travel on the SNF may have impacted habitat effectiveness, and may have affected distribution of mountain quail at the bioregional level. However this is not likely the case. While a ¼ mile buffer along roads and motorized trails is a conservative but reasonable zone of influence (ZOI) for many species, it likely overestimates the amount of early and mid seral habitat affected by motorized travel by a considerable amount. Unlike deer or other more visible MIS, mountain quail do not likely need as large of a ZOI in order to ensure adequate cover. Nor do they need as large of a ZOI to protect them from road-side predation. While mountain quail are prone to predation, much of it is upon the young and adults, not the nests, and much of the predation is from accipiters rather than road-side predators. Furthermore, while nest predation can extend up to 600 meters (greater than ¼ mile), narrow routes with no maintained verge do not typically generate substantial edge effects, particularly when surrounded by a tall forest canopy (Noss 2000). Therefore, nest predators are not expected to increase significantly in numbers along the majority of the NFTS roads and motorized trails. Despite the fact that the roads and motorized trails ZOI did not need to be as high as ¼ mile for mountain quail, it was used to maintain consistency between the method the MIS habitats were analyzed

The SNF Travel Management Project would continue to directly, indirectly, and cumulatively affect up to 22,767 acres of early seral coniferous forest habitat (lowest) under Alternative 4, and 40,642 acres (highest) under the No Action Alternative. The acres affected range from 4 to 7 percent of the total Sierra Nevada-wide acreage. The Travel Management Plan would **not** result in a change of: (1) habitat acres; (2) canopy cover class; or (3) CWHR size class within early seral coniferous forest. However, as mentioned above, effectiveness of the habitat would be impacted due to: (1) human disturbance, (2) edge effects (nest parasitism and predation), and (3) habitat avoidance and abandonment. As discussed above, the acres affected are likely less than

stated above since a conservative approach was taken for the calculation of affected acres. Therefore, Alternative 4 would decrease impact of motorized travel at the bioregional level to less than 4 percent. Alternatives 2, 3, and 5 would decrease impact of motorized travel at the bioregional level to less than 5 percent. As such, the action alternatives would likely decrease impact of motorized travel on the SNF to the point that it would no longer have a significant effect upon habitat and distribution of mountain quail at the bioregional level. At less than 7 percent, the No Action alternative may continue to adversely affect habitat effectiveness, and may affect the distribution of mountain quail at the bioregional level, but this is not likely the case, as reasoned above. The majority of effects would occur from existing roads and motorized trails and Open Areas (and under Alternative 1, unauthorized routes that could receive use). Only an insignificant amount (less than1 percent) would be due to added roads, motorized trails and Open Areas.

The Travel Management Project will directly, indirectly, and cumulatively affect up to 152,699 acres of mid seral coniferous forest habitat (lowest) under Alternative 4, and 265,455 acres (highest) under the No Action Alternative. The acres affected range from 6 percent to 10 percent of the total Sierra Nevada-wide acreage. The Travel Management Plan would **not** result in a change of: (1) habitat acres; (2) canopy cover class; or (3) CWHR size class within mid seral coniferous forest habitat. However, as mentioned above, effectiveness of the habitat would be impacted due to: (1) human disturbance, (2) edge effects (nest parasitism and predation), and (3) habitat avoidance and abandonment. As previously mentioned the acres affected are likely less than stated above since a conservative approach was taken for the calculation of affected acres. Alternative 2 and Alternative 4 would have the least affect (less than 6 percent), followed by Alternatives 3 and 5 (less than 7 percent). The No Action alternative would have the greatest affect (less than 10 percent). Because all of the alternatives may continue to affect greater than 5 percent of the total Sierra Nevada-wide acreage, they may adversely affect the habitat at a bioregional level, and may affect the distribution of mountain quail across the bioregion. However, this is not likely the case as reasoned above. The majority of effects would occur from existing roads, motorized trails and Open Areas (and under Alternative 1, unauthorized routes that could receive use). Only an insignificant amount (less than1 percent) would be due to added roads, motorized trails and Open Areas.

Shrubland Habitat– Affected Environment

Shrubland habitat on the SNF is comprised of montane chaparral (MCP) and mixed chaparral (MCH), as defined by the California Wildlife Habitat Relationships System (CWHR) (CDFG 2005). The entire analysis area contains about 50,713 acres of shrubland habitat. About 46,459 of them are currently open to cross-country motorized travel. About 30 miles of unauthorized routes (encompassing 10,785 ZOI acres) exist within this habitat. About 1.7 of these miles exist in areas where motorized cross-country travel is currently prohibited (See Figure 1-3 for a map of those areas). About 161 miles of NFTS roads and motorized trails, private roads, and other public roads (state, county, other federal) (encompassing 26,287 ZOI acres) exist in shrubland habitat within the analysis area. Including all roads, trails, and unauthorized routes (even those in prohibited areas), the habitat has a route density of 2.42 mi./sq.mi. About 1.5 acres of managed Open Areas exist within the habitat. Furthermore, about 22.0 acres of unauthorized Open Areas exist within the habitat. About 1.7 of these exist in prohibited areas. All in all, about 37,096 acres of shrubland habitat are impacted by roads, trails, unauthorized routes, managed Open Areas, and unauthorized Open Areas. Nevertheless, because about 17 miles of roads and motorized trails (encompassing 4,336 ZOI acres) are closed year-round to motor vehicle traffic (except for necessary administrative use), the acres of shrubland habitat taken out of effective MIS use is closer to 32,760 or 65 percent.

Shrubland Habitat – Environmental Consequences

Direct and Indirect Effects

The following indicators were chosen to provide a relative measure of the direct and indirect effects to the habitat. Although thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Acres of habitat available
- Acres of habitat open for cross-country motorized use
- Miles of unauthorized routes within the habitat, and acres of habitat encompassed by a ¼ mile zone of influence (ZOI)
- Miles of NFTS, private, other public roads and motorized trails within the habitat, and acres of habitat encompassed by a ¼ mile ZOI
- Total density (mi/sq mi) roads and motorized trails and unauthorized routes that could receive use within the habitat
- Acres of Open Areas (FS managed and unauthorized) within the habitat

ALTERNATIVE 1 – NO ACTION

Effects due to Continued Cross-country Motor Vehicle Travel: Under the No Action alternative, 46,459 acres of shrubland habitat would remain open for motorized cross-country travel. Nevertheless, the majority of this habitat on the SNF is mature to decadent, and shrubs are too large and dense to permit much vehicular travel off roads and motorized trails and unauthorized routes). Generally, cross-country travel in shrubland habitat is possible for only about a year after a wildfire, control burn, fuels reduction, or other vegetation management activity. Motorized travel after a fire or other disturbance would impact deer that are browsing on newly emerging shrubs, but would not likely impact the MIS (fox sparrows) because they would not likely be present due to a lack of adequate nesting and cover habitat.

Occasional cross-country travel through habitat types on the SNF would not generate lasting impacts upon the habitats, nor would MIS likely avoid using areas that are only occasionally accessed by motor vehicles. However, where cross-country travel occurs in the same vicinity regularly, unauthorized routes and Open Areas are generated and impacts upon habitat and MIS use of habitat occurs. Under this alternative, cross-country travel would not be prohibited. It is assumed that the proliferation of unauthorized routes and Open Areas would continue and the effects would be similar to those discussed under adding roads and motorized trails and Open Areas to the NFTS. This means that about 29 miles of unauthorized routes, and 20 acres of unauthorized Open Areas could receive use within the habitat under the No Action alternative.

Effects Due to Additions to the NFTS: There are no roads, motorized trails or Open Areas identified to add to the NFTS under this alternative; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Under this alternative, there are no proposed changes to the NFTS. Since there are no changes to seasonal closures for the NFTS in this alternative, there would be no decrease in the negative effect upon shrubland habitat effectiveness.

ALTERNATIVE 2 – PROPOSED ACTION

Effects due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited across the SNF under this alternative. Prohibition of cross-country travel would limit motor vehicle use to managed Open Areas and NFTS, private, and other public roads and motorized trails. The effects described Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 44 miles of roads and motorized trails and 6 acres of Open Areas are proposed for addition to the NFTS. Of the 44 miles of roads and motorized trails added, about 0.4 mile would be added to shrubland habitat. None of the Open Areas would be added to this habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. About 8 more miles of roads and motorized trails within shrubland habitat would be closed year-round under this alternative, increasing the amount of roads and motorized trails closed year-round in the habitat by 32 percent.

ALTERNATIVE 3

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas and NFTS, private and other public roads and motorized trails. Direct and indirect effects are the same as described in Alternative 2.

Effects Due to Additions to the NFTS: Under this alternative, no roads, motorized trails or Open Areas are proposed for addition to the NFTS; therefore, there would be no direct or indirect effect to the habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads). Under this alternative, there would be no changes to the NFTS. Effects are the same as Alternative 1.

ALTERNATIVE 4

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas and NFTS, private and other public roads and motorized trails. The effects are the same as described in Alternative 2. The effects described Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 51 miles of roads and motorized trails and 37 acres of Open Areas are proposed for addition to the NFTS. Of the 51 miles added, about 2 miles would be added to shrubland habitat. Of the 37 acres of Open Areas added, about 3 acres would be added to shrubland habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1)**.** Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat, as discussed above under Alternative 2.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. About 11 more miles of roads and motorized trails within shrubland habitat would be closed year-round under this alternative, increasing the amount of roads and motorized trails closed year-round in the habitat by 39 percent.

ALTERNATIVE 5

Effects Due to the Prohibition of Cross-country Motor Vehicle Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of unauthorized routes and Open Areas. Motor vehicle use would be limited to managed Open Areas, and NFTS, private, and other public roads and motorized trails. Direct and indirect effects are the same as described in Alternative 2. The effects described Alternative 1 would not occur.

Effects Due to Additions to the NFTS: Under this alternative, 85 miles of roads and motorized trails and 105 acres of Open Areas are proposed for addition to the NFTS. Of the 85 miles added, about 3 miles would be added to shrubland habitats. Of the 105 acres of Open Areas added, about 8 acres would be added to shrubland habitat.

Effects Due to Changes to the NFTS (includes season of use, vehicle class, and opening or closing roads): Note: vehicle class types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type (see assumptions in Section 3.13.1). Therefore, changes to class of use are not expected to have any detectable impact on wildlife or their habitat, as discussed above under Alternative 2.

Changes to the NFTS that would have a positive effect on habitat and habitat effectiveness are year-round closures. About 4 more miles of roads and motorized trails within shrubland habitat would be closed year-round under this alternative, increasing the amount of roads and motorized trails closed year-round in the habitat by 19 percent.

Shrubland Habitat - Cumulative Effects

As discussed above, roads, motorized trails and Open Areas within ¼ mile of the habitat are likely to increase: (1) nesting, resting and foraging disturbance; (2) nest predation; and/or (3) habitat avoidance. Those impacts are most significant during the reproductive seasons and may reduce reproductive success. Reproductive season for the fox sparrow begins in mid-May and ends in early August. The periods of greatest sensitivity occurs during nest building, and incubation when the individual is more likely to abandon the site (Gotmark 1992 in Knight and Gutzwiller 1995). Another period of sensitivity is the nestling/fledgling period when parental attentiveness may be disturbed; thereby, disrupting feeding patterns and increasing the chance that young may become stressed and/or predated upon.

The higher the road and motorized trail density, the greater the amount of habitat taken out of effective MIS use. When density exceeds a certain point, the habitat does not provide any place for undisturbed reproduction, foraging, or resting to occur. If density remains too high, habitat is likely avoided. Species population can be reduced as a result. Existing motorized travel has created a route density of 2.42 mi./sq.mi within shrubland habitat and has likely impacted as much as 65 percent of it by decreasing its effectiveness for MIS. A comparison of route densities and percent habitat impacted is provided in the table below.

Other activities have likely contributed cumulative effects upon the habitat. There are 28 active cattle allotments encompassing about 743,247 acres within the analysis area. They permit 17,000 animal unit months (AUMs). Some of the cattle allotments encompass shrubland habitat. While cattle prefer grasses and forbs, they browse on young shrubs and new growth of woody

vegetation in the spring. Furthermore, there tends to be a dietary shift towards woody vegetation late in the season (about a month before most cattle are taken off the allotments), because grasses and forbs have cured. In addition to seasonal browsing, cattle can impact the effective use of shrubland habitat by incidentally knocking down nests. Nevertheless, impact by cattle is limited by standards and guidelines in the 1995 LRMP amendment which limits use of woody shrubs to 20 percent annual leader growth when rangeland is in satisfactory condition and 10 percent if in unsatisfactory condition (USDA-FS 1995b, p. 2-15). Furthermore, because the majority of shrubland habitat on the Forest is mature to decadent, cattle do not tend to utilize it to a large degree. Therefore, it is assumed that only a small percent of shrubland habitat within the analysis area is impacted by cattle grazing.

About 53,192 acres within the analysis area have been impacted by timber management activities, with about 1,537 acres or 3 percent of shrubland habitat being impacted. Furthermore, there are about 50,805 acres of plantations within the analysis area, with about 7,380 acres or 15 percent of shrubland habitat being impacted. Some double counting of impacted acres likely occurs since both harvesting and planting occurs on the same piece of land over the long run. Nevertheless, the acres of impacted habitat are thought to be a fair representation. Treated acres experience a temporary reduction and/or absence of shrubs. Nevertheless, shrubs tend to re-establish within a year of treatments. Therefore, these activities rejuvenate shrubland habitat and benefit it in the long-run.

Finally, about 22,274 acres of prescribed burns have/will occur within the analysis area, with about 2,026 occurring in shrubland habitat. Furthermore, about 55,605 acres of wildfires have occurred in the analysis area, with about 9,922 occurring in shrubland habitat. According to historical fire records of the High Sierra Ranger District, it is likely that about 1,866 additional acres of wildfire will occur on the district in the foreseeable future. The same acreage is assumed for the Bass Lake RD. Immediate impact of prescribed burns and wildfires in shrubland habitat is a decrease in its availability. However, shrubs tend to resprout within a year after prescribed burns and within 5 years after wildfires. Therefore, burns tend to rejuvenate the habitat. Wildfires in forested habitats likely increase shrubland habitat. Not all of the acres burned in wildfires can be replanted due to funding and/or site limitations; and they tend to convert to shrubland habitats.

Table 3- 200 below summarizes the differences that would occur within shrubland habitat under each alternative.

Table 3- 200. Indicators per Alternative for Shrubland Habitat

	Acres Open to Motorized Cross-country Travel	Miles of NFTS and other Private/ Public Roads and Motorized Trails (added miles included in total above)	Miles of NFTS Roads and Motorized Trails Closed Year-round*	Miles of Unauthorized Routes that Can Receive Motorized Travel	Route Density (mi./sq. mi.)	Acres of Managed Open Areas (added Open Areas included in total above)	Acres of Unauthorized Open Areas that Can Receive Motorized Travel	Acres and Percent Habitat Impacted by a Decrease in Effectiveness for MIS
Alt1	46,459	161 (+0)	17	28	2.39	1.5 (+0)	20	32,297 = 64%
Alt2	0	161.4 (+0.4)	25	0	2.04	1.5 (+0)	0	19,428 = 38%
Alt3	0	161 (+0)	17	0	2.04	1.5 (+0)	0	21,953 = 43%
Alt4	0	163 (+2)	28	0	2.06	4 (+2.5)	0	18,575 = 37%
Alt5	0	164 (+3)	21	0	2.08	10 (+8.5)	0	21,210 = 42%

Relationship of Shrubland Habitat to MIS

Fox Sparrow

The MIS chosen for this habitat type is the fox sparrow. 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 in USDA-FS 2008).

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trend

As determined in the MIS Report for Travel Management (Strand and Sanchez 2010), current motorized travel on the SNF is affecting up to 32,760 acres of shrubland habitat or 4 percent of the acres available within the Sierra Nevada bioregion. Affected acres were derived by summarizing the acres of habitat impacted by existing and added roads, motorized trails and Open Areas. As reasoned in the MIS Report, acres of habitat that are only occasionally traversed by cross-country travel (i.e. no unauthorized routes exist upon them) were not included in the calculation of affected acres. Acres of habitat impacted by roads and motorized trails were derived by placing a ¼ mile buffer along all roads and motorized trails that are open either year-round or seasonally. Roads and motorized trails that are closed year-round were not included in the calculation of affected acres, as reasoned in the MIS Report. A ¼ mile buffer is conservative and likely overestimates the percent of habitat affected. Therefore, it is likely that less than 4 percent of the habitat within the Sierra Nevada bioregion has likely been affected by motorized travel on the SNF. As such, motorized travel on the SNF has not likely affected shrubland habitat at a bioregional level, nor has it likely affected the distribution of fox sparrow across the bioregion.

The Travel Management Project alternatives would continue to directly, indirectly, and cumulatively effect up to 18,575 acres of shrubland habitat (lowest) under the Alternative 4 and 32,297 acres (highest) under the No Action alternative. As explained above, the acres affected would likely be less. The Travel Management Plan would **not** result in a change of : (1) habitat acres; (2) canopy cover class; or (3) CWHR size class. However, effectiveness of the habitat would be impacted due to: (1) human disturbance, (2) edge effects, and (3) habitat avoidance and abandonment. Nevertheless, because the acres affected range from less than 2 to 4 percent of the total Sierra Nevada-wide acreage, none of the alternatives would likely affect shrubland habitat at the bioregional level, nor would they likely affect the distribution of fox sparrow across the Sierra Nevada bioregion.

Compliance with the LRMP, Travel Management Rule and Other Direction

Table 3- 201. Compliance with LRMP and Other Direction

			Complies with LRMP and Other Direction		
Guidance from 2004 Record of Decision for the Sierra Nevada Forest Plan Amendment (Framework)	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
California Spotted owl and Northern Goshawk (Standard and Guideline 82)		x	x	x	x
Fisher and Marten (Standard and Guideline 87 and 89)		x	x	x	x
Riparian Habitat (Standard and Guideline 92)			x	x	x
Guidance from the 1991 LRMP					
Deer areas (winter range, population centers, holding areas)	x	x	x	x	x

Alternatives 2-5 are in compliance with the Travel Management Rule as they minimize harassment of wildlife and the significant disruption of wildlife habitats by implementing the design features as part of the season of use. Roads and motorized trails were reviewed and ground-truthed through field reconnaissance to determine if habitat was being impacted and if so, season of use was implemented along with surveys to determine location of nests for birds or survey information from Pacific Southwest Research for furbearers. Deer season of use was implemented to reduce harassment according to LRMP.

Migratory Landbird Conservation on the SNF

Within the National Forests, conservation of migratory birds focuses on providing a diversity of habitat conditions at multiple spatial scales and ensuring that bird conservation is addressed when planning for land management activities. As part of the Travel Management process, the SNF has conducted an assessment of existing roads and trails within SNF boundaries. Any new construction, reconstruction and maintenance of system roads or trails will be conducted under a separate NEPA analysis and decision. Because current travel management efforts are directed at identifying which existing unauthorized routes will be formally added to the NFTS while prohibiting cross-country travel, and because there is no expectation of new construction or development, no changes in the distribution or abundance of habitats available to migratory prohibition of cross-country travel is expected to result in less use across the landscape. Therefore, habitat functionality is expected to remain similar or more than, and levels of disturbance related to use are expected to remain similar to or less than, predecisional levels.

Summary of Determinations for Threatened and Forest Service Sensitive Species

It is my determination, under Alternative 1, Travel Management may affect not likely to adversely affect the **Valley Elderberry Longhorn Beetle** because cross-country travel may disturb VELB habitat.

It is my determination, under Alternatives 2-5, Travel Management will have **no effect** to the **Valley Elderberry Longhorn Beetle** because the Fish and Wildlife design criteria will be

implemented. The habitat will not be disturbed because at this time there are no roads and motorized trails designated in VELB habitat.

It is my determination, under all alternatives except Alternative 1, Travel Management will have **no effect** to the **bald eagle** because the Fish and Wildlife design criteria will be implemented and there are no roads or motorized trails in bald eagle habitat. Under Alternative 1, it is my determination the Travel Management FEIS **may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability for bald eagles** because there is a motorized trail designated within 1/8 mile of a bald eagle nest.

It is my determination, under all alternatives; Travel Management **may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability for the California spotted owls and Northern goshawks** because while some habitat will be impacted by noise disturbance from motorized use; however, it is minimized by the season of use being applied to both species where applicable. The Resource Issue Codes WL-1 and WL-2 are applied if there is a known nest site within ¼ mile of a road or motorized trail. There is a minimal difference between road densities; however, when you look at the miles of roads and motorized trails being added there would be an effect to the amount of habitat used by the species. The seasonal closures are a benefit to wildlife because it protects habitat for the species during the critical nesting and fledgling time.

Under Alternative 5 (least restrictive), there are approximately 2 percent of the spotted owl PACs potentially being impacted and of that 12.6 miles are within PACS and if the roads and motorized trails is within ¼ mile of the nest location then Resource Issue Code WL-2 will be applied reducing the disturbance to the owl.

As for the Northern goshawk, under Alternative 2 (least restrictive), there are 2.4 miles of roads and motorized trails within PACs but not known nest sites. If nest sites are located, Resource Issue Code WL-1 will be applied to reduce disturbance to the birds. It is less than 2 percent of the habitat being affected across the project area.

It is my determination, under all alternatives; Travel Management **may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability for the great gray owl** because habitat will be impacted minimally and there are few roads and motorized trails that are adjacent to meadows there is the potential for vegetation to be crushed or trampled along meadows.

It is my determination, under Alternatives 1 and 5, Travel Management **may impact individuals but not likely to cause a trend to a Federal listing or a loss of viability for the willow flycatcher** because there is only one motorized trail adjacent to an occupied meadow.

It is my determination, under Alternatives 2-4; Travel Management will have **no impact for the willow flycatcher** because there are no roads and motorized trails adjacent to any occupied meadows or suitable habitat.

It is my determination, under all alternatives, Travel Management **may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability** for all three bat species, Western red bat, Pallid bat, Townsends big-eared bat, because the species may utilize the habitat where noise disturbance could occur from trampling or crushing of vegetation. The disturbance should be minimized because all three species would benefit from wet weather closures which would be a time when they use the habitat.

It is my determination, under all alternatives; Travel Management **may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability for the marten** because habitat will be impacted by noise disturbance from motorized use. There is a minimal

difference between road densities; however, when you look at the miles of road being added, there would be an effect to the amount of habitat used by the species. If there is an increase in seasonal closures, there would be a benefit to the marten which would minimize the effects because more habitat would be protected during critical foraging and denning periods.

It is my determination that Alternative 1 (No Action) of the Travel Management Project **may affect individuals of a species has been found warranted for federal listing, and is likely to result in a further downward trend and loss of viability.** Given the isolated nature of the Southern Sierra Fisher population and continued cross-country travel under this alternative, significant impacts from disturbance, fragmentation and increased vehicle related mortality are likely to occur. Based on past route expansion levels, habitat quality would be expected to continue to decline until the viability of the fisher population in the project area is threatened.

It is my determination, under Alternatives 2 and 5; Travel Management **may affect individuals of a species that has been found warranted for federal listing, but is unlikely to contribute toward a downward trend and loss of viability for the Pacific fisher** because habitat will be impacted by noise disturbance from motorized use. There is a minimal difference between road densities; however, when you look at the miles of roads and motorized trails being added, there would be an effect to the amount of habitat used by the species. If there is an increase in seasonal closures, there would be a benefit to the fisher because more habitat would be protected during critical foraging and denning periods.

Impacts to important habitat features such as snags or downed logs utilized for den and resting purposes, or for cover near roads, would be minimally impacted through the implementation of these alternatives. Felling of snags and movement of down logs would be limited to existing public health and safety hazards which occur adjacent to trails and roads. Given that the availability of hazard trees typically occurs in a sporadic fashion over a relatively small linear strip of habitat associated with roadway, their influence in reducing overall background levels of these resources on the larger landscape is small.

Existing canopy closure associated with forested stands would not decrease below current levels since further route expansions would not occur with the prohibition of cross-country travel. Some passive recovery of canopy in the form of shrub cover may increase over the mid to long term as vegetation returns along unauthorized roads and motorized trails abandoned with the elimination of cross-country travel.

Alternatives 2, 4 and 5 significantly reduce road and motorized trail density from existing levels within high suitability fisher habitat by 0.040 (Alternative 2) to 0.073(Alternative 5) miles/sq mi depending on the alternative. These conditions would provide for lower levels of motorized disturbance, and decrease potential indirect anthropogenic influences such as disease transmission and inadvertent fire starts associated with human access.

Although an improvement from current conditions, these alternatives would also add between 6.8 and 14.7 miles of roads and motorized trails in high suitability fisher (60-79 and 80-100 percent probability added together for action alternatives) habitat to the NFTS depending on the Alternative. However, the added roads and motorized trails proposed are comprised by native (dirt) surfaced roads or trails of smaller widths, necessitating slower vehicle speed. As such, it is not anticipated these would increase incidence for vehicle-related mortality due to collision to occur. The cumulative route densities associated with these alternatives according to Freel (1991) would maintain habitat within the range of low capability. But a review of female fisher home ranges found female fishers successfully reproducing in areas with route densities far above that noted in these alternatives, suggesting ability for animals to become habituated to at least some levels of motorized use. This is also supported by Zielinski et al. (1997) and the preliminary results noted from long term status and trend monitoring for fisher populations showing

consistent distribution and index of detections at existing route density and current use levels. Given that route density would be decreasing from current levels, it is unlikely that these proposed actions would result in substantial reductions in habitat quality. Therefore, these actions are not anticipated to reduce the viability of the fisher population in the project area.

Cumulative actions from prior or future projects are of limited magnitude and have not contributed long-term degradation of fisher habitat.

It is my determination that Alternative 3 (system roads and motorized trails only) of the Travel Management Project will have **no effect** on Pacific fisher. No roads and motorized trails will be added to the NFTS, so there would be no direct or indirect effects to this species or its habitat. From current management, this would eliminate approximately 83.6 miles of cross-country unauthorized routes from high suitability fisher habitat. Only the existing NFTS roads and motorized trails would remain.

It is my determination that Alternative 4 of the Travel Management Project **may affect individuals of a species that has been warranted for federal listing, but is unlikely to contribute toward a further downward trend and loss of viability.** This alternative adds 8.7 miles of roads and motorized trails to the NFTS in high suitability fisher habitat resulting in 74.9 fewer miles of motorized route in this habitat. The cumulative route density in this alternative would maintain habitat within the range of moderate capability using the model created by Freel (1991) and is expected to improve habitat conditions for fisher over the long term.