3.03. Terrestrial & Aquatic Species

Introduction

Management of wildlife species and habitat, and maintenance of a diversity of animal communities is an important part of the mission of the Forest Service (Resource Planning Act of 1974, National Forest Management Act of 1976). Management activities on National Forest System (NFS) lands must be planned and implemented so that they do not jeopardize the continued existence of threatened or endangered species or lead to a trend toward listing or loss of viability of Forest Service Sensitive species. In addition, management activities should be designed to maintain or improve habitat for Management Indicator Species to the degree consistent with multiple-use objectives established in each Forest Land and Resource Management Plan (LRMP). Management decisions related to public motorized travel can affect wildlife by increasing human-caused mortality, causing changes in behavior due to disturbance, and habitat modification (Gaines et al. 2003, Trombulak and Frissell 2000, USDA Forest Service 1998). It is Forest Service policy to minimize damage to vegetation, avoid harassment to wildlife, and avoid significant disruption of wildlife habitat while providing for motorized public use on National Forest System (NFS) lands (FSM 2353.03(2)). Therefore, management decisions related to public motorized travel on NFS lands must consider effects and wildlife and their habitat.

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

Management direction relevant to the proposed action as it affects terrestrial and aquatic biota includes:

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

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

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

Following de-listing, the species was placed on the Region 5 Regional Forester's Sensitive Species List (USDA Forest Service 1999). In the sections below, this document and the Biological Evaluation for the Tahoe NF Motorized Travel Management Project, which is incorporated by reference, analyzes and discloses effects of the alternatives.

- **Forest Service Manual and Handbooks (FSM/H 2670)**: Forest Service Sensitive (FSS) species are animal and plant species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and ensure their continued viability on national forests. It is Forest Service policy to analyze impacts to sensitive species to ensure management activities do not create a significant trend toward federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE) and is summarized and referenced in this Chapter.
- **Sierra Nevada Forest Plan Amendment (SNFPA)**: The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified the following standards and guidelines applicable to motorized travel management and terrestrial biota, which will be considered during the analysis process:
- **Wetland and Meadow Habitat** (Management Standard & Guideline 70): Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.
- **California Spotted owl and Northern Goshawk**: Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites (Management Standard & Guideline 82).
- **Fisher and Marten**: Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites (Management Standard & Guidelines 87 and 89).
- **Riparian Habitat:**
  - Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species (Management Standard & Guideline 92).
  - As part of project-level analysis, conduct peer reviews for projects that proposed ground-disturbing activities in more than 25 percent of the RCA or more than 15 percent of a CAR (Management Standard & Guideline 94).
  - Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity (RCO#2, Management Standard & Guideline 100).
  - Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage for aquatic-dependent species. Locate water drafting sites to avoid adverse effects to in

stream flows and depletion of pool habitat. Where possible, maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows, wetlands, and other special aquatic features (RCO#2, Management Standard & Guideline 101).

- Prior to activities that could adversely affect streams, determine if relevant stream characteristics are within the range of natural variability. If characteristics are outside the range of natural variability, implement mitigation measures and short-term restoration actions needed to prevent further declines or cause an upward trend in conditions. Evaluate required long-term restoration actions and implement them according to their status among other restoration needs (RCO#2, Standard and Guideline 102).
- Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, and day use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions (RCO#3, Management Standard and Guideline 116).

- **Management Indicator Species(MIS)(1982 Planning Rule)(36 CFR 219):** Management indicator species are animal species identified in the 2007 Sierra Nevada Forest MIS Amendment Record of Decision, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule)(36 CRF 219). Guidance regarding management indicator species (MIS) set forth in the Tahoe NF LRMP as amended by the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (USDA Forest Service 2007a) directs Forest Service resource managers to *(1)* at the project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and *(2)* at the bioregional scale, monitor populations and/or habitat trends of MIS. Although, the 2007 SNF MIS Amendment exempted the Tahoe NF Motorized Travel Management Project from adopting the newly amended MIS list, the ROD provides the deciding officer the discretion to elect to apply the new project-level analysis requirements. The Tahoe NF Forest Supervisor has elected to apply the new project-level analysis requirements to this project. Therefore, in the sections below, this document and the Tahoe NF Travel Management Project-Level MIS report, which is hereby incorporated by reference, evaluates and discloses the impacts of the Tahoe NF Motorized Travel Management Project alternatives on the habitat of the twelve (12) Management Indicator Species (MIS) identified in the Tahoe NF LRMP (USDA 1990) as amended by the 2007 SNF MIS Amendment ROD.
- **Tahoe NF Land and Resource Management Plan (Tahoe LRMP):** The Record of Decision (ROD) for the 1990 Tahoe LRMP identified the following standards and guidelines applicable to motorized travel management and terrestrial biota, which will be considered during the analysis process:
- **Deer Habitat Management (Management standard and guideline)**: Limit vehicle access on key deer winter ranges when deer are present. Also limit vehicle access in key summer range habitats during periods of migration and fawning. Retain or establish roadside screening along open roads in areas Important for migration, fawning, or concentrated seasonal use.

- **Meadow Edge Habitat (Management standard and guideline)**: Locate roads away from meadow edges where alterative routes are available.

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

Background

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

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

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

Mortality from collision with vehicles

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

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

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

Modification of animal behavior

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

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

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

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

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

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

Alteration of the terrestrial and aquatic wildlife habitat

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

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

Some Potential Effects of Habitat Alteration to Aquatic Species Habitats

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

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

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

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

Some Potential Effects of Habitat Alteration to Terrestrial Wildlife Habitats

Forest roads and trails can both enhance and decrease habitat for wildlife (Jalkotzy et al. 1997). The road or trail creates edge habitat for species that are habitat generalists, particularly for some mammal species (e.g., coyote and deer mice) and some songbird species. Ravens are more common along roads since carrion is more available along these corridors. For habitat specialists, such as interior dwelling species that require intact, undisturbed patches of habitat such as the American marten and the spotted owl, roads

can fragment habitat. Roads and trails can also fragment or disrupt habitat indirectly by introducing exotic or noxious weeds. In addition roads can increase pollutants like dust and vehicle emissions that can contaminate roadside vegetation which wildlife feed upon.

Increased alteration and use of habitats by humans

Several studies have indicated that high road densities result in adverse impacts on certain wildlife species. Impacts from high densities include excessive harvest including legal and illegal, disturbance/harassment from noise, and habitat alteration. Brocke et al. (1988) reported that high road densities can elicit a variety of negative impacts of certain wildlife species. These effects include human disturbance. In Adirondack counties, the black bear population density index (based on the number of legal kill) showed a ten-fold decrease when road density increased by ten times. Other studies were cited as showing similar sensitivity to road density for other large predators and ungulates.

Effects Analysis Methodology

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

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

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

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

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

Species	Federally Listed	Forest Service Sensitive	Management Indicator Species	Other Species of Concern	Indicator Habitat or Ecosystem Component	Distribution on Tahoe NF
American Marten		X	X		Late-seral closed canopy coniferous forests	Forest-wide
Aquatic macro invertebrates			X		Riverine and lacustrine habitats	Forest-wide
Bald Eagle		X			Mature conifer forest near large bodies of water	Nests near or adjacent to specific reservoirs on theTahoe NF
Band-tailed Pigeon				X	Pure oak and mixed oak/conifer forest	Forest-wide
Black Bear				X	Early and late seral stages within all forest types	Forest-wide
Blue Grouse			X		Late seral open canopy coniferous forests	Forest-wide
California Floater		X			In fairly large streams and lakes, in relatively slow currents on soft substrates (mud-sand)	Not known to occur on the TNF, historically documented in Donner Lake adjacent to the Tahoe NF.
California Red-legged Frog	X				Cold water ponds and stream pools with depths exceeding 0.7 meters and with overhanging vegetation such as willows, as well as emergent and submergent vegetation	Suitable habitat on west side of TNF below 4,000 ft;. no known occupied habitat on TNF; 3 known populations on private land adjacent to TNF.
California Spotted Owl		X	X		Mature and late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir), tree size 4 & 5 (canopy closures M and D), and tree size 6	Forest-wide
California Wolverine		X			Various habitat types used, coniferous forests, subalpine and alpine areas above 8,000 ft.	Verified detections on the eastside of the Tahoe NF.
Coniferous forest birds				X	Coniferous forests, all seral stages, all canopy closures	Forest-wide
Foothill Yellow-legged Frog		X			Shallow, slow flowing water of rocky streams and rivers in a variety of habitats including riparian, mixed conifer, and wet meadow types below 6000 feet elevation on the west slope of the Sierra Nevada	Below 6000 feet elevation on the west slope of the Tahoe NF
Fox Sparrow			X		Shrubland (west-slope chapparral types)	Westside of the Tahoe NF on the Yuba River Ranger District and American River Ranger District.

Species	Federally Listed	Forest Service Sensitive	Management Indicator Species	Other Species of Concern	Indicator Habitat or Ecosystem Component	Distribution on Tahoe NF
Great Gray Owl		X			Mature and late seral conifer forest adjacent to meadows	One recent confirmed sighting on TNF, but breeding has not been verified. Recent sightings on private land.
Greater Sandhill Crane		X			Wet meadow, shallow lacustrine, and fresh emergent wetland habitat	Only known breeding at Kyburz Flat and Carman Valley on Sierraville RD Reported on pvt land in Sardine Valley.
Great Basin Ramshorn Snail		X			Lakes and larger, slow streams in and around the northern Great Basin; suitable habitat on TNF within slow segments of the Truckee and Little Truckee Rivers and tributaries	No verified locations on TNF; historically found in the Truckee River downstream of Lake Tahoe, on the LTBMU
Hairy Woodpecker			X		Medium and large snags in green forest	Forest-wide
Hardhead		X			Great Valley and Foothill belts, and in larger west-slope streams into the Yellow pine belt	No verified locations on TNF; historic report on Sierraville RD
Lahontan Cutthroat Trout	X				Historically and currently occupied streams and lakes	Limited distribution on Sierraville and Truckee ranger districts
Lahontan Lake Tui Chub		X			Lakes and reservoirs, known only from Pyramid Lake and Lake Tahoe.	Possible population in Stampede, Boca and Prosser Reservoirs on the Tahoe National Forest.
Mountain Quail			X		Early and mid-seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, eastside pine, tree sizes 1, 2, and 3, all canlopy closures	Forest-wide
Mountain Yellow-legged Frog		X			Low gradient (up to 4%) perennial streams and lakes above 4500 feet elevation	Locations above 4,500 ft. on the TNF, has disappeared from many historic locations on the Tahoe NF
Mule Deer			X		Uses a variety of habitats Forest-wide including mid, early, and late seral forests; meadows; riparian areas; and shrublands MIS indicator habitat - Oak-associated Hardwood & Hardwood/conifer	Indicator habitat occurs on the westside of the Tahoe NF. Deer populations occur forest-wide.
Northern Flying Squirrel			X		Late-seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir), tree size 5 (canopy closures M and D), and tree size 6	Forest-wide

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

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

A total of 36 species or species groups are included in the species group assessment, including the special status species listed in Table 3.03-2. These include aquatic macro invertebrates, 5 amphibian

species, 2 aquatic invertebrate species, 3 fish species, 1 reptile species, 15 bird species, and 9 mammal species. These species were divided into wildlife groups (some species occurred in more than one group) as described in Table 3.03-2. Species not included in these assessments include the Valley elderberry longhorn beetle and the peregrine falcon since their habitats are either not on the Tahoe NF or are not affected by this project. Assessments for the Valley elderberry longhorn beetle and the peregrine falcon are carried out in the Biological Evaluation are incorporated by reference.

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

Wildlife group	Species
Wide-ranging carnivores	Black bear, wolverine, Sierra Nevada red fox
Ungulates	Mule deer
Oak and Oak-conifer associated species	Mule deer, pallid bat
Early and mid seral coniferous forest associated species	Mountain quail
Late-seral moderate to closed canopied coniferous forest associated species	California spotted owl, northern goshawk, great gray owl, American marten, Pacific fisher, northern flying squirrel, forest coniferous birds (brown creeper)
Late-seral open canopied coniferous forest	Blue grouse
Riparian and wetland species [including lacustrine (lakes) and riverine habitat (rivers, streams)]	Bald eagle, great gray owl, greater sandhill crane, willow flycatcher, yellow warbler, aquatic macroinvertebrates, California floater, Great Basin ramshorn snail, Lahontan cutthroat trout, Lahontan tui chub, hardhead, California red-legged frog, foothill yellow-legged frog, mountain yellow-legged frog, Pacific tree frog, northwestern pond turtle, Sierra Nevada red fox, Western red bat.
Snag associated species	Pallid bat, hairy woodpecker
Shrubland (west-slope chaparral) associated species	Fox sparrow

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

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

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

Road and trail – associated factors[1]	Activity Type[2]	Definition of Associated factors	Wildlife group affected
Hunting and trapping	Harvest	Mortality from hunting or trapping as facilitated by road and trail access	• Wide-ranging carnivores • Ungulates • Oak Associated Species • Early and mid seral coniferous forest
Poaching	Harvest	Increased illegal take of animals as facilitated by trails and roads	• Wide-ranging carnivores • Ungulates • Oak Associated species • Early and mid seral coniferous forest
Collisions	Harvest	Mortality or injury resulting from a motorized vehicle running over or colliding with an animal	• Wide-ranging carnivores • Ungulates • Late seral species • Aquatic-Riparian species
Habitat loss and fragmentation	Habitat modification	Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities	• Wide-ranging carnivores • Ungulates • Late seral species • Early and mid seral species • Aquatic-Riparian species
Edge effects	Habitat modification	Changes to habitat microclimate associated with the edge induced by roads or trails	• Late successional
Snag or downed log reduction	Habitat modification	Reduction in density of snags and down logs due to their removal near roads as facilitated by road access	• Wide-ranging carnivores • Late successional species • Snag dependent species
Collection	Harvest	Collection of live animals for use as pets (such as amphibians and reptiles) as facilitated by the physical characteristics of roads or trails or by road or trail access	• Late successional species • Aquatic-Riparian species
Route for competitors and predators	Habitat modification	A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise	• Wide-ranging species • Ungulates • Late successional species • Early and mid seral species • Aquatic-Riparian associated • Oak-Associated hardwood & hardwood/conifer species • Snag-dependent species • Shrubland associated species
Disturbance at a specific site	Disturbance	Displacement of individual animals from a specific location that is being used for reproduction and rearing of young	• Wide-ranging carnivores • Ungulates • Late successional species • Early and mid seral species • Aquatic-Riparian associated • Oak-associated hardwood & hardwood/conifer species • Snag-dependent species • Shrubland associated species
Physiological response	Disturbance	Increase in heart rate or stress hormones when near a road or trail or network of roads or trails	• Wide-ranging carnivores • Ungulates • Late successional species • Early and mid seral species • Aquatic-Riparian associated • Oak-Associated hardwood & hardwood/conifer species • Snag-dependent species • Shrubland associated species

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

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

Step 3. Processes and models: The assessment process to analyze the effects of motorized travel routes (road and trails) on the Tahoe NF was done in a three primary steps: (1) Road density was derived within specific wildlife habitats, (2) the cumulative effects of travel routes to species groups were assessed based on a similar process completed by Gaines et al. 2003, and (3) the relative environmental risk of roads and trails to habitats was determined.

Step 4. Analysis of effects: The information generated in step 3 was used to analyze the direct, indirect and cumulative effects of the proposed alternatives on the wildlife groups. The analysis of the project alternatives focuses on the effects of three actions: (1) the prohibition of cross-country motorized vehicle travel, (2) adding facilities (roads unauthorized for motorized public use, trails, and/or areas) to the National Forest Transportation System (NFTS), and (3) changing the vehicle class and season of use on the NFTS.

Wildlife Analysis Assumptions

- All vehicle types result in approximately the same amount of disturbance effect to wildlife.
- Location of route is equal to disturbance effects from that route (e.g., assume all trails provide the same level of disturbance).
- Habitat is already impacted in the short-term. In the long-term, habitat will remain the same on motorized trails added to the National Forest Transportation System (NFTS), but impacts will decrease to at least some degree on non-added trails with the prohibition of cross-country motorized travel and subsequent passive restoration (see Soils section for further assumptions).
- The focus of this analysis is on suitable habitat; suitable habitat is assumed occupied unless it has been surveyed to a standard that determines absence.
- Noise generated from non-motorized associated disturbance impacts are limited to within 60 meters of motorized roads and trails.
- The cumulative effects of past projects are incorporated within the existing vegetation and travel system maps.
- The estimation of route densities for Alternative 1 (no action) includes all existing motorized trails un-authorized for motorized use; this is based on the assumption that these un-authorized motorized trails would continue to be used under continued cross-country travel. Under the action alternatives, only motorized trails proposed for addition to the National Forest Transportation System (NFTS) are included in estimating route densities, since under the ban for cross-country travel, motorized use would only occur on the NFTS.
- Continued cross-country motorized travel under the no action alternative (Alternative 1) will lead to continued proliferation of motorized routes, which would have a high likelihood of increasing overtime (see Chapter 3.0 Recreation).

Wildlife Sources of Information

- GIS layers of the following wildlife resources were used for analysis:
  - Bald Eagle – nest sites

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

Analysis Indicators

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

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

Affected Environment and Environmental Consequences by Species Groups

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

Affected Environment Description

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

Environmental Consequences Description

Direct and Indirect Effects Boundary

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

Cumulative Effects Boundary (Space and Time)

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

Within the cumulative effects boundary, cumulative effects from motorized routes are analyzed quantitatively using route density by assessing the accumulation of all past, present, and future route-associated actions, including existing system routes, motorized trails added to the NFTS, and any future routes that would be created within the next 20 years within the boundary of the Tahoe NF (NFS and non-NFS lands). In addition, overall cumulative effects from other past, present, and reasonably foreseeable future actions are described. Twenty years is a reasonable timeframe for estimating cumulative impacts of motorized routes in the reasonably foreseeable future. Past actions include routes that were created within the last 50 to 100 years and will be incorporated into the existing condition, such as roads that are closed or decommissioned.

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

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly

costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one cannot reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or events contributed to those effects. Finally the Council on Environmental Quality issued an interpretive memorandum on June 34, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate aggregate effects of past actions without delving into the historical details of individual past actions." For these reasons, the analysis of past actions in this section is based on current environmental conditions and is represented in the current maps used to analyze cumulative effects that have occurred in the past 100 years or more.

In addition, past actions for the previous 20 years will be discussed under each species as appropriate, including activities as timber harvest, grazing, and non-motorized recreation to provide pertinent information of relatively recent activities that may still be impacting species and their habitats.

Analysis Measures or Indicators

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

Density of motorized routes for habitat effectiveness

Route density has often been used as a surrogate to estimate habitat effectiveness or the direct and indirect effects of motorized routes on terrestrial wildlife. Route density thresholds for wildlife have not been established on the Tahoe NF, and thresholds for wildlife in the literature can vary by season and by geographic location. Therefore, road density "thresholds" will not be used to determine effects of the project alternatives, but rather road density is used for a relative comparison of the alternatives. Route density was determined at the scale of 7th field watershed, since this scale is sufficiently large to accurately estimate road densities. Route densities at a larger scale could potentially mask route density effects and therefore, underestimate effects to wildlife species. Route densities at any smaller scale may actually be amplified and therefore overestimate the effects to wildlife. Route density calculations for alternative 1 include existing routes unauthorized for motorized public use because use of these routes can be assumed to continue as part of continued cross-country travel. Finally, route density necessarily includes all motorized routes, including existing NFTS system, non-NFS routes, etc. because route

density must be calculated across an area (miles per square mile), and therefore, the direct and indirect effects of proposed route additions is shown by the differences between the alternatives.

Table 3.03-4. Proportion of Tahoe NF acreage with motorized route densities between 0 miles per square mile and >6 miles per square mile (averaged by 7th field watershed)

Alternatives		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Wildlife								
Motorized Route Density (Percent of Forest Total)	**0 Miles/Square Mile**	<1%	<1%	<1%	<1%	<1%	<1%	<1%
	0-2 Miles/Square Mile	17%	25%	27%	26%	24%	25%	25%
	2-4 Miles/Square Mile	44%	56%	56%	56%	53%	56%	56%
	4-6 Miles/Square Mile	32%	15%	13%	14%	18%	15%	15%
	>6 Miles/Square Mile	7%	4%	4%	4%	5%	4%	4%

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

Miles of motorized routes to measure potential disturbance

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

Forest-wide miles of motorized routes

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

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

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

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

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

Influence for individual species that are used in the analysis of effects are based upon the best available science in the literature. Because there are limited data and studies for many species, assumptions and generalizations were made for some species where no data were available. The Zone of Influence is a relative index of habitat effectiveness to compare alternatives.

Wide-Ranging Carnivores

Large and mid-sized carnivores are unique in their response to human-induced habitat changes due to their large spatial habitat needs and their sensitivity to landscape patterns, including road edge effects and road density (Buskirk and Zielinski 2003 In Zabel, et al 2003). The wolverine and the Sierra Nevada red fox may be considered to be sensitive to the presence of humans and human activities (Claar et al. 1999, Grinnell et al. 1937). Three species were included in the wide-ranging carnivore habitat assessment group –black bear (*Ursus americana*), the wolverine (*Gulo gulo*), and the Sierra Nevada red fox (*Vulpes vulpes necator*).

The following is a summary of some of the potential trail- and road associated effects to wide ranging-carnivores (Gaines et al. 2003):

- Mortality from hunting or trapping as facilitated by road and trail access
- Increased illegal poaching of animals as facilitated by trails and roads
- Mortality or injury resulting from a motorized vehicle running over or hitting an animal
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young
- Change in behavior and/or increased mortality of animals (euthanasia or shooting) due to increased contact with humans, as facilitated by road and trail access including recreational sites, such as campgrounds
- Interference with dispersal or other movements as posed by a road or trail itself or by human activities on or near roads, trails, or networks
- Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities
- A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise
- Reduction in density of snags and down logs due to their removal near roads as facilitated by road access
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young (i.e. fawning habitat)
- Increase in heart rate or stress hormones when near a road or trail or network of roads or trails

Effects Common to All Wide-ranging Species

Change in Class of Vehicles. Although responses to motorized vehicle use varies by species and depends upon the type of vehicle, in addition to the intensity, timing, speeds, and amount motorized vehicle use, the specific species responses are not well understood. For this analysis, it is assumed that all vehicle

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

Wet Weather Seasonal Restrictions. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and trails, where wide-ranging species would be benefited through the reduction of noise and disturbance associated with motorized use, especially motorized routes that are within wide-ranging species habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather restrictions on native surfaced motorized routes and therefore, there would be no benefit to wide-ranging species from wet weather seasonal restrictions under these alternatives.

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

Addition of Motorized Open Areas

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

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

Greenhorn Area: Located just outside of Nevada City, the Greenhorn is popular four wheel drive and motorcycle use area by local residents. The majority of the area was hydraulically mined during the gold rush resulting in a lack of vegetation. The area also has a currently operating gravel plant. The Greenhorn Area is only proposed under Alternative 2. The Greenhorn area does not provide suitable habitat for wide-ranging species due to the amount of human activity and urban development in the area. Therefore implementation of Alternative 2 would not likely pose a concern for wide-ranging species, including the wolverine, bear, and red fox. If individual animals are using the area, they could receive some localized, direct disturbance, but because the area is already receiving concentrated use by people, any animals using the area likely have adapted to the amount of use occurring or have already avoided the area.

Access to Boca, Stampede, and Prosser reservoirs: As the water levels are drawn down in these reservoirs, motor vehicles are used to access the shoreline for boating, camping, fishing and picnicking. They are typically not used as open play areas as are Eureka Diggings and Greenhorn Creek. The access to these reservoirs is only proposed under Alternative 2. The three reservoir areas occur on the Truckee

Ranger District within eastside pine habitat. Eastside pine habitat is generally lower in elevation than where wolverine and the Sierra Nevada red fox are known to occur (subalpine and alpine habitats) during the summer months when the reservoirs are used for recreational activities, and therefore would not affect wolverine and the red fox. Minor and incidental direct impacts to bear, wolverine, or red fox are traveling in vicinity of the reservoirs. The area used to access the reservoirs has no vegetation, and therefore does not provide cover or forage habitat for bear, wolverine, and red fox. Overall, access to the three reservoirs would have no to minimal direct, indirect, or cumulative impact to wide-ranging species.

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

The geographic boundary for analyzing cumulative effects to wide-ranging species (wolverine, Sierra Nevada red fox, and bear) are lands that fall within the boundary of the Tahoe NF including all National Forest System lands and non-National Forest System lands (private). The Tahoe NF boundary is sufficiently large to encompass the home ranges of wide-ranging species located on the Tahoe NF. In addition, the Forest boundary encompasses a wide variety of habitats used by these species, from early seral to late seral forests, subalpine and alpine habitats, meadows and riparian habitats, and oak and oak-conifer woodlands. The cumulative effects of past actions relies on current environmental conditions as a proxy. As previously stated, existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. However, some past actions are presented in order to describe potential habitat changes of wide-ranging species that have occurred in the past.

The timeframe for analyzing cumulative effects of reasonably foreseeable future actions for wide-ranging species is approximately twenty years into the future. Twenty years into the future is a reasonable amount of time to estimate potential cumulative impacts to wide-ranging species from future foreseeable activities.

Black Bear: Affected Environment

The black bear is a Management Indicator Species on the Tahoe NF. The Tahoe LRMP describes important bear habitat as all forested types, particularly in the early and late seral vegetation types. California Wildlife Habitat Relationships program (CWHR 2005) describes black bear habitats as dense, mature stands of forest habitats, and black bears feed in a variety of habitats including brushy stands of forest, valley foothill riparian and wet meadows. Habitat requirements include large trees and various cavities and hollows in trees, snags, stumps, logs, uprooted trees, talus slopes, or earth dens. Large undeveloped blocks of habitat, where bears will encounter few humans in the core areas within these blocks, are assumed to be important for black bear.

Black bears have been known to be affected by road and trail associated factors including collisions, hunting, poaching, negative human interactions, and displacement or avoidance (Gaines et al. 2003). On the Tahoe NF, bear collisions have been reported at various locations, primarily along state highways such as Interstate 89 and Interstate 49. The frequency of bear-vehicle collisions is relatively low.

Collisions, Hunting and Poaching: The California Department of Fish and Game (2004) report that the level of bear-vehicle collisions are low, and most probably occur on higher speed paved highways. Collisions on lower speed unpaved routes being evaluated for this project are not likely to occur.

Increased road density likely has an indirect impact on bears by increasing bear and human interaction, such as providing increased access to hunters. Bear harvest varies by habitat and accessibility to bear habitat. Bears are most vulnerable to harvest where road densities are high and escape cover is limited. The amount of human access for bear hunting and poaching opportunities is directly related to the proportion of roads and trails. As routes increase on the Tahoe NF, access for bear hunting and poaching increase. However, statewide bear monitoring indicates bear population trends are either stable or increasing. CDFG (2004) reports that legal and illegal bear harvest together "will not have significant negative effects on the State's bear resource." Therefore, it is possible to assume that human access for bear hunting and poaching does not have a negative impact on the bear population numbers on the Tahoe NF.

Negative Bear-Human Interactions: As human access increases, the potential for negative human interactions with bears also increases. On the Tahoe NF, negative bear-human interactions have primarily occurred at campgrounds, ski resorts, developed recreational facilities, etc. As bear populations in the Sierra Nevada continue to increase, bear-interactions on the Tahoe NF are also expected to increase. Bear mortalities may result from repeated negative bear-human interactions, but the number of bear killed as a result of these negative encounters is not expected to affect the overall bear population on the Tahoe NF.

Displacement or Avoidance: Little research has been conducted on the impacts on black bears from recreation in relation to the use roads and trails. Therefore, impacts to black bears from OHV activities associated with roads and trails are not well understood. However, in Idaho, black bears are reported to respond to increases in road density by shifting their home ranges to areas of lower road densities (Young and Beecham 1986 *In* Joslin and Youmans, coordinators 1999). In Montana, Kasworm and Manley (1990) found that black bears avoided habitat within 274 meters of roads. Bears were more likely to be displaced by roads than by trails. A study in North Carolina indicated that road density had no affect in bear movement within their home ranges (Brody and Pelton 1989 *In* Joslin and Youmans, coordinators 1999).

Black Bear: Environmental Consequences

Analysis Measures

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

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

Route density thresholds for black bear are not readily available in the literature, however, Hurley et al. (1981) recommended that preferred black bear habitat (high capability) has road densities below 0.5 miles per square mile, and moderate habitat capability has road densities below 5 miles per square mile.

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

Direct and Indirect Effects

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

Route Density: To assess the extent the project alternatives may influence bear habitat, including effects from hunting, poaching, and displacement, the density of motorized roads/trails across the Tahoe NF (includes both NFS and non-NFS lands) was determined by 7th field watersheds (Table 3.03-5).

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

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

Low bear habitat capability: Alternative 1 has the greatest amount of low habitat capability for bears at 19% of the Forest compared to all the alternatives. Alternative 5 provides the next highest amount of low capability bear habitat. The rest of the alternatives are similar in the amount of low bear habitat capability ranging from 8 to 9 percent.

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

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

Zone of Influence

Table 3.03-6 displays the direct, indirect, and cumulative effects to bear habitat within a 275-meter Zone of Influence of motorized roads/trails. Alternative 1 reduces bear habitat effectiveness to the greatest extent because motorized use can be expected to continue on motorized trails un-authorized for motorized

use during continued cross-country travel. Alternative 1 directly and indirectly influences approximately 19% of bear habitat within a 275-meter Zone of Influence of these motorized trails un-authorized for motorized use where bear habitat effectiveness could be reduced or where negative bear-human interactions have the potential to occur. Alternative 5 directly and indirectly reduces habitat effectiveness by approximately 4% within a 275-meter influence of motorized trails added to the National Forest Transportation System (NFTS). Motorized trails added to the NFTS under the remaining action alternatives directly and influences from 0% (Alternative 3) to 2% (Alternative 2) of bear habitat.

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

Table 3.03-6. Proportion of Bear Habitat within a 275-meter "Zone of Influence" of Motorized Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of Proposed Alternatives							
Proposed motorized route additions to NFTS (negative impact)	0%	2%	0%	1%	4%	1%	1%
Existing routes unauthorized for motorized public use (negative impact)	19%	0%	0%	0%	0%	0%	0%
Routes unauthorized to motorized public use (positive impact)	0%	18%	19%	19%	16%	18%	19%
Cumulative Effects of Past, Present, and Proposed Actions							
Existing motorized routes - NFS lands (negative impact)	32%	32%	32%	32%	32%	32%	32%
Existing motorized routes - non-NFS lands (negative impact)	14%	14%	14%	14%	14%	14%	14%
Positive Cumulative Effects							
Decommissioned routes (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Relative Cumulative Impact Score = Sum Total of Motorized Routes both positive and negative (**Note**: Some overlap may occur where route categories intersect)	**65%**	**46%**	**46%**	**47%**	**50%**	**47%**	**47%**

Summary of Direct and Indirect Effects

Table 3.03-7 summarizes the overall net effect to black bear from the proposed actions from motorized route additions, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

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

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

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects black habitat where cross country travel continued, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 18% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 16% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 18% habitat within 275 meters of existing routes unauthorized to motorized public use	Benefits black bear habitat where cross country travel is prohibited, including within 19% habitat within 275 meters of existing routes unauthorized to motorized public use

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

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Cumulative Effects to Bear

The geographic boundary for analyzing cumulative effects to bear are lands that fall within the boundary of the Tahoe NF including all National Forest System lands and non-National Forest System lands (private). The Tahoe NF boundary is sufficiently large to encompass the home range of bears located on the Tahoe NF. In addition, the Forest boundary encompasses a wide variety of habitats used by the bear--from early seral to late seral forests, meadows and riparian habitats, and oak and oak-conifer woodlands. The timeframe for analyzing cumulative effects for the bear is approximately twenty years into the past and into the future. Twenty years into the future is a reasonable amount of time to estimate potential cumulative impacts to bear from future foreseeable activities.

Cumulative effects from motorized routes: Route density is a useful way to measure cumulative effects to bear from the sum total of all relevant past, present, and reasonably foreseeable future impacts associated with motorized routes. Table 3.03-8 displays cumulative effects to bear.

The cumulative effects of route density would be greatest under Alternative 1 (no action) compared to all the other alternatives, followed by Alternative 5. Under alternative 1, approximately 19% of the Tahoe NF would be in low habitat capability where route density exceeds 5 miles/square miles and approximately 27% of bear habitat would have reduced effectiveness within 275 meters of routes unauthorized for motorized public use. Unmanaged cross-country travel would continue and increase over the next 20 years based on the increasing trend in sales of ATVs, motorcycles and 4X4 vehicles in recent years, likely resulting in an increase in routes unauthorized for motorized public use. The overall cumulative effects of Alternative 5 would only be slightly greater than alternatives 2, 3, 4, 6, & 7. Alternatives 2, 3, 4, 6 & 7 would have similar cumulative effects and would not result in an appreciable change in overall bear habitat capability since the addition of routes unauthorized for motorized public use to the existing NFTM system would only cumulatively add between 0-2 percent.

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

Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Past and Present Effects – Proportion of Forest with low bear habitat capability (>5mi/square mile)	19%	9%	8%	8%	11%	9%	9%
Future Effects – Likelihood of increased route density contributing to low bear habitat capability	**High** – Unmanaged cross country route proliferation will continue to increase over time, low bear habitat capability will increase with time	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same	**Low** – Cross country route proliferation will be prohibited, bear habitat capability will remain approx. the same
Cumulative Effects of Route Density Affecting Habitat Capability	Greatest Potential for Cumulative Effects of Route Density from past, present, and future, resulting in a greater percentage of the landscape in low bear habitat capability	Similar to Alt 3, 4, 6, & 7. Bear Habitat Capability would stay approx. the same as existing situation	Similar to Alt 2, 4, 6, & 7. Bear Habitat Capability would stay approx. the same as existing situation	Similar to Alt 2, 3, 6, & 7. Bear Habitat Capability would stay approx. the same as existing situation	Slightly greater cumulative effects than Alt 2, 3, 4, 6, & 7. Route density would contribute slightly to reduced bear habitat capability over the existing situation.	Similar to Alt 2, 3, 6, & 7. Bear Habitat Capability would stay approx. the same as existing situation	Similar to Alt 2, 3, 6, & 7. Bear Habitat Capability would stay approx. the same as existing situation

Overall Cumulative Effects to Bear from Past, Present and Reasonably Foreseeable Future Actions: Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on private lands within the Tahoe NF boundary. Past and current cumulative effects to bear include loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheel drive vehicles, ATVs, and motorcycles.

Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to habitats for bear. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. In general, management treatments which maintain cover and/or enhance foraging habitat for bear should benefit the bear, particularly projects that would promote bear forage species, such as fruit bearing shrubs and forbs.

Vegetation and fuels treatments generally do not increase forage quality and quantity for bear because they do not usually result in reducing the canopy cover below 40% which would not necessarily increase the production of understory species important for bear foraging. These treatments may result in the short-term reduction in cover for the bear, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Between 1994 and 2007, approximately 64,000 acres burned on the Tahoe NF, some of which have removed forested habitat for bear.

Thinning projects designed to reduce hazardous fuels will continue to be the primary activity affecting wide-ranging species habitat on the Tahoe (see Appendix Q, Wildlife Cumulative Effects). It expected that suitable habitat will be maintained, and it is anticipated that these treatments will reduce the amount forested wildlife habitat potentially lost from future stand replacing wildfires (USDA Forest Service 2004). The California Department of Forestry and Fire Protection currently lists approximately 12,000 acres of private land within the Tahoe NF administrative boundary for which timber harvest plans have been submitted. Timber harvest on private lands is generally more intensive and often changes the amount of forest cover available, but may increase foraging availability by increasing shrub habitats, particularly for bear.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increase in negative interactions between humans and bears. Developed recreational sites such as campgrounds and other facilities have the potential to be bear attractant sites. Currently the Tahoe NF has a number of developed campgrounds and an unknown

number of dispersed camp sites. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased negative human-bear interactions would be expected, particularly during the summer months. Table 3.00-1 lists the reasonably foreseeable recreation projects that are expected to occur. Two non-motorized trails are being proposed for development in the near future. The development and use of these trails are not expected to considerably increase human-bear interactions, but rather the sheer increase in humans using the Tahoe NF will likely lead to increased negative human-bear interactions. In addition, non-motorized use (hiking, mountain biking, equestrian) may occur on routes unauthorized for motorized public use until these areas are revegetated and recovered through active or passive restoration means. It is expected that, generally, non-motorized recreation on routes unauthorized for motorized pubic use is less of an impact than motorized recreation due to reduced noise levels, although this is uncertain.

Wolverine and Sierra Nevada Red Fox: Affected Environment

The wolverine and the Sierra Nevada red fox are wide-ranging carnivores that use a variety of vegetation types, but appear to select areas that are relatively free from significant human disturbance. Both the wolverine and the Sierra Nevada red fox are designated by the Regional Forester in the Pacific Southwest Region of the Forest Service as Sensitive.

In the Sierra Nevada, wolverine are known from over 4,000 feet elevation to over 10,000 feet elevation. According, to Aubrey et al. (2008, pers. comm.), wolverine natal den sites are highly correlated with subalpine and alpine regions that have late persistent snow during April and May. Until recently, no verified sightings of wolverine have been documented within the State of California since the 1920's, though several anecdotal wolverine observations have been reported throughout the Sierra Nevada including several apparently reliable observations on the Tahoe NF in recent years. In February and March 2008, verified wolverine photographic detections were taken from remote controlled camera stations on the Tahoe NF between the towns of Truckee, CA, and Sierraville, CA. Wolverine photographs were documented from four separate baited camera locations. Genetic results indicate the DNA evidence that has been collected to date is from a single male individual. DNA testing also indicates this individual is not related to the wolverine population from the southern Sierra Nevada region and it is also not related to wolverine populations in the Cascades region of Washington state (Mike Schwartz, 2008,personal communication). DNA results indicate that this particular wolverine has haplotype A, which is ubiquitous and shared with wolverine populations in the Rocky Mountains, Canada, and Alaska. At this time, the origin of this individual is unknown. Given the results of DNA testing, three possibilities remain of this wolverine's origin: (1) it escaped from captivity, (2) it dispersed from the nearest known populations in the Rocky Mountains or (3) it is from native northern Sierra Nevada population that was previously undetected by Grinnell et al. (1937).

Wolverines are known to be sensitive to humans and road associated factors, but are not necessarily affected by summer recreation trails (Gaines et al. 2003). Gaines et al. (2003) reported that wolverines may be displaced from natal dens in subalpine cirques as a result of winter recreation activities. Road and trail-associated factors that may affect wolverine include reduction in down logs, trapping, disturbance at a specific site, and vehicle collisions. Road density can be used as a relative measure of human influence on the wolverine, though no empirical data exist which correlate motorized route density with wolverine

population numbers due to the scarcity of research, the low population numbers, and overall difficulty in studying species that encompass large home ranges. Studies indicate that home ranges in North America may vary from less than 38.6 square miles to over 347.5 square miles.

The current distribution and population status of the Sierra Nevada red fox is uncertain (CDFG 2004). The Sierra Nevada red fox has not been verified to occur on the Tahoe NF, though habitat for this species occurs within subalpine conifer habitats interspersed with meadows. The nearest known population of the native Sierra Nevada red fox is a small population located in the Lassen Peak vicinity (Lassen National Park and Lassen National Forest, which represents the only verified detections of the subspecies in recent years (Perrine 2005, Perrine et al. 2007). Road construction and increased human settlement in the Sierra Nevada has the potential to facilitate the dispersal of non-native red foxes into the historic range of the Sierra Nevada red fox, by providing access to areas previously unavailable to the exotic foxes. Roads provide a potential travel corridor for valley foxes to move into Sierra Nevada red fox habitat. Although the tolerance of Sierra Nevada red fox to the presence of humans is an unknown, it is evident that the non-native red foxes thrive in human-altered environments (Lewis et al. 1999, Kamler and Ballard 2002). In addition, urban development within the range of Sierra Nevada red fox may pose a risk to the species through an increased risk of predation from domestic pets, disease transmission, automobile collisions, and other human-wildlife conflicts.

Wolverine and Sierra Nevada Red Fox: Environmental Consequences

Analysis Measures

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

Motorized Route Density: Motorized route density provides a relative measure of habitat effectiveness. Many literature references indicate wolverine and red fox are primarily associated with remote, secluded areas and may be sensitive to human presence. Therefore, it would follow that as route density increases, human presence may also increase and which reduces security habitat for wolverine and red fox. To compare alternatives, route density categories between 0 to >6 miles/square mile are presented.

Zone of Influence - Habitat Fragmentation (Snags and Down Logs): Sixty meters is the maximum distance within which the removal of hazard trees for roads and trails would occur where logs and snags important for wolverine and red fox may be lost for public safety concerns. The Zone of Influence within 60 meters of routes was used as a measure for analyzing habitat fragmentation as it pertains to loss of snags and down logs along routes within mature to late seral coniferous forest habitat as classified by 4M, 4D, 5M, 5D, & 6 CWHR types within the Tahoe NF. Furthermore, additional analysis of habitat fragmentation is presented within Old Forest Emphasis Areas (OFEAs) and within the Tahoe NF Forest Carnivore Network, which is presented in the section for Late seral coniferous Forest Associated Species Group.

Disturbance to a Specific Site - Wolverine: The Sierra Nevada Forest Plan Amendment (2004) directs that upon detection of a verified wolverine, management impacts within 5 miles of the verified detection be analyzed. Activities associated with motorized routes represent potential direct disturbance to wolverine using the area. Therefore, the miles of routes proposed to be added to the NFTS within five miles of the four verified wolverine photographic detection sites on the Truckee and Sierraville Ranger Districts of the Tahoe NF were evaluated for each of the project alternatives.

Several studies indicate wolverine den sites are strongly associated with subalpine or treeline habitats, and have late persistent snow during the months of April and May (Banci 1994, Aubry et al. 2007, Copeland et al. 2007, Aubry et al. 2008 – pers. com.). On the Tahoe NF, subalpine and treeline habitats generally occur near or above 8,000 feet; areas that have late spring, deep, persistent snow vary depending on the precipitation and the aspect. Activities associated with motorized routes are assessed for their potential to disturb wolverine den sites.

Direct and Indirect Effects

Motorized Route Density: Motorized route density thresholds for wolverine and Sierra Nevada red fox have not been established, and are hard to determine because of the rarity of these species and their elusive behavior patterns. Therefore, motorized route density across the Tahoe NF provides a relative measure of habitat effectiveness and/or the amount of security habitat available to the wolverine and the Sierra Nevada red fox at the broad landscape scale for which to compare the proposed alternatives. The motorized route density within 7th field watersheds was determined for all motorized routes including those on National Forest System lands and non-National Forest System lands. Although, motorized route density represents the direct, indirect, and cumulative route density for all routes, the differences between the alternatives shows the differences of direct and indirect effects of the alternatives. It is not practical to calculate route density just for those routes that are being considered for addition to the NFTS. Since the wolverine is known to avoid areas within high concentrations of human presence, security habitat is best provided for where route densities are the lowest. In addition, motorized route densities are compared within mature and late seral coniferous forest habitat types (CWHR types 4M, 4D, 5M, 5D, &6), Old Forest Emphasis Areas, and within the Tahoe NF Forest Carnivore Network (See Late seral coniferous Forest Associated Species Section).

Table 3.03-9 provides data on the proportion of lands within the Tahoe NF with motorized route densities between 0 and > 6 miles/square mile. Alternative 1 has the lowest proportion of land with motorized routes density <2 miles/square mile (17% - high to moderate security). The remaining alternatives are similar in their proportion of land base with motorized route density <2 miles/square mile (25% to 26%). Moderate security habitat represented by motorized route density category of 2-4 miles/square mile indicates Alternative 1 provides the least amount (44%) moderate security habitat, followed by Alternative 5. The remaining action alternatives provide slightly greater amounts of moderately secure habitat. Alternative 1 provides the most amount of area with lower (32% - 4 to 6 mi/sq. mi.) and least secure habitat (7% > 6 mi/sq. mi.). Therefore, Alternatives 3, 4, 2, 6, 7, and 5 in descending order provide the most security habitat for the wolverine and Sierra Nevada red fox, and Alternative 1 provides the least amount of security habitat for these two species.

Table 3.03-9. Percent of Tahoe NF with motorized route densities between zero and >6 miles/square mile

Motorized Route Density	Security Risk*	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
0 Miles/Square Mile	High Security	<1%	<1%	<1%	<1%	<1%	<1%	<1%
0-2 Miles/Square mile	Moderately High Security	17%	25%	26%	25%	25%	25%	25%
2-4 Miles/Square mile	Moderate Security	44%	56%	57%	57%	53%	57%	57%
4-6 Miles/Square mile	Lower Security	32%	15%	13%	14%	17%	14%	14%
>6 Miles/Square mile	Least Security	7%	4%	4%	4%	5%	4%	4%

*Security risk was developed based on a review of literature from various sources on wide-ranging species and professional judgment.

Zone of Influence - Habitat Fragmentation (Snags and Down Logs): Snags and down logs are important habitat components for wolverine and red fox. Habitat fragmentation as measured by potential impacts to snags and down logs that may be removed for public safety is determined by estimating the Zone of Influence within 60 meters of motorized routes. The Zone of Influence within mature forest (CWHR 4M, 4D, 5M, 5D, 6), Old Forest Emphasis Areas, and the Tahoe NF Carnivore Network are analyzed for their potential impact of habitat fragmentation (potential loss of snags and down logs) along all motorized routes. These habitat types serve as a broad landscape proxy to evaluate habitat connectivity and fragmentation for mature and old forest conditions that are important for wide-ranging species such as the wolverine and Sierra Nevada red fox.

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

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

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

Disturbance to a Specific Site - Wolverine: The Sierra Nevada Plan Amendment Standard and Guideline #32 (SNFPA ROD 2004) directs that upon detection of a verified wolverine, an analysis be conducted to determine if activities within 5 miles of the detection have the potential to affect the species. Four individual, verified wolverine detections were documented between the towns of Truckee and Sierraville during February and March of 2008. For this analysis, the miles motorized trails that are proposed to be added to the National Forest Transportation System (NFTS) under each alternative were evaluated to determine the potential for motorized use to disturb wolverine that may be foraging or traveling through the area within 5 miles of the four verified wolverine detections. In general, wolverine tend to move up into the higher elevation subalpine and treeline environments during the breeding period. High elevation subalpine and alpine habitat within close proximity to the wolverine detection sites occurs at Mt. Lola, Basin Peak and Castle Peak with elevations above 9,000 feet. Mt. Lola is the nearest location with subalpine and treeline conditions to the four verified wolverine detections (~3 miles). It is unknown whether the wolverine that was detected during February and March of 2008 on the Truckee and Sierraville Ranger Districts would be in the vicinity where it was originally detected during the time when the majority of motorized use would occur. However, if wolverine are using the area for foraging or traveling when motorized use tends to occur, Alternative 1 results in the greatest miles of routes within 5 miles of verified wolverine detections where direct disturbance could potentially occur. Alternative 5 results in the next greatest potential disturbance to wolverine by activities associated with motorized trails un-authorized for motorized use that would be added to the NFTS (9 miles), followed by alternatives 2, 6, 7, and 4 in descending order. Alternative 3 does not add any motorized trails un-authorized for motorized use to the NFTS, and therefore, would not have any direct effects to wolverine within 5 miles of known detection locations.

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

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

Summary of Direct and Indirect Effects

Table 3.03-12 summarizes the overall net effect to red fox and wolverine from the proposed actions from motorized route additions, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

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

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

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects red fox and wolverine habitat where cross country travel continued on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Has the highest proportion of habitat within the highest route density categories (>4 mi/mi^2) resulting in low habitat security, and the lowest proportion in the lowest density categories (<4 mi/mi^2)	Benefits red fox and wolverine habitat where cross country travel is prohibited on 715,200 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi^2) by 20% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi^2) by 22% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi^2) by 18% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 4% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi^2) by 17% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi^2) by 18% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi^2) by 18% compared to Alternative 1.

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

Cumulative Effects: Sierra Nevada Red Fox and Wolverine

Cumulative Effects of Motorized Routes

The geographic boundary for analyzing cumulative effects to wolverine and the Sierra Nevada red fox are lands that fall within the boundary of the Tahoe NF including all National Forest System lands and non-National Forest System lands (private). The Tahoe NF boundary is sufficiently large to encompass the home ranges of the wolverine and Sierra Nevada red fox located on the Tahoe NF. In addition, the Forest boundary encompasses a wide variety of habitats used by the wolverine and red fox - a variety of forested habitats, subalpine meadow habitats, and riparian streamside habitats. The timeframe for analyzing reasonably foreseeable cumulative effects for the wolverine and Sierra Nevada red fox is approximately 20 years into the past and into the future, which is a reasonable amount of time to estimate potential cumulative impacts to these species from future foreseeable activities.

The cumulative effects to wolverine and Sierra Nevada red fox are evaluated by analyzing the effects of the alternatives in terms of motorized route density, habitat fragmentation, and disturbance to a specific site (wolverine only) from past, present, and reasonably foreseeable actions (Table 3.03-13). Past and present motorized route densities are combined to represent the current existing condition. Since no thresholds of motorized route density for these species have been established, motorized route density is only used to compare the relative differences between the alternatives. Motorized route densities categories >4 miles/square mile (“lower security” and “least security”) are used as a metric to compare relative route densities of the alternatives where human impacts of motorized routes may render habitat less suitable and/or secure to wolverine and red fox. Habitat fragmentation through removal of snags and down logs for public safety is also used to evaluate the cumulative impacts of the proposed alternatives.

Table 3.03-13. Cumulative effects to Wolverine and Sierra Nevada Red Fox from Motorized Route Density, Habitat Fragmentation, and Disturbance to a Specific Site

Alternatives	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Present and Past Effects							
Motorized Route Density - Total Combined Percent of Tahoe NF with route density categories of 4 to 6 Miles/square mile (lower security) and >6 miles/square mile (least security habitat)	39%	19%	17%	18%	23%	19%	19%
Habitat Fragmentation - Total Percent of Forest within 60 meters of existing and proposed motorized routes (approximate percentage, some overlap on motorized routes may occur)	26%	<20%	<20%	<20%	22%	<20%	<20%
Disturbance to a specific site – cumulative miles of all motorized routes within 5 miles of verified wolverine detections	638	538	534	536	543	537	536
Addition of Motorized Open Areas	0	Eureka Diggins (27 acres) Greenhorn (60 acres) Boca, Stampede, and Prosser (2,589 acres)	0	0	0	0	0
Acres of Cross Country Travel Prohibited	0	715,224	717,900	717,900	717,900	717,900	717,900
Acres of Cross Country Travel continued	717,900	0	0	0	0	0	0
Change in Class of Vehicles	None	No effect	None	No effect	No effect	No effect	No effect
Wet Weather Seasonal Restrictions	None	Reduced disturbance	None	Reduced disturbance	None	Reduced disturbance	None

Alternatives	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Future Effects							
Potential for route proliferation contributing to motorized route density and habitat fragmentation into the future	High potential for increased route density and habitat fragmentation in the future due to unmanaged cross country travel	Low potential for increased route density and habitat fragmentation– Cross country route proliferation will be prohibited	Low potential for increased route density and habitat fragmentation– Cross country route proliferation will be prohibited	Low potential for increased route density and habitat fragmentation– Cross country route proliferation will be prohibited	Low potential for increased route density and habitat fragmentation– Cross country route proliferation will be prohibited	Low potential for increased route density and habitat fragmentation– Cross country route proliferation will be prohibited	Low potential for increased route density and habitat fragmentation– Cross country route proliferation will be prohibited
Cumulative Effects							
Overall Cumulative Effect of past, present and future motorized routes to wolverine and red fox	Greatest cumulative effect from route density and proportion of Forest fragmented by routes	Cumulative effects of route density and habitat fragmentation are similar to Alternatives 3, 4, 6, 7	Cumulative effects of route density and habitat fragmentation are similar to Alternatives 2, 4, 6, 7	Cumulative effects of route density and habitat fragmentation are similar to Alternatives 2, 3, 6, 7	Next highest Cumulative effect after Alternative 1, slightly higher cumulative effect than Alternatives 2, 3, 4, 6, & 7	Cumulative effects of route density and habitat fragmentation are similar to Alternatives 2, 3, 4, 7	Cumulative effects of route density and habitat fragmentation are similar to Alternatives 2, 3, 4, 6

*Alternative 1 includes all existing routes unauthorized to motorized public use under continued cross country travel.

Overall Cumulative Effects to California Wolverine and Sierra Nevada Red Fox from Past, Present, and Reasonably Foreseeable Future Actions

Past and current cumulative effects to wolverine and Sierra Nevada red fox include current and historic grazing; loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, winter recreation (skiing and snowmobiling), and general recreation activities including all forms of motorized use including 4 wheel drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands. Improved range conditions as a result of implementing the revised grazing standards and guidelines should benefit prey species for both the wolverine and red fox, especially as sight specific allotment management plans are developed.

Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to habitats for wolverine and red fox. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. It is uncertain how vegetation treatments actually affect the wolverine as no empirical data exists on how vegetation management affects habitat quality for both the wolverine and the red fox. In general, management treatments which maintain or enhance habitat for deer should benefit the wolverine.

Vegetation and fuels treatments generally do not increase forage quality and quantity for deer (wolverine prey species) because they do not usually result in reducing the canopy cover below 40% which would not necessarily increase the production of understory species important for deer foraging. These treatments may result in the short-term reduction in cover for the California wolverine and the Sierra Nevada red fox, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Between 1994 and 2007, approximately 64,000 acres burned on the Tahoe NF, some of which have removed forested habitat for wide-ranging species.

On the Tahoe NF, present and past recreational impacts to the wolverine and red fox are far-reaching. The impact of humans from commercial harvest and trapping of wolverine during the turn of the century likely significantly contributed to the decline (and potential extirpation) in wolverine compared to historic conditions in the Sierra Nevada. The Tahoe NF recreation activities includes many forms of recreation including both passive and active recreation. Summer recreation includes fishing, hiking, camping at developed and dispersed sites, hunting, off highway use, and wildlife viewing. Winter recreation includes developed ski areas, cross country skiing, and over snow recreation. Since no scientific studies are available that show how these activities impact these species, it is unknown how these recreational activities affect the distribution and abundance of wolverine and the red fox.

The wolverine and the red fox are considered to be primarily associated with areas with low human influence, such as remote wilderness and roadless areas. Increased recreational use on the Tahoe NF in the near future has the potential to impact wolverine if den sites at high elevation subalpine and alpine areas

are disrupted during the breeding period (January to June 30). Increases in recreational activities associated with motorized routes are generally not likely to affect subalpine and alpine areas considered to be suitable for wolverine and red fox denning habitat when they are covered by snow.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires, and recreation, Alternative 1 poses the greatest risk to the wolverine and red fox on the Tahoe NF, where 39% of the Tahoe NF has motorized route densities that fall in the lower security (motorized route density category 4-6 mi/sq. mi.) and least secure (motorized route density category >6 mi/sq. mi.) habitat condition, followed by Alternative 5 (23%). The remaining action alternatives are similar and only slightly increase overall cumulative impacts to wolverine and Sierra Nevada red fox on the Tahoe NF. Alternative 3 does not add any routes to the NFTS, so it does not add to existing cumulative impacts. All the action alternatives will result in a beneficial impact to wolverine prey (mule deer) from the ban of cross country travel on over 800,00 acres, including the use on between 257 and 390 miles of existing motorized trails un-authorized for motorized use, depending on the alternative (Alternative 5 least benefit to Alternative 3 greatest benefit), compared to Alternative 1.

Non-motorized (hiking, mountain biking, equestrian) use may occur on existing motorized trails un-authorized for motorized use. Generally, it is expected that non-motorized recreation would be less impactive than motorized recreation, but the degree of the reduced impact depends upon the type and intensity of non-motorized use. Over time, it is expected that these existing motorized trails would eventually become revegetated through active or passive restoration. The time of recovery would depend upon the site-specific soil and vegetative conditions.

In addition, Alternatives 4, 5, & 6 would benefit wolverine prey on deer winter ranges through the implementation of wet weather closures on native surfaced roads and trails. Finally, Alternative 1, with continued cross-country travel, including continued use of existing motorized trails un-authorized for motorized use, has the greatest number of route miles occurring within a 5 mile radius of verified wolverine detections (104 mi.), followed by the remaining alternatives in descending order (Alt 5 – 9 mi., Alt 2 – 4 mi., Alt 6 – 3 mi., Alt 4 & 7 – 2 mi., Alt 3 – none).

Sensitive Species Determinations

The Biological Evaluation for the Travel Management EIS project (Appendix L-1, which is incorporated by reference) made a determination that implementation of Alternative 6, the preferred alternative, may affect the California wolverine and the Sierra Nevada red fox, but is not likely to result in a trend toward Federal listing or loss of viability for the California wolverine or the Sierra Nevada red fox within the planning area of the Tahoe National Forest. Alternative 6 would prohibit current and future cross country travel, and which would have a considerably fewer number of miles of motorized routes within 5 miles of verified wolverine detections as compared to Alternative 1, no action (Alternative 1 - 104 miles, Alternative 6 - 3 miles). Across the Tahoe NF, fragmentation and route density would be considerably reduced compared to Alternative 1, no action. In the absence of a range wide viability assessment, this viability determination is based on local knowledge of this species as discussed previously in this evaluation, and professional judgment.

Compliance with the Forest Plan and Other Direction

The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified the following standard and guideline applicable to wolverine and red fox was analyzed for the Motorized Travel Management Project:

Wolverine and Sierra Nevada Red Fox Detections: Detection of a wolverine or Sierra Nevada red fox will be validated by a forest carnivore specialist. When verified sightings occur, conduct an analysis to determine if activities within 5 miles of the detection have a potential to affect the species. If necessary, apply a limited operating period form January 1 to June 30 to avoid adverse impacts to potential breeding. Evaluate activities for a 2-7ear period for detections not associated with a den site (Standard and Guideline 32).

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

California wolverine: The Travel Management Project analyzed how proposed motorized trail additions would affect the area within a 5 mile radius of known verified wolverine detections. The analysis indicated that if wolverine are using the area for foraging or traveling when motorized use tends to occur, motorized use has the potential to disturb the wolverine. Alternative 1 continues cross country travel, where continued use on 104 miles of motorized trails un-authorized for motorized use would occur, within 5 miles of verified wolverine detections where direct disturbance could potentially occur. Alternative 5 results in the next greatest potential disturbance to wolverine by activities associated with 9 miles of proposed motorized trail additions within 5 miles of known wolverine detection, followed by alternatives 2, 6, 7, and 4 in descending order. Alternative 3 does not add motorized trail to the National Forest Transportation System (NFTS), and therefore, would not have any direct effects to wolverine within 5 miles of known detection locations. In addition, the prohibition of cross country travel on approximately 700,000 acres across the Forest significantly improves habitat effectiveness for all the action alternatives.

Ungulates - Mule Deer: Affected Environment

The mule deer is the only species in the ungulate group. The mule deer is a Management Indicator Species on the Tahoe NF. The Tahoe LRMP indicates that mule deer use a mix of all successional stages, but the most important mule deer habitat types are early successional types, hardwoods, and shrublands. Most deer on the Tahoe NF migrate seasonally between higher elevation summer range and low elevation winter range. In general, critical winter range, critical summer range, and fawning habitats represent key habitats for deer where heavier use and higher quality habitats for wintering and summer use are expected to occur.

The Tahoe National Forest has four main deer herds within its administrative boundaries: Downieville, Nevada City, Blue Canyon and Loyalton/Truckee. The Sloat, Mooretown and Doyle herds overlap with small portions of the Tahoe NF in the extreme north sections of the administrative boundaries and are insignificant on a forest scale. Deer herd habitat types are displayed in Table 3.03-14.

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

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

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

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

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

Many studies have been conducted on the interaction of road and trail-associated activities and mule deer, and have shown that road and trail-associated factors have the potential to impact mule deer populations directly and indirectly, including mortality from vehicle-collisions, modification of behavior (avoidance or flight), mortality from hunting and poaching, habitat fragmentation, edge effects of roads and trails, and others. Roads and trails can result in the disturbance or disruption of individuals in a deer population. Deer inhabiting areas near roads and trails may move away from the area when disturbed by humans. Several factors affect the degree to which trail and road associated human activities disrupt deer. This section will highlight some examples of the way in which roads and trails can affect individual deer and deer populations. Studies on both white-tailed deer and mule deer are included in the summaries.

Displacement or Avoidance: In general, mule deer will move away from, or flush, from an approaching person and will usually allow a person in or on a vehicle to get closer than a person on foot (Freddy et al. 1986, Wisdom et al. 2004). Wisdom et al. (2004) found that mule deer showed little measurable flight response to experimental OHV treatments but cautioned that deer may well be responding with fine-scale changes in habitat use (i.e. avoidance), rather than substantial increases in movement rates and flight responses. Several studies have found that mule deer avoid areas in proximity to roads. Deer avoid primary roads more than secondary or tertiary roads and also avoid roads more in open habitats as opposed to areas with vegetative or topographic cover (deVos et al. 2003).

Various studies have shown that mule deer have displacement distances that vary between 200 and 800 meters, depending upon the road type and traffic level, and the surrounding habitat (Perry and Overly 1977, Rost and Bailey 1979, Johnson et al. 2000). One study found that if habitat was available away from a linear road or trail, then deer avoided the disturbance corridor (Jalkotzy et al. 1997). However, when no suitable deer habitat was available away from the road or trail, then deer used the habitat adjacent to the road or trail. Rost and Bailey (1979) reported that deer and elk in Colorado avoided roads, especially within 200 meters of a road. Perry and Overly (1977) reported that deer were displaced up to 800 meters from roads.

Main roads were found to reduce deer use up to 0.5 miles (800 m), whereas secondary and primitive roads reduced deer densities from between 200 to 400 meters in these studies. Additional variables such as the amount and frequency of traffic, and the spatial distribution of roads in relation to deer use, influence the degree of negative effects that roads have on deer use in forested habitats (Perry and Overly 1977, Johnson et al. 2000, deVos et al. 2003). Where disturbance causes deer to avoid areas within preferred habitats, animals may be forced into less preferred or lower quality habitats. Such shifts, particularly if repeated, can result in adverse impacts to the energy balance of individual deer and ultimately can decrease population productivity, especially on winter ranges (deVos et al. 2003).

Hunting and Poaching: Greater human access can increase opportunities for hunting as well as poaching of deer. During the hunting season, deer may become more wary of humans, and disturbance to deer is greater when being hunted. In New York State, antlered deer were found to have longer flight distances than deer than were not hunted (Jalkotzky et al. 1997). Hunted deer populations tend to have stronger reactions to people on foot than motorized vehicles. This may be due to the fact the deer can detect a vehicle from greater distances rather than getting surprised by quieter humans on foot. Roads and trails can facilitate deer harvest success. A study using 143 radio-collared deer in Minnesota revealed that deer mortality during the hunting season was 2-4 times higher for deer that lived 0.2 km from a road versus those that were at >0.3 km from a road. Major access routes radiating from urban centers into deer range provide increased opportunities for hunters.

Since hunting levels for deer are controlled through hunting zone quotas and tag limits established by the California Department of Fish and Game (CDFG), an increase in hunting opportunity or hunter success is unlikely to impact deer populations (deVos 2003). Hunting limits also take into account estimates of the amount of illegal kill and road kill occurring. Levels of illegal harvest are not presently described as a significant source of mortality for deer herds on the Tahoe NF (CDFG 2003, CDFG 1998).

Thomas et al. (1979) used Perry and Overly's data to develop a habitat effectiveness model based on road densities. The model indicated that a 20% loss in habitat effectiveness occurred when road densities were about 2 miles/mi^2 for summer range habitat. At road densities of 6 miles/mi^2, habitat effectiveness declined by 50-95% depending on the type of road.

One study found that all terrain vehicles altered deer feeding and use patterns, and these deer produced fewer young the following year (Yarmaloy 1988). An Arizona study using deer and elk decoys reported that illegal road hunting was widespread (Bancroft *IN* Watson 2005). Eleven of 19 archery elk and deer hunters and 41of 53 firearms hunters committed violations by attempting illegal take after observing a decoy from their vehicle.

Collisions: Vehicle collisions with deer can contribute considerably to direct deer mortality. Deer are probably the most frequently-killed large mammal along North America's roads. The Insurance Institute for Highway Safety commissioned a study which estimated that more than 1.5 million deer/vehicle collisions occur annually, resulting in more than 29,000 human injuries and 150 deaths. Romin and Bissonette (1996), conservatively estimated that the U.S. national deer road kill in 1991 totaled at least 500,000 deer. Deer road kills vary considerably by region and by season. In California, mule deer road kill along a 3 mile stretch of secondary highway was estimated at 3.7 and 4.8 per kilometer per year during spring and fall migrations, respectively (Jalkotzy et al. 1997).

Deer and vehicle collisions probably differ by the type of road or trail, so care must be given when considering deer-vehicle collisions. The majority of deer-vehicle collisions occur in the early morning or late afternoon and evening hours, around dawn and sunset, when the deer are most active and when visibility is poor. More deer-vehicle collisions occur during the spring and fall when deer are migrating. In the fall, hunting may cause deer to be more wary and increase movement of deer. In the spring, vegetation tends to green-up along roadsides and attract deer to roads. There are little to no data on deer road kills along Forest roads, however roads maintained at a higher standard for passenger vehicle (maintenance levels 3, 4, & 5), where vehicle speeds are greatest, have the most potential to contribute to deer-vehicle collisions. Deer-vehicle collisions on roads and trails which are maintained for high clearance vehicles (maintenance level 2 roads) are probably not appreciable in number due to the lower speeds and the amount of use received by these roads.

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

Summary of trail and road associated impacts to mule deer:

- Mortality from hunting or trapping as facilitated by motorized road and trail access
- Increased illegal take of animals as facilitated by trails and roads
- Mortality or injury resulting from a motorized vehicle colliding with an animal
- Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities
- Increased mortality of animals (euthanasia or shooting) due to increased contact with humans, as facilitated by road and trail access
- Interference with dispersal or other movements as posed by a road or trail itself or by human activities on or near roads, trails, or networks
- Spatial shifts in populations or individuals animals away from human activities on or near roads, trails, or networks
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young
- Increase in heart rate or stress hormones when near a road or trail or network of roads or trails.

Ungulates - Mule Deer: Environmental Consequences

Effects common to all alternatives

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

Analysis Measures

Wet Weather Seasonal Restrictions for Motorized Vehicles: The 1990 Tahoe LRMP (Forest Plan) recognizes that the restriction of motorized vehicle access within certain deer habitat areas is important to deer, especially within key deer winter ranges. Seasonal restrictions for deer habitat as specified in the 1990 Tahoe Forest Plan and contained in existing Forest Orders would be continued. Table 3.03-16 displays the seasonal restrictions specified in the Forest Plan that would apply to all the alternatives including the no action alternative. These seasonal restrictions apply to all native surface roads and motorized trails within the specified Management Areas.

Table 3.03-16. Tahoe Forest Plan Motor Vehicle Closures by Management Area (MA)

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

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

Prohibition of Cross Country Travel

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

Motorized Route Density: Road density has traditionally been used as an indicator for deer habitat effectiveness models (Perry and Overly 1977, Thomas, et al. 1979). These models indicate that as road density increases, deer use declines (Thomas et al. 1979, Witmer et al 1985). Factors such as hunting pressure, poaching, and other human disturbances are also likely to relate to road densities. Critical winter range, critical summer range, and fawning habitats represent key habitats for deer where heavier use and higher quality habitats for wintering and summer use are expected to occur. The average motorized route densities within critical winter range, critical summer range, and fawning habitat for each deer herd within the Tahoe NF was determined for each 7th field watershed.

Miles of Routes: To assess the potential direct and indirect impacts to deer from motorized route associated disturbance including noise, hunting, poaching, etc., the miles of motorized trails to be added to National Forest Transportation System (NFTS) were determined for each alternative by key deer habitat type (critical summer, fawning, winter, and critical winter) within each of the deer herds - Blue Canyon, Downieville, Nevada City, and Loyalton-Truckee.

Zone of Influence: Critical winter range is considered to provide key habitat for deer during the winter months, and fawning habitat and critical summer range is expected to receive heavier deer use in the summer months. Determining the proportion of critical winter range and the proportion of critical fawning and summer range occurring within a Zone of Influence associated with roads or motorized trails, provides another measure of the effects of project alternatives upon these key deer types.

Based upon the Rost and Bailey's 1979 study in Colorado, which indicated that deer were displaced within a 200 meter distance of secondary roads, a distance of 200 meters was applied to represent the Zone of Influence related to motorized routes, since the majority of Tahoe NF roads and trails are likely most similar to those roads addressed in the Colorado study area. The use of a larger Zone of Influence (i.e., 400 meters or 800 meters) could potentially exaggerate the effects of motorized routes, as the science of motorized route effects vary upon many factors. The proportion of each deer herd's critical winter range habitat and critical summer range and fawning habitat occurring within this Zone of Influence was determined for each Alternative. Thresholds associated with this measure have not been established, but relative changes in habitat effectiveness can be evaluated and compared.

Direct and Indirect Effects

Wet Weather Seasonal Restrictions

Wet weather seasonal restrictions of native surface motorized roads and trails are analyzed for the project alternatives (Table 3.03-15). Alternatives 4, 5, and 6 provide additional wet weather seasonal restrictions, which may benefit deer that may be using areas that are not currently under existing Forest Plan deer seasonal restrictions. In areas outside current Forest Plan closure areas, the wet weather seasonal closures would provide an additional 4 months wet weather closure (3 months for the Burlington Ridge and

Greenhorn area) and would reduce the effects of motorized vehicles upon deer using these areas, as compared to Alternatives 1, 2, 3, and 7, which have no wet weather seasonal closures.. Alternatives 4, 5, and 6 could result in shorter or longer wet weather closure periods, but this would vary annually depending upon rainfall and soil conditions.

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

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

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

Prohibition of Cross Country Travel

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

Blue Canyon Deer Herd

Under Alternative 1, cross country travel would continue on 187,074 acres, where disturbance, disruption, avoidance, and abandonment could result. Under all the action alternatives, cross country travel would be prohibited on an additional 79% of deer habitat (187,074 acres out of 236,616 Blue Canyon herd habitat

acres), which would substantially benefit the Blue Canyon deer herd and reduce negative effects associated with motorized use.

Downieville Deer Herd

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

Nevada City Deer Herd

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

Loyalton-Truckee Deer Herd

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

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

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

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

Addition of Motorized Open Areas

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

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

Greenhorn Area: Located just outside of Nevada City, the Greenhorn is popular four wheel drive and motorcycle use area by local residents. The majority of the area was hydraulically mined during the gold rush resulting in a lack of vegetation. The area also has a currently operating gravel plant. The Greenhorn Area is only proposed under Alternative 2. The Greenhorn area does not provide suitable habitat for wide-ranging species due to the amount of human activity and urban development in the area. Therefore implementation of Alternative 2 would not likely pose a concern for wide-ranging species, including the

wolverine, bear, and red fox. If individual animals are using the area, they could receive some localized, direct disturbance, but because the area is already receiving concentrated use by people, any animals using the area likely have adapted to the amount of use occurring or have already avoided the area.

Access to Boca, Stampede, and Prosser reservoirs: As the water levels are drawn down in these reservoirs, motor vehicles are used to access the shoreline for boating, camping, fishing and picnicking. They are typically not used as open play areas as are Eureka Diggings and Greenhorn Creek. The access to these reservoirs is only proposed under Alternative 2. The three reservoir areas occur on the Truckee Ranger District within eastside pine habitat. Eastside pine habitat is generally lower in elevation than where wolverine and the Sierra Nevada red fox are known to occur (subalpine and alpine habitats) during the summer months when the reservoirs are used for recreational activities, and therefore would not affect wolverine and the red fox. Minor and incidental direct impacts to bear, wolverine, or red fox are traveling in vicinity of the reservoirs. The area used to access the reservoirs has no vegetation, and therefore does not provide cover or forage habitat for bear, wolverine, and red fox. Overall, access to the three reservoirs would have no to minimal direct, indirect, or cumulative impact to wide-ranging species.

Motorized Route Density: On the Tahoe NF, motorized road density was determined by 7th field watersheds by deer herd. Table 3.03-17 shows the average road and trail densities within deer herd ranges under each Alternative (calculated by dividing the total road or trail mileage on NFS lands in deer ranges by the square miles of NFS lands in deer ranges).

Blue Canyon Deer Herd

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

Downieville Deer Herd

For the Downieville Deer Herd, only about 60 acres of critical summer or fawning habitat falls within the boundaries of the Tahoe NF. No motorized route miles fall within fawning habitat for this deer herd. In critical summer habitat, Alternative 1 has 1.8 miles/miles^2 or 0.3 miles/miles^2 higher than all other alternatives. Within critical winter range, Alternative 1 approaches 4 miles per square mile and route densities in this alternative exceed route densities in the other alternatives by approximately 0.7 mile/square mile (Table 3.03-17). Within winter range, Alternative 1 has route densities of 3.8 miles/square mile, which exceed route densities in all the action alternatives by at least 0.8 mile/square mile.

Nevada City Deer Herd

When comparing critical summer and fawning habitat for the Nevada City Deer Herd, Alternative 1 exceeds the action alternatives by about 0.3 miles/square mile (Table 3.03-17). For critical winter habitat, route densities for Alternative 1 exceed all the action alternatives by about 1.1 miles/square mile. Within winter range, Alternative 1 route densities exceed the action alternatives by nearly a mile/square mile and slightly less than that compared to Alternative 5.

Loyalton-Truckee Deer Herd

Route densities for the Loyalton-Truckee Deer Herd are greatest under Alternative 1, where route densities exceed all the action alternatives approximately 0.3 to 0.5 miles/square mile within each of critical summer, fawning, critical winter, and winter ranges (Table 3.03-16). All the action alternatives have similar route densities. Although Alternative 5 has slightly higher route densities within critical summer and fawning habitat than the other action alternatives, the additional 0.1 mile/square mile should not pose an appreciable impact to the Loyalton-Truckee Deer Herd. There are no differences in route densities for the action alternatives within winter or critical winter range.

Table 3.03-17. Average route densities (miles/square mile) on NFS lands within deer herd winter ranges, critical winter ranges, critical summer, and fawning areas on the Tahoe NF

	Range Type	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Blue Canyon Deer Herd	Critical Summer	2.2	1.9	1.9	1.9	2.1	1.9	1.9
	Fawning	0.6	0.5	0.5	0.5	0.6	0.5	0.5
	Critical Winter	3.3	2.4	2.4	2.4	2.6	2.4	2.4
	Winter	4.6	3.6	3.6	3.6	3.8	3.6	3.6
Downieville Deer Herd	Critical Summer	1.8	1.5	1.5	1.5	1.5	1.5	1.5
	Fawning	0	0	0	0	0	0	0
	Critical Winter	3.9	3.2	3.2	3.2	3.2	3.2	3.2
	Winter	3.8	2.9	2.9	2.9	3.0	2.9	2.9
Nevada City Deer Herd	Critical Summer	2.4	2.1	2.1	2.1	2.1	2.1	2.1
	Fawning	2.9	2.7	2.6	2.7	2.7	2.7	2.7
	Critical Winter	5.2	3.9	3.9	3.9	4.1	3.9	3.9
	Winter	4.8	3.8	3.8	3.8	3.9	3.8	3.8
Loyalton-Truckee Deer Herd	Critical Summer	2.9	2.5	2.5	2.5	2.5	2.5	2.5
	Fawning	5.4	4.8	4.8	4.8	4.8	4.8	4.8
	Critical Winter	1.6	1.3	1.3	1.3	1.3	1.3	1.3
	Winter	2.4	1.9	1.9	1.9	1.9	1.9	1.9

* Alternative 1 includes motorized under continued cross country travel.

Route Density Summary

For all major deer herds occurring within the boundaries of the Tahoe NF, Alternative 1 would have the greatest route densities compared to all the action alternatives within essential summer (fawning and critical summer) and winter (critical winter and winter) ranges. Alternative 5 would have slightly greater route densities than all the remaining action alternatives. Within critical summer and fawning areas,

Alternative 1 poses a somewhat higher risk to all deer herds on the Tahoe NF and may therefore pose a greater risk in the ability for these deer herds to successfully reproduce and rear fawns, as compared to all the action alternatives. The action alternatives are similar in their motorized route densities and therefore, impacts to the Tahoe deer herds within critical summer or critical winter ranges do not vary amongst the action alternatives. Alternative 1 also has the greatest direct and indirect effects to winter ranges, especially on the west side of the Forest, where Alternative 1 motorized route densities exceed the action alternatives by over 1 mile/square mile in some instances, where habitat effectiveness would be reduced.

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

Table 3.03-18 displays the miles of proposed motorized trail additions to the NFTS for the action alternatives, and the miles of existing motorized trails un-authorized for motorized use for Alternative 1, No Action,) for each deer herd. Motorized trail additions displays a way to compare alternatives to assess the direct and indirect impacts to deer from motorized routes where access for hunting and poaching, and disturbance and avoidance may occur. Key deer habitat within Critical Summer, Fawning, Critical Winter, and Winter Ranges are shown below.

Blue Canyon Deer Herd

Within Critical Summer Range, Implementing Alternative 1 would have motorized route miles that exceed Alternative 5 by about 18 miles, and exceed Alternatives 2, 3, 4, 6, by nearly 40 miles for the Blue Canyon Deer Herd. Motorized route miles within fawning habitat for the Blue Canyon herd is minor.

Within critical winter ranges, Alternatives 1 has the most motorized route miles at 65 miles, followed by Alternative 5 with 50 miles. Motorized route miles for the remaining action alternatives is about 45 route miles in critical winter range. A similar pattern emerges for winter range.

Alternative 1 poses the greatest risk to the Blue Canyon Deer Herd on both critical summer and critical winter/winter ranges, followed next by Alternative 5.

Downieville Deer Herd

For the Downieville Deer Herd, only about 60 acres of critical summer and no mapped fawning areas fall within the boundaries of the Tahoe NF. Within critical winter range, Alternative 1 has 17 motorized route miles, and the all the action alternatives have 14 miles of motorized routes each. Within winter range, Alternative 1 has the highest number of motorized route miles (310 miles), where direct and indirect disturbance associated with motorized routes could occur when deer are stressed during the winter. All the action alternatives are similar in their motorized route miles within winter range (242 to 243 miles).

In summary, Alternative 1 poses the greatest risk to the Downieville Deer Herd on both critical winter and winter ranges where resources may be scarce and deer may be stressed during the winter months.

Nevada City Deer Herd

When comparing critical summer and fawning habitat for the Nevada City Deer Herd, Alternative 1 exceeds the action alternatives by at least 30 miles (Table 3.03-18). For critical winter habitat and winter ranges, Alternative 1 exceeds Alternative 5 by about 84 miles; and the remaining action alternatives by an additional 20 miles.

In summary, Alternative 1 poses the greatest risk to the Nevada City Deer Herd on all key deer habitat types - critical summer, fawning, critical winter, and winter habitats when deer are most vulnerable to disturbance.

Loyalton-Truckee Deer Herd

Motorized route miles for the Loyalton-Truckee Deer Herd are greatest under Alternative 1, where motorized route miles exceed all the action alternatives by at least 18 miles (Alternative 5) within critical summer ranges (Table 3.03-18). Within fawning habitat, route miles are similar for all alternatives, with Alternative 1 exceeding the remaining alternatives by 2-3 miles. Alternative 1 poses the greatest concern to the Truckee-Loyalton Deer Herd on both critical summer ranges and fawning habitat that are important to for reproduction and rearing young during the summer months.

Motorized route miles in critical winter and winter ranges are highest in Alternative 1, exceeding the action alternatives by 6-7 miles. There are relatively no differences in motorized route miles for the action alternatives within winter or critical winter ranges

Alternative 1 poses the greatest risk than the action alternatives within key ranges, where the Loyalton-Truckee Deer Herd are most vulnerable to factors associated with motorized vehicles.

Table 3.03-18. Miles of Motorized Trail Additions on NFS and private lands within deer herd winter ranges, critical winter ranges, critical summer, and fawning areas on the Tahoe NF

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of Motorized Routes Within Blue Canyon Deer Herd	Critical Summer Habitat	38	2	0	0	20	1	0
	Fawning Habitat	<1	0	0	0	0	0	0
	Critical Winter Habitat	20	0	0	0	5	0	0
	Winter Habitat	95	4	0	0	20	4	4
Miles of Motorized Routes Within Downieville Deer Herd	Critical Summer Habitat	<1	0	0	0	0	0	0
	Fawning Habitat	0	0	0	0	0	0	0
	Critical Winter Habitat	3	0	0	0	0	0	0
	Winter Habitat	68	1	0	0	1	1	0
Miles of Motorized Routes Within Nevada City Deer Herd	Critical Summer Habitat	34	2	0	1	4	2	1
	Fawning Habitat	5	0	0	0	0	0	0
	Critical Winter Habitat	26	0	0	0	5	0	0
	Winter Habitat	53	1	0	0	14	0	0
Miles of Motorized Routes Within Loyalton-Truckee Deer Herd	Critical Summer Habitat	22	0	0	0	0	0	0
	Fawning Habitat	4	0	0	0	0	0	0
	Critical Winter Habitat	5	1	0	1	1	1	1
	Winter Habitat	2	0	0	0	0	0	0
Total motorized miles for all herds (existing system, unauthorized for motorized public use and private)		**380**	**11**	**0**	**6**	**70**	**9**	**6**

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

Zone of Influence at 200 Meters

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

Areas that are less influenced by motorized routes are considered “security habitat,” whereas, areas influenced by motorized routes are considered “zones of influence” where deer are less secure. For Alternative comparison purposes, a simple ranking system, such as the one developed by Gaines et al. (2003), is used. For this purpose, less than 25 percent of key habitat affected was ranked as a low level of road or trail influence, 25 to 50 percent of key habitat affected was ranked as a moderate level of influence, and greater than 50 percent of key habitat affected was ranked as a high level of influence. Using this ranking system, Alternative 1 results in a high level of motorized route influence on each deer herd’s critical summer and winter ranges combined, where the effectiveness of critical deer range habitat could be reduced. All the action alternatives result in a “Low” influence to key summer and winter ranges from the addition of routes unauthorized for motorized public use. The sections below describe how the alternatives rank in their influence on key deer habitats from routes unauthorized for motorized public use for each deer herd.

Blue Canyon Deer Herd

Alternative 1 poses the greatest risk to the Blue Canyon Deer Herd from reduced habitat effectiveness from potential disturbance or avoidance behavior as a result of factors associated with cross-country travel, including continued use of ,motorized trails un-authorized for motorized use. Under Alternative 1, approximately 20% of key winter deer ranges are “moderately” influenced by motorized trails un-authorized for motorized use and approximately 9% of key summer ranges are affected. All the action alternatives result in a low influence on key deer ranges from proposed additions of motorized trails un-authorized for motorized use. Alternative 5 has a somewhat higher Zone of Influence than the remainder

of the action alternatives where approximately 5% of key winter ranges are directly and indirectly affected.

Downieville Deer Herd

The Downieville Deer Herd is moderately affected overall by Alternative 1 where 42% of critical summer ranges, 9% critical winter, and 15% winter ranges are within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use which may be used under continued cross-country travel. Alternatives 2, 3, 4, 6 and 7 do not directly or indirectly affect key deer habitats. Alternative 5 contributes to a low amount of key habitats affected by motorized trails added to the NFTS within a 200 meter Zone of Influence where, on average, 1% of key deer habitats are affected.

Nevada City Deer Herd

Alternative 1 poses the greatest risk where a moderate amount of key winter deer habitat (39%) is influenced by continued use of motorized trails un-authorized for motorized use associated with cross-country travel within the Nevada City Deer Herd resulting in a moderate reduction of habitat effectiveness on winter ranges when deer are stressed and resources may be low. Combined critical summer and fawning habitat is influenced on average 8% of key summer habitats within 200 meters of existing motorized trails un-authorized for motorized use which could continue to be used under continued cross-country travel. The action alternatives all result in a “low” amount of key deer habitat being influenced by motorized trails added to the NFTS. However, Alternative 5 results in an average of 2% of all key winter ranges and 1% of key summer habitats influenced by motorized routes added to the NFTS.

Loyalton-Truckee Deer Herd

All the alternatives result in a “low” influence on key deer habitats within the Loyalton-Truckee Deer herd, with Alternative 1 resulting in the greatest amount of key deer habitats influenced by factors associated with continued use of existing motorized trails un-authorized for motorized use associated with cross-country travel. Alternative 1 directly and indirectly affects an average 14% key summer habitats and 9% key winter ranges. The remaining alternatives affect 1% of key deer summer and winter habitats.

Table 3.03-19. Proportion of Key Deer Ranges within a 200-meter "Zone of Influence" of Motorized Routes by Herd

	Range Type	Acres	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Blue Canyon Deer Herd	Critical Summer	64,829	9%	1%	0%	0%	5%	0%	0%
	Fawning	729	0%	0%	0%	0%	0%	0%	0%
	Subtotal/Weighted Average	**65,558**	**9%**	**<1%**	**0%**	**0%**	**5%**	**<1%**	**0%**
	Overall Ranking Key Summer		Low	Low	Low	Low	Low	Low	Low
	Acres of Key Summer Range where motorized cross country travel is prohibited		0	29,794	29,794	29,794	29,794	29,794	29,794
	Acres of Key Summer Range where motorized cross country travel is continued		29,794	0	0	0	0	0	0
	Critical Winter	12,115	18%	0%	0%	0%	4%	0%	0%
	Winter	60,533	20%	1%	0%	1%	5%	1%	1%
	Total Weighted Average	**72,648**	**20%**	**<1%**	**0%**	**1%**	**5%**	**<1%**	**<1%**
	Overall Rank Key Winter Range		Mod	Low	Low	Low	Low	Low	Low
	Acres of Key Winter Range where motorized cross country travel is prohibited		0	54,464	54,464	54,464	54,464	54,464	54,464
	Acres of Key Winter Range where motorized cross country travel is prohibited		54,464	0	0	0	0	0	0
Downieville Deer Herd	Critical Summer	**60**	42%	0%	0%	0%	0%	0%	0%
	Overall Ranking Key Summer		Mod	Low	Low	Low	Low	Low	Low
	Acres of Key Summer Range where motorized cross country travel is prohibited		0	185,173	185,173	185,173	185,173	185,173	185,173
	Acres of Key Summer Range where motorized cross country travel is continued		185,173	0	0	0	0	0	0
	Critical Winter	4,868	9%	0%	0%	0%	1%	0%	0%
	Winter	56,679	15%	0%	0%	0%	1%	0%	0%
	Subtotal/Weighted Average	**61,607**	**15%**	**0%**	**0%**	**0%**	**1%**	**0%**	**0%**
	Acres of Key Winter Range where motorized cross country travel is prohibited		0	40,514	40,514	40,514	40,514	40,514	40,514
	Acres of Key Winter Range where motorized cross country travel is continued		40,514	0	0	0	0	0	0
	Overall Rank Key Winter		Low	Low	Low	Low	Low	Low	Low

	Range Type	Acres	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Nevada City Deer Herd	Critical Summer	60,162	8%	1%	0%	1%	1%	1%	0%
	Fawning	8,118	9%	1%	0%	0%	1%	1%	1%
	Subtotal/Weighted Average	**68,280**	**8%**	**1%**	**0%**	**<1%**	**1%**	**1%**	**<1%**
	Overall Ranking Key Summer		Low	Low	Low	Low	Low	Low	Low
	Acres of Key Summer Range where motorized cross country travel is prohibited		0	25,418	25,418	25,418	25,418	25,418	25,418
	Acres of Key Summer Range where motorized cross country travel is continued		25,418	0	0	0	0	0	0
	Critical Winter	14,101	23%	0%	0%	0%	1%	0%	0%
	Winter	37,071	16%	0%	0%	0%	2%	0%	0%
	Subtotal/Weighted Average	**51,172**	**18%**	**0%**	**0%**	**0%**	**2%**	**0%**	**0%**
	Overall Rank Key Winter		Mod	Low	Low	Low	Low	Low	Low
	Acres of Key Winter Range where motorized cross country travel is prohibited		0	28,375	28,375	28,375	28,375	28,375	28,375
	Acres of Key Winter Range where motorized cross country travel is continued		28,375	0	0	0	0	0	0
Loyalton-Truckee Deer Herd	Critical Summer	25,748	14%	0%	0%	0%	0%	0%	0%
	Fawning	4,440	13%	0%	0%	0%	0%	0%	0%
	Subtotal/Weighted Average	**30,188**	**14%**	**<1%**	**0%**	**0%**	**0%**	**0%**	**0%**
	Overall Ranking Key Summer		Low	Low	Low	Low	Low	Low	Low
	Acres of Key Summer Range where motorized cross country travel is prohibited		0	22,497	22,497	22,497	22,497	22,497	22,497
	Acres of Key Summer Range where motorized cross country travel is continued		22,497	0	0	0	0	0	0
	Critical Winter	8,524	10%	1%	0%	1%	1%	1%	1%
	Winter	4,508	8%	0%	0%	0%	0%	0%	0%
	Subtotal/Weighted Average	**13,032**	**9%**	**<1%**	**0%**	**<1%**	**<1%**	**<1%**	**<1%**
	Overall Ranking Key Winter		Low	Low	Low	Low	Low	Low	Low
	Acres of Key Winter Range where motorized cross country travel is prohibited		0	8,008	8,008	8,008	8,008	8,008	8,008
	Acres of Key Winter Range where motorized cross country travel is continued		8,008	0	0	0	0	0	0

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

Summary of Direct and Indirect Effects

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

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

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

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

Cumulative Effects

Cumulative Effects of Motorized Routes

The geographic boundary for assessing cumulative effects of motorized and non-motorized routes includes all lands within the Tahoe NF. The Tahoe NF encompasses the majority of the land base within the Blue Canyon, Nevada City, Downieville, and Loyalton-Truckee deer herds. The Tahoe NF is sufficiently large enough to assess cumulative effects of motorized and non-motorized routes since the Tahoe ranges from low elevation to high elevation and includes and array of habitat types used by the mule deer. It also covers a variety of deer habitat types including critical summer, summer, fawning, critical winter, winter, holding areas, and migration corridors. The timeframe for assessing past cumulative effects of motorized routes to mule deer takes into consideration the aggregate approach of the existing condition. The current condition and current use of motorized routes is the result of past actions. The timeframe for considering foreseeable future actions is approximately 20 years out.

Cumulative Motorized Route Miles

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

Blue Canyon Deer Herd

Within Critical Summer Range, Implementing Alternative 1 would have motorized route miles that exceed Alternative 5 by about 18 miles, and exceed Alternatives 2, 3, 4, 6, by nearly 40 miles for the Blue Canyon Deer Herd. Motorized route miles within fawning habitat for the Blue Canyon herd is minor.

Within critical winter ranges, Alternatives 1 has the most motorized route miles at 65 miles, followed by Alternative 5 with 50 miles. Motorized route miles for the remaining action alternatives is about 45 route miles in critical winter range. A similar pattern emerges for winter range.

Alternative 1 poses the greatest risk to the Blue Canyon Deer Herd on both critical summer and critical winter/winter ranges, followed next by Alternative 5.

Downieville Deer Herd

For the Downieville Deer Herd, only about 60 acres of critical summer and no mapped fawning areas fall within the boundaries of the Tahoe NF. Within critical winter range, Alternative 1 has 17 motorized route miles, and the all the action alternatives have 14 miles of motorized routes each. Within winter range, Alternative 1 has the highest number of motorized route miles (310 miles), where direct and indirect disturbance associated with motorized routes could occur when deer are stressed during the winter. All the action alternatives are similar in their motorized route miles within winter range (242 to 243 miles).

In summary, Alternative 1 poses the greatest risk to the Downieville Deer Herd on both critical winter and winter ranges where resources may be scarce and deer may be stressed during the winter months.

Nevada City Deer Herd

When comparing critical summer and fawning habitat for the Nevada City Deer Herd, Alternative 1 exceeds the action alternatives by at least 30 miles (Table 3.03-19). For critical winter habitat and winter ranges, Alternative 1 exceeds Alternative 5 by about 84 miles; and the remaining action alternatives by an additional 20 miles.

In summary, Alternative 1 poses the greatest risk to the Nevada City Deer Herd on all key deer habitat types - critical summer, fawning, critical winter, and winter habitats when deer are most vulnerable to disturbance.

Loyalton-Truckee Deer Herd

Motorized route miles for the Loyalton-Truckee Deer Herd are greatest under Alternative 1, where motorized route miles exceed all the action alternatives by at least 18 miles (Alternative 5) within critical summer ranges (Table 3.03-17). Within fawning habitat, route miles are similar for all alternatives, with Alternative 1 exceeding the remaining alternatives by 2-3 miles. Alternative 1 poses the greatest concern to the Truckee-Loyalton Deer Herd on both critical summer ranges and fawning habitat that are important to for reproduction and rearing young during the summer months.

Motorized route miles in critical winter and winter ranges are highest in Alternative 1, exceeding the action alternatives by 6-7 miles. There are relatively no differences in motorized route miles for the action alternatives within winter or critical winter ranges.

Alternative 1 poses the greatest risk than the action alternatives within key ranges, where the Loyalton-Truckee Deer Herd are most vulnerable to factors associated with motorized vehicles.

Table 3.03-21. Cumulative Motorized Route Miles

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

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

Zone of Influence

Tables 3.03-22 through 3.03-25 display the percent of key deer ranges within a 200-meter Zone of Influence of all motorized routes on both public and private lands within the boundary of the Tahoe National Forest for each of the major deer herds: Blue Canyon, Downieville, Nevada City, and Loyalton-Truckee. The cumulative effects of motorized and non-motorized routes is discussed for each deer herd for the alternatives.

Blue Canyon Deer Herd

The Blue Canyon Deer Herd has approximately equal amounts of key winter range and key summer range (Table 3.03-18). Overall cumulative effects (Table 3.03-22) within the Blue Canyon Deer Herd (including motorized trails un-authorized for motorized use, existing system routes, and non-motorized routes on both NFS and non-NFS lands), indicates all the alternatives "highly" reduce habitat effectiveness within key deer winter ranges (critical winter and winter) with the largest contribution from existing motorized system routes (44%). Alternative 1 poses the greatest risk to reduced habitat effectiveness within key winter ranges where approximately 64% of key winter range is influenced by all motorized and non-motorized routes, of which approximately 20% of key winter range is influenced by cross country travel, including use on existing motorized trail un-authorized for motorized use. This amount of influence from motorized routes could have significant ramifications to the Blue Canyon Deer Herd when the deer are already stressed during the winter months, especially since unmanaged cross-country travel would continue at an unknown rate in the future.

Under all the action alternatives, only a "low" proportion of key deer winter range is influenced by proposed additions of motorized trails to the NFTS (range 0% to 5%-Alt 5). Under the action alternatives, between 17% and 20% (17% - Alt 5, 20% remaining action alternatives) of key deer winter range would benefit from the prohibition of cross country travel, including motorized use on existing motorized trails un-authorized for motorized use. However, since these motorized trails would continue to remain in place until they are physically revegetated, non-motorized use on these routes may occur which could still reduce habitat quality, but the effects would likely be less depending on the type of activity.

Overall cumulative effects to key summer ranges result in an overall "moderate" influence from all motorized and non-motorized routes under all the alternatives. Alternative 1 has the highest overall cumulative impacts (45%), followed by Alternative 5 (41%), and the remaining alternatives (36%), where key summer ranges (critical summer and fawning) are influenced cumulatively by all motorized and non-motorized routes. On average, Alternative 1 directly and indirectly affects 9% of key summer ranges (9%-critical summer, 0%-fawning) from cross country motorized travel on existing motorized trails un-authorized for motorized use. The remaining action alternatives do not contribute existing cumulative impacts. Motorized trails added to the NFTS under Alternative 5 contributes an additional 5% each to key winter and key summer ranges to existing cumulative impacts. Between 5% and 9% of key summer range influenced by the motorized trails un-authorized for motorized use would benefit deer, since cross-country motorized travel, including use on these motorized trails, would be prohibited. In addition, for all the action alternatives, cross-country motorized travel would be prohibited.

Table 3.03-22. Proportion of Blue Canyon Herd Key Deer Ranges within a 200-meter "Zone of Influence"

	Range Type	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives								
Motorized trails to be added to NFTS (negative impact)	Critical Summer	9%	1%	0%	0%	5%	0%	0%
	Fawning	0%	0%	0%	0%	0%	0%	0%
	Weighted Average Key Summer	**9%**	**<1%**	**0%**	**0%**	**5%**	**0%**	**0%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	18%	0%	0%	0%	4%	0%	0%
	Winter	20%	1%	0%	1%	5%	1%	1%
	Weighted Average Key Winter	**20%**	**<1%**	**0%**	**<1%**	**5%**	**<1%**	**<1%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Cumulative effects of past, present, and proposed actions								
Existing motorized and non-motorized routes (NFS and non NFS lands) (negative impact)	Critical Summer	36%	36%	36%	36%	36%	36%	36%
	Fawning	0%	0%	0%	0%	0%	0%	0%
	Weighted Average Key Summer	**36%**	**36%**	**36%**	**36%**	**36%**	**36%**	**36%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Critical Winter	36%	36%	36%	36%	36%	36%	36%
	Winter	46%	46%	46%	46%	46%	46%	46%
	Weighted Average Key Winter	**44%**	**44%**	**44%**	**44%**	**44%**	**44%**	**44%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
Routes decommissioned or unauthorized to motorized public use (positive impact)	Critical Summer	0%	8%	9%	9%	5%	9%	9%
	Fawning	0%	0%	0%	0%	0%	0%	0%
	Weighted Average Key Summer	**0%**	**8%**	**9%**	**9%**	**5%**	**9%**	**9%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	0%	18%	18%	18%	15%	18%	18%
	Winter	1%	20%	20%	20%	17%	20%	20%
	Weighted Average Key Winter	**<1%**	**20%**	**20%**	**20%**	**17%**	**20%**	**20%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Total Cumulative Effects								
Overall Relative Cumulative Impact Score = Sum Total of Routes (**Note**: Some overlap may occur where route categories intersect)	**Cumulative Total Key Summer (%)**	**45%**	**36%**	**36%**	**36%**	**41%**	**36%**	**36%**
	Cumulative Total Key Summer Ranking	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Cumulative Total Key Winter (%)	**64%**	**44%**	**44%**	**44%**	**49%**	**44%**	**44%**
	Cumulative Total Key Winter Ranking	**High**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**

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

Downieville Deer Herd

Habitat within the boundary of the Downieville Deer Herd has a higher proportion of key winter range than key summer range (Table 3.03-18), therefore, the majority of this discussion will focus on cumulative effects to key winter ranges. Only 60 acres of key summer ranges falls within the boundary of the Downieville Deer Herd. However, Alternative 1 does result in a "moderate" cumulative impact where 42% of critical summer range is specifically influenced by cross-country motorized travel, including use

of motorized trails un-authorized for motorized use. The action alternatives do not add to existing cumulative impacts to critical summer range.

Overall cumulative effects (Table 3.03-23) from motorized route associated factors within the Downieville Deer Herd (including proposed motorized trail additions to the NFTS, existing system routes, and non-motorized routes on both NFS and non-NFS lands), indicates all the alternatives "moderately" reduce habitat effectiveness within key deer winter ranges (critical winter and winter), ranging between 43% and 100%, with the largest contribution from existing NFTS motorized routes and motorized routes off of NFS lands (43%). Alternative 1 poses the greatest risk to reduced habitat effectiveness within key winter ranges where approximately 15% of key winter range (critical winter – 9% , winter – 15%) is influenced by continued cross-country motorized travel, including use motorized trails un-authorized for motorized use. The total cumulative impact from Alternative 1 results in reduced habitat effectiveness within about 58% of key winter ranges. This high influence of motorized and non-motorized routes may have considerable adverse impacts to the Downieville Herd when deer are stressed during the winter months, especially since unmanaged cross-country travel would continue at an unknown rate in the future under this alternative.

Under the action alternatives, approximately 43% of key winter ranges are cumulatively impacted by motorized and non-motorized routes, resulting in a high amount of reduced habitat effectiveness for the Downieville Deer Herd. Alternative 5 directly and indirectly results in about 5% of additional reduced habitat effectiveness in key deer winter range. All the remaining action alternatives result in adding a nominal amount of direct and indirect impacts to existing cumulative impacts on key deer winter range, where less than 1% winter range results in lower habitat effectiveness. Under the action alternatives, the majority of existing motorized trails un-authorized for motorized use within key winter habitat would be prohibited from the ban of cross country travel, ranging from 17% (Alt 5) to 20% (remaining alternatives). However, since these motorized trails would continue to remain in place until they are re-vegetated. Non-motorized use on these motorized trails may occur which could still reduce habitat quality, but the effects would likely be less depending on the type and intensity of non motorized use.

Table 3.03-23. Downieville Deer Herd - Proportion of Key Deer Ranges within a 200-meter "Zone of Influence"

	Range Type	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives								
Motorized routes (negative impact)	Critical Summer	42%	0%	0%	0%	0%	0%	0%
	Overall Rank	**Mod**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	9%	0%	0%	0%	0%	0%	0%
	Winter	15%	0%	0%	0%	1%	0%	0%
	Weighted Average Key Winter	**15%**	**0%**	**0%**	**0%**	**<1%**	**0%**	**0%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Adverse Cumulative effects of past, present, and proposed actions								
Existing motorized and non-motorized (NFS and non NFS) routes (negative impact)	Critical Summer	0%	0%	0%	0%	0%	0%	0%
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	47%	47%	47%	47%	47%	47%	47%
	Winter	43%	43%	43%	43%	43%	43%	43%
	Weighted Average Key Winter	**43%**	**43%**	**43%**	**43%**	**43%**	**43%**	**43%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
Positive Cumulative Effects								
Decommissioned routes or routes unauthorized to motorized public access (positive impact)	Critical Summer	0%	42%	42%	42%	42%	42%	42%
	Overall Rank	**Low**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Critical Winter	0%	9%	9%	9%	9%	9%	9%
	Winter	2%	17%	17%	17%	17%	17%	17%
	Weighted Average Key Winter	**<1%**	**16%**	**16%**	**16%**	**16%**	**16%**	**16%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Total Cumulative Effects								
Overall Relative Cumulative Impact Score = Sum Total of Routes (**Note**: Some overlap may occur where route categories intersect)	**Cumulative Key Summer (%)**	**42%**	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
	Cumulative Key Summer Ranking	**Mod**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Cumulative Key Winter (%)	**58%**	**43%**	**43%**	**43%**	**43%**	**43%**	**43%**
	Cumulative Key Winter Ranking	**High**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**

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

Nevada City Deer Herd

The Nevada City Deer Herd has a slightly higher proportion of key summer range (~40%) to key winter ranges (~60%) (Table 3.03-18). Overall cumulative effects (Table 3.03-24) within the Nevada City Deer Herd (including motorized trails un-authorized for motorized use, existing system routes, and non-motorized routes on both NFS and non-NFS lands), indicate Alternative 1 "highly" reduces habitat effectiveness within key deer winter habitats where 67% are cumulatively affected, followed by Alternative 5 (51%), and then by the remaining action alternatives (49%). Existing NFTS system and non-NFS routes influences approximately 49% key winter habitats. Alternative 1 poses the greatest risk to reduced habitat effectiveness within key winter ranges where approximately 18% of key winter range is attributed to continued cross-country motorized use, including use of motorized trails un-authorized for motorized use, where current existing NFS and non-NFS motorized routes are already highly influencing

key deer winter ranges. This additional reduction in habitat effectiveness could pose a significant cumulative impact to the Nevada City Deer Herd, especially considering habitat fragmentation within the existing condition of the checkerboard ownership pattern in this region, including the urban development issues. Increased stress from this motorized use could affect this herd's population numbers, especially since unmanaged cross-country travel would continue at an unknown rate in the future.

Under Alternative 5, about 2% of proposed additions of motorized trails un-authorized for motorized use to the NFTS would add to existing cumulative impacts within key deer winter range. The remaining action alternatives would not add to existing cumulative impacts as no proposed motorized trails un-authorized for motorized use are identified to be added to the NFTS which would directly or indirectly affect winter range for the Nevada City Deer Herd. The majority (22%) of motorized trails un-authorized for motorized use within key winter habitat would be prohibited from motorized use under the action alternatives where deer would benefit. However, since these existing motorized trails un-authorized for motorized use would continue to remain on the ground, and may receive non-motorized use, habitat effectiveness could be reduced, but the effects would likely be less than motorized use, depending on the type of activity.

Overall cumulative effects to key summer ranges results in an overall "moderate" influence from all motorized and non-motorized routes under all the alternatives. Alternative 1 has the highest overall cumulative impacts (48%). The action alternatives would cumulatively affect between 40% and 41% of key summer ranges (critical summer and fawning) by all motorized and non-motorized routes. On average, Alternative 1 directly and indirectly affects 8% of key summer ranges (8%-critical summer, 9%-fawning) from motorized trails un-authorized for motorized use and 25,418 acres where cross country travel would continue. The remaining action alternatives contributes a relatively small proportion to existing cumulative impacts, where between 0% and 1% of key summer range is affected by the addition of proposed motorized trails to be added to the NFTS. Under the action alternatives, approximately 9-11% of key summer range currently influenced by the prohibition of cross-country travel, including use on motorized trails un-authorized for motorized use that would be a benefit to the Nevada City Deer Herd. Finally, the prohibition of cross country travel on 25,418 acres of key summer range (critical summer and fawning) would be an additional benefit to the Nevada City Deer Herd.

Table 3.03-24. Nevada City Deer Herd - Proportion of Key Deer Ranges within a 200-meter "Zone of Influence"

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives								
Motorized Routes (negative impact)	Critical Summer	8%	1%	0%	1%	1%	1%	0%
	Fawning	9%	1%	0%	0%	1%	1%	1%
	Weighted Average Key Summer	**8%**	**1%**	**0%**	**<1%**	**1%**	**1%**	**<1%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	23%	0%	0%	0%	1%	0%	0%
	Winter	16%	0%	0%	0%	2%	0%	0%
	Weighted Key Winter	**18%**	**0%**	**0%**	**0%**	**2%**	**0%**	**0%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Cumulative effects of past, present, and proposed actions								
Existing motorized and non motorized routes (NFS and non NFS lands) (negative impact)	Critical Summer	38%	38%	38%	38%	38%	38%	38%
	Fawning	52%	52%	52%	52%	52%	52%	52%
	Weighted Average Key Summer	**40%**	**40%**	**40%**	**40%**	**40%**	**40%**	**40%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Critical Winter	45%	45%	45%	45%	45%	45%	45%
	Winter	50%	50%	50%	50%	50%	50%	50%
	Weighted Key Winter	**49%**	**49%**	**49%**	**49%**	**49%**	**49%**	**49%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
Positive Cumulative Effects								
Routes unauthorized to motorized public access (positive impact)	Critical Summer	2%	9%	10%	10%	9%	9%	10%
	Fawning	2%	10%	12%	12%	10%	10%	11%
	Weighted Average Key Summer	**0%**	**9%**	**11%**	**11%**	**9%**	**9%**	**11%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	2%	25%	25%	25%	24%	25%	25%
	Winter	2%	17%	17%	17%	17%	17%	17%
	Weighted Average Key Winter	**2%**	**22%**	**22%**	**22%**	**22%**	**22%**	**22%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Total Cumulative Effects								
Overall Relative Cumulative Impact Score = Sum Total of All Routes (**Note**: Some overlap may occur where route categories intersect)	**Cumulative Key Summer (%)**	**48%**	**41%**	**40%**	**40%**	**41%**	**41%**	**40%**
	Cumulative Key Summer Ranking	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Cumulative Key Winter (%)	**67%**	**49%**	**49%**	**49%**	**51%**	**49%**	**49%**
	Cumulative Key Winter Ranking	**High**	**Mod**	**Mod**	**Mod**	**High**	**Mod**	**Mod**

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

Loyalton-Truckee Deer Herd

The Loyalton-Truckee Deer Herd has more than twice the amount of key summer range (~70%) compared to key winter ranges (~30%) (Table 3.03-18). Overall cumulative effects (Table 3.03-25) within the Loyalton-Truckee Deer Herd (including motorized trails un-authorized for motorized use that are proposed to be added to the NFTS, existing system routes, and non-motorized routes on both NFS and non-NFS lands), indicate all the alternatives "highly" reduce habitat effectiveness within key deer

summer habitats where between 60% (Alternatives 2, 3, 4, 6, & 7- lowest) and 72% (Alternative 1-highest) are cumulatively affected. Existing NFS system and non-NFS routes influences approximately 58% key winter habitats (NFS - 34%, non-NFS - 24%). Alternative 1 poses the greatest risk to reduced habitat effectiveness within key summer ranges where approximately 52% of key summer range is influenced by all motorized and non-motorized route. Under Alternative 1, cross-country motorized travel, including use of motorized trails un-authorized for motorized use, reduces habitat effectiveness by an average of 14% within key summer ranges (critical summer 14%, fawning-13%) where current existing NFS and non-NFS motorized routes are already highly influencing critical summer ranges. This additional reduction in habitat effectiveness could pose a considerable cumulative impact to the Loyalton-Truckee Deer Herd. Increased stress from this use could affect this herd's population numbers, especially since unmanaged cross-country travel would continue at an unknown rate in the future.

Alternative 2 adds minimal cumulative effects (<1%) from motorized trails added to the NFTS within key summer habitat for the Loyalton-Truckee Deer Herd. The remaining action alternatives would not add to existing cumulative impacts to key summer range since no motorized trails would be added to the NFTS. The majority of existing motorized trails un-authorized for motorized use within key winter habitat would not be added to the NFTS under the action alternatives, where deer would benefit. However, since these motorized trails would continue to remain in place until they are restored, non-motorized use on these routes may occur which could reduce deer habitat quality, but the effects would likely be less depending on the type of activity and the intensity of use.

On average, Alternative 1 directly and indirectly affects an average of 9% of key winter ranges from cross-country motorized travel, including use on motorized trails un-authorized for motorized use. Overall cumulative effects from all existing NFS, non-NFS, and this continued cross-country travel with concentrated use on motorized trails un-authorized for motorized use influences a moderate proportion (39%) of key winter ranges where habitat effectiveness within key winter ranges could be reduced under the no action alternative. Under all the action alternatives, cumulative effects to key winter ranges results in an overall "moderate" influence from all motorized and non-motorized routes under all the action alternatives. All the action alternatives would cumulatively affect approximately 30% of key winter ranges by all motorized and non-motorized routes. Under the action alternatives, approximately 9% of key winter range influenced by existing motorized trails un-authorized for motorized use would be beneficial where disturbance from motorized use would not occur, including 2,173 acres where cross-country motorized travel would be prohibited.

Table 3.03-25. Loyalton-Truckee Deer Herd – Proportion of Key Deer Ranges within a 200-meter "Zone of Influence"

		Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives								
Motorized routes (negative impact)	Critical Summer	14%	0%	0%	0%	0%	0%	0%
	Fawning	13%	0%	0%	0%	0%	0%	0%
	Weighted Average Key Summer	**14%**	**<1%**	**0%**	**0%**	**0%**	**0%**	**0%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	10%	1%	0%	1%	1%	1%	1%
	Winter	8%	0%	0%	0%	0%	0%	0%
	Weighted Average Key Winter	**9%**	**<1%**	**0%**	**<1%**	**<1%**	**<1%**	**<1%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Cumulative effects of past, present, and proposed actions								
Existing motorized and non motorized routes - NFS and non NFS lands (negative impact)	Critical Summer	40%	40%	40%	40%	40%	40%	40%
	Fawning	25%	25%	25%	25%	25%	25%	25%
	Weighted Average Key Summer	**38%**	**38%**	**38%**	**38%**	**38%**	**38%**	**38%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Critical Winter	25%	25%	25%	25%	25%	25%	25%
	Winter	40%	40%	40%	40%	40%	40%	40%
	Weighted Average Key Winter	**30%**	**30%**	**30%**	**30%**	**30%**	**30%**	**30%**
	Overall Rank	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
Positive Cumulative Effects								
Decommissioned routes or routes unauthorized to motorized public access (positive impact)	Critical Summer	0%	13%	14%	14%	13%	14%	14%
	Fawning	1%	13%	13%	13%	13%	13%	13%
	Weighted Average Key Summer	**<1%**	**13%**	**14%**	**14%**	**13%**	**14%**	**14%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
	Critical Winter	1%	9%	10%	9%	9%	9%	9%
	Winter	0%	8%	8%	8%	8%	8%	8%
	Weighted Average Key Winter	**<1%**	**9%**	**9%**	**9%**	**9%**	**9%**	**9%**
	Overall Rank	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Total Cumulative Effects								
Overall cumulative impact = sum total of all routes	**Cumulative Key Summer %**	**52%**	**~39%**	**38%**	**38%**	**38%**	**38%**	**38%**
	Cumulative Key Summer Ranking	**High**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**
	Cumulative Key Winter %	**39%**	**<31%**	**30%**	**<31%**	**<31%**	**<31%**	**<31%**
	Cumulative Key Winter Ranking	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**	**Mod**

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

Overall Cumulative Effects from Past, Present, and Reasonably Foreseeable Future Actions

Past and current cumulative effects to mule deer include current and historic grazing of mule deer habitat; loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the mule deer within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to mule deer habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally do not increase forage condition for deer because they do not usually result in reducing the canopy cover below 40%, except for group selection harvest treatments on the Sierraville RD. Group selection harvests are expected to increase forage condition and increase forest structural diversity. These thinning treatments may result in the short-term reduction in cover for deer, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Many recent, current, and future vegetation and fuels reduction projects are emphasizing habitat improvement for deer by removing competing conifers within oak habitats and aspen habitats which are designed to enhance mule deer foraging condition. Between 1994 and 2007, approximately 64,000 acres burned on the Tahoe NF, some of which have removed mule deer habitat.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increase in negative interactions between humans and mule deer. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased disturbance to mule deer would be expected, particularly during the summer months. Two non-motorized trails are being proposed for development in the near future. The development and use of these trails may slightly increase disturbance to mule deer since deer have been shown to demonstrate increased responses to humans when humans are in close proximity to deer, especially when humans are on foot.

Table 3.00-1 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit reissuances. Table 3.03-26 below summarizes cumulative impacts from reasonably foreseeable projects and a description of the potential impact to mule deer and their habitat.

Table 3.03-26. Direct, Indirect, and Cumulative Impact to Mule Deer from Reasonably Foreseeable Future Projects

Project type	Number of Projects	Mule Deer Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in aspen and oak habitats.	• Short-term adverse impacts during harvest. • Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve riparian and meadow habitat quality used for forage and fawning.	Beneficial cumulative impact by improving long-term forage and fawning habitat quality.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance.	Slight increase in cumulative impact.
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from grazing, vegetation/fuels projects, wildfires, and recreation, Alternative 1 poses the greatest risk to the 4 major deer herds on the Tahoe NF, where between 12% and 27% of key winter ranges are influenced by motorized trails un-authorized for motorized use, and between 7% and 41% of key summer ranges are affected, depending on the deer herd. Alternative 5 slightly increases the amount of cumulative effects on key deer habitats over the other action alternatives, where site specific localized effects may occur. The remaining action alternatives are similar and only slightly increase overall cumulative impacts to the 4 major deer herds on the Tahoe NF. Alternative 3 does not add any motorized trails to the NFTS, so does not add to existing cumulative impacts. All the action alternatives will result in a beneficial impact to all deer ranges across the Tahoe NF from the ban on cross-country travel, including motorized travel on approximately 1,123 to 1,294 miles of existing motorized trails un-authorized for motorized use depending on the alternative. It is expected that non-motorized use may occur on these motorized trails un-authorized for motorized use which would likely result in less disturbance to mule deer. However, some studies indicate that certain non-motorized activities (hiking, mountain bicycling, equestrian, etc.) could actually result in greater disturbance to mule deer. At any rate, the amount of disturbance caused by non-motorized use will depend on the type, intensity and duration of the use. As existing motorized trails un-authorized for motorized use become re-vegetated and recover over time, either through active or passive restoration efforts, overall mule deer disturbance from motorized routes is expected to diminish in the future.

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

MIS Summary

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

The change is the class of vehicles will have no effect to mule deer habitat, since the change in class of vehicles on existing motorized routes will generally not affect mule deer habitat condition. Wet weather seasonal restrictions under Alternatives 4, 5, and 6 on all native surfaced roads and motorized trails would benefit mule deer habitat effectiveness through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted. Finally cross country travel would be prohibited on 65,239 acres with the implementation of the action alternatives where disturbance, avoidance, and abandonment by mule deer would be reduced or eliminated. Alternative 1 would have the greatest risk to mule deer habitats, where cross country travel would continue, affecting 65,239 acres of oak-associated hardwood and hardwood/conifer habitat.

Summary of Mule Deer Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mule deer; hence, the oak-associated hardwood and hardwood/conifer effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the mule deer. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 809,000 acres of oak-associated hardwood and hardwood/mixed conifer habitat on National Forest System lands in the Sierra Nevada. The trend is slightly increasing (within the last decade, changing from 5% to 7% of the acres on National Forest System lands).

Population Status and Trend. The mule deer has been monitored in the Sierra Nevada at various sample locations by herd monitoring (spring and fall) and hunter survey and associated modeling (CDFG 2007). California Department of Fish and Game (CDFG) conducts surveys of deer herds in early spring to

determine the proportion of fawns that have survived the winter, and conducts fall counts to determine herd composition (CDFG 2007). This information, along with prior year harvest information, is used to estimate overall herd size, sex and age rations, and the predicted number of bucks available to hunt (ibid). These data indicate that mule deer continue to be present across the Sierra Nevada, and current data at the range wide, California, and Sierra Nevada scales indicate that, although there may be localized declines in some herds or Deer Assessment Units, the distribution of mule deer populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mule Deer Trend. Alternative 1 results the greatest amount of oak-associated hardwood and hardwood/conifer habitat 13,595 acres (1.7% of Sierra Nevada-wide habitat) affected by cross country travel, including use on existing motorized trails un-authorized for motorized use. Alternative 5 results in 1,699 acres or 0.1% of Sierra Nevada-wide habitat affected, where mule deer habitat within oak-associated hardwood and hardwood/conifer habitat types would be reduced. The remaining action alternatives (Alt 2, Alt 3, Alt 4, Alt 6, and Alt 7) do not affect oak-associated hardwood and hardwood/conifer habitat. Based on the small percentage of habitat affected, the Tahoe NF Motorized Travel Management Project will not alter the existing habitat trend, nor will it lead to a change in the distribution of mule deer across the Sierra Nevada bioregion.

Compliance with the Forest Plan and Other Direction

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

> *Limit vehicle access on key deer winter ranges when deer are present. Also limit vehicle access in key summer range habitats during periods of migration and fawning.*

The Tahoe Travel Management Project provides project design standards for minimizing effects of deer habitat on key deer winter ranges and key summer ranges, including maintaining existing LRMP OHV seasonal restrictions for deer, the prohibition of cross country travel (acres), and wet weather seasonal restrictions. The effects of these actions and the addition of motorized trails to the NFTS and designated “open areas” were analyzed within key deer habitats for the major deer herds on the Tahoe NF, including Downieville herd, Nevada City Herd, Blue Canyon herd, and the Loyalton-Truckee herd. The analysis of effects indicated that Alternative 1 least complies with Tahoe NF LRMP standard and guideline and poses the greatest risk to the four major deer herds, where between 12% and 27% of key winter ranges are influenced by motorized trails un-authorized for motorized use, and between 7% and 41% of key summer ranges are affected, depending on the deer herd. All of the action alternatives meet this Standard and Guideline by limiting access to varying degrees. Of the action alternative, Alternative 5 least limits vehicle access , while Alternative 3 most limits access. Alternatives 2, 4, 6, and 7 complies with LRMP deer direction similarly, somewhat less than Alternative 3, and slightly more than Alternative 5. All the action alternatives will result in a beneficial impact to all deer ranges across the Tahoe NF from the ban on cross-country travel, including motorized travel on approximately 1,123 to 1,294 miles of existing motorized trails un-authorized for motorized use depending on the alternative. In addition, Alternatives 4, 5, & 6 would benefit deer on winter ranges through the implementation of wet weather closures on native surfaced roads and motorized trails.

> *Guidance regarding management indicator species(MIS) set forth in the Tahoe NF LRMP as amended by the 2007 SNF MIS Amendment ROD directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and (2) at the bioregional scale, monitor populations and/or habitat trends of MIS, as identified in the Tahoe NF LRMP as amended.*

The mule deer was selected as Management Indicator Species for the Tahoe NF as amended by the 2007 SNF MIS Amendment ROD. Project-level effects to mule deer were analyzed under for each alternative and disclosed in the sections above under Environmental Consequence in the MIS Summary Section and in the Tahoe NF Motorized Travel Management Project Level MIS report, which is incorporated by reference. In addition, population and habitat trends for mule deer are conducted at the bioregional scale.

Oak Woodland and Oak-Conifer Associated Species: Affected Environment

Introduction: Species within the Oak Woodland and Mixed Oak-Conifer Forest Group include mule deer, wild turkey, band-tailed pigeon, Western gray squirrel, and the pallid bat. The mule deer is identified as Management Indicator Species in the Sierra Nevada Forests (Sierra Nevada Forests Management Indicator Species Amendment Record of Decision 2007). See previous section for mule deer MIS analysis. The pallid bat is designated as a Forest Service Sensitive Species by the Regional Forester.

Species associated with pure oak woodland and mixed oak-conifer forest have the potential to be affected by road and trail-associated factors. The relationship between roads and motorized trails associated factors to population trends of these species is unknown.

Mortality from hunting or trapping: In general, roads facilitate access to the hunted species and their habitat in this group. Impacts of road and trail associated factors to wild turkeys varies. Turkeys in Alabama were found to show no apparent impact when approached by vehicles. However, after several years of being hunted and receiving an increase in disturbance, turkeys went for cover when vehicles approached (Wright and Speake 1975 *In:* Joslin and Youmans, coordinators 1999).

Fragmentation, Edge and Microclimate Effects: Roads can also create edge effects which may alter microclimates near roads which may enhance habitat for these species or may have negligible impacts to their habitat overall.

Disturbance and changes in behavior: Pallid bats may be sensitive to human disturbance. If roost sites are disturbed by route associated factors, local pallid bat populations may be negatively impacted.

Summary of Route associated factors to hardwood associated species:

- Mortality from hunting or trapping as facilitated by road and trail access (wild turkey, western gray squirrel, band-tailed pigeon)
- Changes to habitat microclimate associated with the edge induced by roads or trails
- Changes in behavior that may lead to loss of reproductive success due to trail and road associated factors.

Oak Woodland and Oak-Conifer Associated Species: Environmental Consequences

Effects common to all oak woodland and oak-conifer species

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

Wet weather seasonal restrictions: Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails where oak associated species would benefit from reduced noise disturbance when wet weather restrictions would be implemented.

Prohibition of Cross Country Travel. Alternative 1 poses the greatest risk to oak associated species where cross country travel would not be prohibited on 65,239 acres, where oak associated species could be subjected to disturbance, avoidance, and abandonment. The remaining action alternatives would prohibit cross country travel within oak and oak/conifer woodlands on approximately 65,239 acres.

Analysis Measures

Motorized Route Density: Motorized route density provides a relative index of impacts to oak associated species. For example, motorized route density levels can provide a relative index of the amount of human access to hunt species, such as wild turkey, gray squirrel, and the band-tailed pigeon, which can have an impact on population numbers. Roads and motorized trails have the potential to cause adverse impacts to pallid bats through the loss of oak habitat, especially for urban expansion on private lands. Motorized routes within oak habitats may lead to changes in behavior and may ultimately result in reduced reproductive success for oak associated species.

Direct and Indirect Effects

Motorized Route Density: The direct and indirect effects to oak associated species was determined by assessing the proportion of pure oak and oak-conifer habitats with proposed motorized route densities between 0 and 6 miles/square mile (Table 3.03-27) across the Tahoe NF. The direct and indirect effects of proposed motorized routes is the differences in route densities between the alternatives. Under Alternative 1, with continued cross-country motorized use, including continued use of existing motorized trails un-authorized for motorized use, 85% of the Tahoe NF oak habitats (pure oak woodland and mixed oak-conifer types) would have motorized route densities that exceed 2 miles/square mile, where increased access to hunters may potentially have an impact on oak associated species, such as wild turkey, gray squirrels, and band-tailed pigeon. Pallid bat have the greatest potential to be disturbed within oak habitats under Alternative 1 compared to all the action alternatives.

Alternative 5 would result in approximately 76% of oak habitat with motorized route densities exceeding 2 miles/square mile. The remaining alternatives would have similar proportions of oak habitats (75-76%) where motorized route densities would exceed 2 miles/square mile.

Table 3.03-27. Proportion of Oak Habitat with Motorized Route Densities between 0 and 6 miles/square mile

Motorized Route Density (miles/square mile)	**Alt 1***	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
0-2 miles/square mile	15	25	25	25	24	24	25
2-4 miles/square mile	43	60	60	60	57	61	60
4-6 mile/square mile	38	13	13	13	17	13	13
6+ miles/square mile	4	2	2	2	2	2	2

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

Summary of Direct and Indirect Effects

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

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

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Trail Additions	Has the lowest proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and the greatest proportion of habitat in the highest motorized route density categories (.>4 miles/square mile) when compared to all the action alternatives.	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), when compared to Alt 1. Similar to Alts 3, 4, & 7	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), when compared to Alt 1. Similar to Alts 2, 4, & 7	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), when compared to Alt 1,. Similar to Alts 2. 4, & 7	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), when compared to Alt 1. Slightly higher route densities in the lowest motorized route density categories than Alts 2, 3, 4, & 7.	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), when compared to Alt 1. Slightly higher route densities in the lowest motorized route density categories than Alts 2, 3, 4, & 7.	Increases the proportion of habitat in the lowest motorized route density categories (0-4 miles/square mile), and reduces the proportion of habitat in the highest motorized route density categories (.>4 miles/square mile), similar to Alts 2, 3, & 4
Cross Country Travel	Negatively effects 65,239 oak and oak-conifer habitat acres where cross country travel would continue	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	No effect	No effect	No effect	No effect	No effect	No effect	No effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively effects 65,239 oak and oak-conifer habitat acres where cross country travel would not be prohibited, resulting in the greatest proportion of habitat within the highest motorized route density categories	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lowest proportion of habitat in the highest motorized route density categories. Similar to Alts 3, 4, & 7.	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lowest proportion of habitat in the highest motorized route density categories. Similar to Alts 2, 4, & 7.	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lowest proportion of habitat in the highest motorized route density categories. Similar to Alts 2, 3, & 7.	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lower proportion of habitat in the highest motorized route density categories than Alt 1 and slightly higher than 2, 3, 4, & 7. Similar to Alt 6.	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lower proportion of habitat in the highest motorized route density categories than Alt 1 and slightly higher than 2, 3, 4, & 7. Similar to Alt 5.	Benefits 65,239 oak and oak-conifer habitat acres where cross country travel is prohibited, resulting in lowest proportion of habitat in the highest motorized route density categories. Similar to Alts 2, 3, & 4.

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

Cumulative Effects

Cumulative Effects Boundary Space and Time

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

Overall Cumulative Effects of Past, Present and Reasonably Foreseeable Actions

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

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

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

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

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

The fox sparrow was selected as the MIS for shrubland (chaparral) habitat on the west-slope of the Sierra Nevada, comprised of montane chaparral (MCP), mixed chaparral (MCH), and chamise-redshank chaparral (CRC) as defined by the California Wildlife Habitat Relationships System (CWHR) (CDFG 2005). The Sierra Nevada Forests Bioregional MIS Report and Travel Management MIS Project-Level Report are incorporated by reference. Recent empirical data from the Sierra Nevada indicate that, in the Sierra Nevada, the fox sparrow is dependent on open shrub-dominated habitats for breeding (Burnett and Humple 2003, Burnett et al. 2005, Sierra Nevada Research Center 2007).

Habitat Factor used for Analysis: For the proposed alternatives, the habitat factor used in this analysis was the amount of shrubland habitat (west-slope chaparral) that fell within a 200 meter zone of influence of proposed motorized trails to be added to the National Forest Transportation System (NFTS). The no action alternative (Alternative 1) was analyzed by determining the amount of shrubland habitat that fell within a 200 meter zone of influence of existing motorized trails un-authorized for motorized use.

Current Condition of the Habitat Factor(s) in the Project Area: The project area, comprised of the Tahoe NF boundary, currently has 62,928 acres of shrubland habitat. Shrubland habitat is comprised of various age classes that range from young shrubs, intermediate age classes, and mature to decadent shrub classes.

Direct and Indirect Effects to Habitat

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

Wet Weather Seasonal Restrictions. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where fox sparrow habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted during the wet weather season. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, the fox sparrow habitat effectiveness would not be enhanced when native surfaced motorized routes are under wet weather seasonal restrictions. Cross country travel on existing motorized trails un-authorized for motorized use would have the greatest amount of disturbance to fox sparrow habitat, where the highest number of fox sparrow habitat would not receive the benefit of reduced disturbance associated with motorized use during the wet weather season.

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

Motorized Trail additions to the National Forest Transportation System (NFTS). The direct and indirect effects to fox sparrow shrubland habitat from proposed trail additions to the NFTS results in a decrease in habitat quality from disturbance, displacement and/or avoidance of habitat as a result of activities associated with motorized vehicle use. Based on the analysis conducted for fox sparrow shrubland habitat, Alternative 1 would affect the greatest amount of habitat within a 200-meter zone of influence (Table 3.03-29). Approximately 5,754 acres or 0.6% of Sierra Nevada-wide habitat would be affected by continued cross country travel on existing motorized trails un-authorized for motorized use. Alternative 5 has the next highest direct and indirect effects to fox sparrow habitat, where 1,534 shrubland acres or 0.2% of Sierra Nevada-wide habitat would be affected by proposed motorized trail additions to the NFTS. Alternatives 2, 6, and 7 are similar in their affects to shrubland habitat, where 383 acres or 0.04% of Sierra-wide habitat would be affected. Alternatives 3 and 4 do not result in any direct or indirect effects to fox sparrow habitat.

Table 3.03-29. Acres Cross Country Travel Prohibitions and Proportion of Fox Sparrow MIS habitat within a 200-meter "Zone of Influence" of Proposed Routes

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

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use that would continue with continued cross country travel.
[2] The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Summary of Direct and Indirect Effects

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

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

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

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects fox sparrow 39,639 acres of shrubland habitat where cross country travel continued, including within15% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within approx.14% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within 15% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within approx.15% habitat within a 200-meter zone of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within 11% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within approx.14% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits fox sparrow on 39,639 acres of shrubland habitat where cross country travel is prohibited, including within.14% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.

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

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to fox sparrow includes all suitable fox sparrow shrubland on the west slope of the Tahoe NF on the Yuba River Ranger District and the American River Ranger District. Past and current cumulative effects to fox sparrow include current and historic grazing of fox sparrow habitat; loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 22 active livestock grazing allotments on the American River and Yuba River Ranger Districts, including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to fox sparrow habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Thinning, mastications, and under burning treatments may result in some removal of shrubland habitat in the short-term, but may increase fox sparrow shrubland habitat in the long-term. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have removed fox sparrow habitat, but over time, a large percentage of the burned areas quickly become re-vegetated by shrubland habitats, especially on highly productive sites on the west slope of the Tahoe NF.

Cumulative Effects Conclusion

Alternative poses the greatest cumulative effects to fox sparrow MIS shrubland habitat on the Tahoe NF, where 9,590 acres out of 62,928 acres of fox sparrow habitat would be affected within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. This will add to existing cumulative effects by approximately 15.2%. Alternative 1 could contribute to a downward trend in fox sparrow habitat effectiveness within shrubland habitat (west slope chaparral on the Tahoe NF. Alternative 5 will affect 2,302 acres out of 62,928 acres fox sparrow shrubland habitat or 3.7% of the Tahoe NF fox sparrow shrubland habitat. Alternative 5 will only result in a small downward trend in habitat effectiveness on the Tahoe NF. Alternatives 2, 6, and 7 affects 767 out of 62,928 acres fox sparrow shrubland habitat or 1.2% of the fox sparrow habitat on the Tahoe NF, and will not alter overall fox sparrow shrubland habitat. Alternatives 3 and 4 do not directly or indirectly affect fox sparrow MIS habitat, therefore, no cumulative effects will occur from implementation of alternatives 3 and 4.

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where fox sparrow habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted

during the wet weather season. The change in the class of vehicles would not effect fox sparrow habitat for all of the proposed alternatives. Finally, all the action alternatives would prohibit motorized cross country travel on 39,639 acres of fox sparrow habitat, where habitat effectiveness would be enhanced through reduced disturbance and avoidance.

Summary of Fox Sparrow Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the fox sparrow; hence, the shrubland effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the fox sparrow. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 922,000 acres of west-slope chaparral shrubland habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. The fox sparrow has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including: 1997 to present – Lassen National Forest (Burnett and Humple 2003, Burnett et al. 2005); 2002 to present - Plumas and Lassen National Forests (Sierra Nevada Research Center 2007); on-going monitoring through California Partners in Flight Monitoring Sites (CPIF 2002); 1992 to 2005 – Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that fox sparrows continue to be present at these sample sites, and current data at the range wide, California, and Sierra Nevada scales indicate that, although there may be localized declines in the population trend, the distribution of fox sparrow populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Fox Sparrow Trend. The Tahoe NF Travel Management Project will directly, indirectly, and cumulatively affect between 5,754 acres (highest) of fox sparrow shrubland habitat under Alternative 1 and 0 acres (lowest) under Alternatives 3 and 4. Based on the acres affected, which range from 0% to 0.6% of the total Sierra Nevada-wide, the Tahoe NF Motorized Travel Management Project will not change the existing trend in the habitat, nor will it lead to a change in the distribution fox sparrows across the Sierra Nevada bioregion.

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

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

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

Mountain quail have the potential to be affected by road and trail-associated factors. The relationship between roads and trails associated factors to population trends of the mountain quail is unknown.

Mortality from hunting or trapping: In general, roads facilitate access to hunting of mountain quail. **Fragmentation, Edge and Microclimate Effects**: Roads and motorized trails can also create edge effects which may alter microclimates near roads which may enhance habitat for these species or may have negligible impacts to their habitat overall.

Disturbance and changes in behavior: Mountain quail may be sensitive to human disturbance. If blue grouse roost sites are disturbed by motorized route associated factors, local mountain quail populations may be negatively impacted.

Summary of Route associated impacts to mountain quail:

- Mortality from hunting or trapping as facilitated by road and trail access
- Changes to habitat microclimate associated with the edge induced by roads or motorized trails
- Changes in behavior that may lead to loss of reproductive success due to trail and road associated factors.

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

Analysis Measures

The habitat factor used in this analysis for the action alternatives was the amount of early and mid seral coniferous forest habitat that fell within the 200-meter zone of influence of proposed motorized trail additions to the NFTS. For alternative 1, no action, the amount of early and mid seral coniferous forest habitat that fell within the 200-meter zone of influence of existing motorized trails un-authorized for motorized use was determined. Each alternative was compared to determine the proportion of habitat directly and indirectly affected in relation to the amount of early and mid seral coniferous forest habitat available at the Sierra Nevada-wide scale.

Current Condition of the Habitat Factor(s) in the Project Area: The Tahoe NF Motorized Travel Management project area boundary currently has 89,863 acres of early seral coniferous forest habitat and 402,539 acres of mid-seral coniferous forest habitat. Habitat is comprised of various age classes ranging from sparse seeding coniferous forest (1S) to pole size trees with dense canopy cover (3D) within the early seral habitat, and from small tree sizes with sparse cover (4S) to small tree sizes with dense cover (4D) in the mid-seral habitat type. Motorized routes within mountain quail habitat may lead to changes in behavior and may ultimately result in reduced reproductive success for mountain quail.

Direct and Indirect Effects

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

Overall, the change is the class of vehicles would not likely have an effect to mountain quail habitat, since the change in class of vehicles on existing motorized routes will generally not affect or alter mountain quail habitat condition. In general, some smoothed surfaced roads may become rough surfaced roads through changed road maintenance. In addition, some existing motorized NFTS roads may receive different maintenance resulting in higher vegetation density at the road margins which would provide additional cover and/or foraging habitat. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives.

Wet weather seasonal restrictions: Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where mountain quail habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted during the wet weather season. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, the mountain quail habitat effectiveness would not be enhanced when native surfaced motorized routes are under wet weather seasonal restrictions. Under Alternative 1, continued cross country travel, including use on existing motorized trails un-authorized for motorized use, would result in the greatest amount of disturbance to mountain quail within early and mid seral coniferous forest habitats.

Prohibition of Cross Country Travel: Under Alternative 1, cross country travel would continue, affecting 344,961 acres of early seral and mid seral coniferous forest habitats combined, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the mountain quail. For the action alternatives, cross country travel would be prohibited on 344,961 early and mid seral coniferous forest acres, where disturbance, avoidance, abandonment would be reduced or eliminated.

Proposed Motorized Trail Additions to the National Forest Transportation System (NFTS): Tables 3.03-31 and 3.03-32 display the proportion of early and mid seral coniferous forest affected by the alternatives within a 200-meter zone of influence of motorized routes. Based on the amount of early and mid seral coniferous forest habitat affected within a 200-meter zone of influence of motorized routes, Alternative 1, no action, results in the greatest amount of both early seral (23,775 acres or 4.4% of Sierra Nevada-wide habitat) and mid seral (69,224 acres or 2.5% of Sierra Nevada-wide habitat) coniferous habitat affected. For the action alternatives, Alternative 5 results in the next greatest amount of both early and mid seral habitat affected by proposed motorized trail additions to the NFTS, which affects 6,293 acres (1.2% of Sierra Nevada-wide habitat) and 13,312 acres (0.5% of Sierra Nevada-wide habitat), respectively. The remaining action alternatives affect between 0 acres (Alt 3 – lowest) to 1,399 acres (Alt 2 & Alt 6 - highest) of early seral habitat; and between 0 acres to 2,663 acres of mid seral conifer habitat. For all the alternatives, the proportion of Sierra Nevada-wide early and mid seral habitat affected by motorized routes results in a low risk to habitat security for mountain quail.

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

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

[1]Alternative 1 includes existing motorized trails un-authorized for motorized use that would continue with the continuance of cross country travel.

[2]The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

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

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

[1]Alternative 1 includes existing motorized trails un-authorized for motorized use that would continue with the continuance of cross country travel.

[2]The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Summary of Direct and Indirect Effects

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

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

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

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects 344,961 acres of habitat where cross country travel not prohibited, including within 43% early and mid seral habitat within a 200-meter zone of influence of existing routes motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within approx.41% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within approx.43% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within approx.42% within a 200-meter zone of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within 33% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within 41% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits mountain quail on 344,961 acres of habitat where cross country travel is prohibited, including within. 41% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.

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

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to mountain quail includes mid and early seral coniferous forest habitat within the boundary of the Tahoe NF. Past and current cumulative effects to mountain quail include current and historic grazing of mountain quail habitat; loss of mid and early conifer forest habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 22 active livestock grazing allotments on the west side of the Tahoe NF, including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the mountain quail habitat within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to mountain quail habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally do not increase forage condition for deer because they do not usually result in reducing the canopy cover below 40%, except for group selection harvest treatments on the Sierraville RD. Group selection harvests are expected to increase forage condition and increase forest structural diversity. These thinning treatments may result in the short-term reduction in cover for mountain quail, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have removed mountain quail habitat.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increase in negative interactions between humans and mountain quail. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased disturbance to mountain quail would be expected, particularly during the summer months. Table 3.03-34 summarizes a list of the reasonably foreseeable future projects and their potential direct, indirect, and cumulative impacts.

Table 3.03-34. Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in aspen and oak habitats.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve foraging habitat adjacent to early and mid seral coniferous forest habitat.	Beneficial cumulative impact by improving long-term forage quality.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance.	Slight increase in cumulative impact.
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

Alternative 1 adds the greatest amount to existing cumulative impacts by affecting 26% early seral coniferous forest habitat (23,775 acres out of 89,863 TNF habitat acres) and 17% mid seral coniferous forest habitat (69,224 out of 402,539 TNF habitat acres), totaling 43% of early and mid coniferous forest habitat on the Tahoe NF. Alternative 5 follows, by affecting 7% early seral and 3% mid seral coniferous forest habitats, from proposed motorized trail additions to the NFTS within a 200 meter zone of influence. The remaining action alternatives affect between 0 and 2% early and mid seral coniferous forest habitat combined. Based on the small percentage of habitat affected by the action alternatives, the Tahoe NF Motorized Travel Management Project will not alter the existing trend in early and mid seral coniferous forest habitat important for the mountain quail. Alternative 1 may cause a downward trend mountain quail and may affect the distribution of the species on the Tahoe NF.

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where mountain quail habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted during the wet weather season. The change in the class of vehicles would not effect mountain quail habitat for all of the proposed alternatives. Finally, all the action alternatives would prohibit motorized cross country travel on 34,961 acres of early and mid seral coniferous forest habitat, where mountain quail habitat effectiveness would be enhanced through reduced disturbance and avoidance.

Summary of Mountain Quail Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population

monitoring for the mountain quail; hence, the early and mid seral coniferous forest effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the mountain quail. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 546,000 acres of early seral and 2,766,000 acres of mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend for early seral is slightly decreasing (from 9% to 5% of the acres on National Forest System lands) and the trend for mid seral is slightly increasing (from 21% to 25% of the acres on National Forest System lands).

Population Status and Trend. The mountain quail has been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling, and breeding bird survey protocols, including California Department of Fish and Game hunter survey, modeling, and hunting regulations assessment (CDFG 2004a, CDFG 2004b) and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that mountain quail continue to be present across the Sierra Nevada, and current data at the range wide, California, and Sierra Nevada scales indicate that the distribution of mountain quail populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mountain Quail Trend. The Tahoe NF Motorized Travel Management Project will affect 23,775 acres (3.5% of Sierra Nevada wide habitat) of early seral coniferous forest and 69,775 acres (2.5% of Sierra Nevada-wide habitat) of mid seral coniferous forest habitat important to mountain quail under Alternative 1. The action alternatives will affect between 0 acres and 4,895 acres (Alt 3 & 4 - lowest to Alt 5 - highest) of early seral coniferous habitat, and between 0 acres and 7,987 acres of mid seral coniferous forest habitat. All the action alternatives result in a low percentage of total early and mid seral habitat (0% to 1.3% of Sierra Nevada-wide mid and early seral habitat) affected by motorized routes. Alternative 1, does not prohibit cross country travel, including use on motorized trails un-authorized for motorized use, where approximately 5% early and mid seral coniferous forest combined would be affected at the Sierra Nevada-wide scale. Based upon the low amount of habitat affected, the Tahoe NF Motorized Travel Management Project will not alter the existing trend in early seral and mid seral coniferous habitats, nor will it lead to a change in the distribution of mountain quail across the Sierra Nevada bioregion.

Sooty Grouse (Blue Grouse): Affected Environment

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

Mortality from hunting or trapping: In general, roads facilitate access to hunting of blue grouse. **Fragmentation, Edge and Microclimate Effects**: Roads and motorized trails can also create edge effects

which may alter microclimates near roads which may enhance habitat for these species or may have negligible impacts to their habitat overall.

Disturbance and changes in behavior: Blue grouse may be sensitive to human disturbance. If blue grouse roost sites are disturbed by route associated factors, local blue grouse populations may be negatively impacted.

Summary of Route associated factors to blue grouse:

- Mortality from hunting or trapping as facilitated by road and motorized trail access
- Changes to habitat microclimate associated with the edge induced by roads or motorized trails
- Changes in behavior that may lead to loss of reproductive success due to trail and road associated factors.

Sooty Grouse (Blue Grouse): Environmental Consequences

Habitat/Species Relationship

The sooty grouse was selected as the MIS for late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures less than 40%. Sooty grouse occurs in open, medium to mature-aged stands of fir, Douglas-fir, and other conifer habitats, interspersed with medium to large openings, and available water, and occupies a mixture of mature habitat types, shrubs, forbs, grasses, and conifer stands (CDFG 2005). Empirical data from the Sierra Nevada indicate that sooty Grouse hooting sites are located in open, mature, fir-dominated forest, where particularly large trees are present (Bland 2006).

Habitat Factor(s) for the Analysis: The habitat factor used in this analysis for the action alternatives was the amount of late seral open canopy coniferous forest habitat that fell within the 200-meter zone of influence of proposed motorized trail additions to the National Forest Transportation System (NFTS). For alternative 1, no action, the amount of late seral open canopy coniferous forest habitat that fell within the 200-meter zone of influence of existing motorized trails un-authorized for motorized use was determined. Each alternative was compared to determine the proportion of habitat directly and indirectly affected in relation to the amount of late seral coniferous open canopy forest habitat available at the Sierra Nevada-wide scale.

Current Condition of the Habitat Factor(s) in the Project Area: The project area (Tahoe NF boundary NFS and non NFS lands) currently has 35,389 acres of late seral open canopy coniferous forest habitat. This habitat is comprised of size classes 5S (medium/large tress with sparse canopy cover and 5 (medium/large trees with open canopy cover).

Direct and Indirect Effects to Habitat

Change in Class of Vehicles. Overall, the change is the class of vehicles would not likely have an effect or alter the condition of late seral open coniferous forest habitat for the sooty grouse. In general, some smoothed surfaced roads may become rough surfaced roads through changed road maintenance, but this will not likely result in a measurable change in the condition or amount of sooty grouse habitat at the forest-wide scale. In addition, some existing motorized NFTS roads may receive different maintenance

resulting in higher vegetation density at the road margins which would provide additional cover and/or foraging habitat in localized areas. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives.

Wet Weather Seasonal Restrictions. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where blue grouse habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted during the wet weather season. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, the blue grouse habitat effectiveness would not be enhanced when native surfaced motorized routes are under wet weather seasonal restrictions. Under Alternative 1, continued cross country travel, including on existing motorized trails un-authorized for motorized use, would result in the greatest amount of disturbance to mountain within early and mid seral coniferous forest habitats.

Prohibition of Cross Country Travel. Under Alternative 1, cross country travel would not be prohibited, potentially affecting 17,178 acres of sooty grouse habitat within late seral open canopy coniferous forest, potentially causing disturbance and reducing sooty grouse habitat effectiveness. For the action alternatives, cross country travel would be prohibited on 17,178 acres, where disturbance, avoidance, and disruption would be reduced or eliminated.

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

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

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

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use that would continue with the continuance of cross country travel.

[2] The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Summary of Direct and Indirect Effects

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

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

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

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects 17,178 acres of habitat where cross country travel not prohibited, including within 11% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.11% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% habitat within a 200-meter zone of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.9% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.	Benefits sooty grouse on 17,178 acres of habitat where cross country travel is prohibited, including within approx.10% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.

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

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to blue grouse includes all late seral open canopy coniferous forest habitat within the boundary of the Tahoe NF. Past and current cumulative effects to blue grouse include current and historic grazing of blue grouse habitat; loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the blue grouse within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to blue grouse habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments may not affect habitat for blue grouse because they generally retain at least 40% canopy cover, except for group selection harvest treatments for HFQLG projects on the Sierraville RD. Group selection harvests are expected to increase forage condition and increase forest structural diversity. Some thinning treatments may result in the short-term reduction in cover for blue grouse, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Many recent, current, and future vegetation and fuels reduction projects are improving blue grouse habitat within aspen habitats which are designed to enhance wildlife habitat diversity and foraging condition. Aspen habitats are important for blue grouse. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have removed blue grouse habitat.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Future increases in recreational use on the Tahoe NF is expected, and therefore, increased disturbance, displacement, avoidance, or illegal poaching to blue grouse could be expected, particularly during the summer months. Table 3.03-37 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit re-issuances, and summarizes cumulative impacts to sooty grouse.

Table 3.03-37 Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impact to Sooty Grouse	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover, foraging and reproductive habitat enhancement in aspen and oak habitats.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve riparian and meadow habitat quality used for forage and reproduction.	Beneficial cumulative impact by improving long-term forage quality.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance.	Slight increase in cumulative impact.
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

Alternative 1 poses the greatest cumulative effects to sooty grouse MIS late seral open canopy coniferous habitat on the Tahoe NF where 11% (3,943 acres out of 35,389 Tahoe NF habitat acres) sooty grouse habitat would be affected within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Alternative 5 will cumulatively add 789 acres out of 35,389 acres sooty grouse habitat or approximately 2% of the Tahoe NF late seral open canopy coniferous habitat. Alternatives 2, 4, 6, and 7 will add approximately less than 1% (197 acres out of 35, 389 acres Tahoe NF habitat) to existing cumulative impacts. Alternative 3 does not directly or indirectly affect sooty grouse habitat, and therefore no cumulative impacts will be added under this alternative. The alternatives will not alter existing trend in late seral open canopy coniferous forest habitat.

The change is the class of vehicles will have no effect to sooty grouse habitat, since the change in class of vehicles on existing motorized routes will generally not alter sooty grouse habitat condition. Wet weather seasonal restrictions under Alternatives 4, 5, and 6 on all native surfaced roads and motorized trails would benefit sooty grouse habitat effectiveness through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted. Finally cross country travel would be prohibited on 17,178 acres of sooty grouse habitat with the implementation of the action alternatives where disturbance, avoidance, and abandonment by sooty grouse would be reduced or eliminated. Alternative 1 would have the greatest cumulative impact to sooty grouse habitats, where cross country travel would continue and increase, affecting 17,178 acres of late seral open canopy coniferous forest habitat.

Summary of Sooty Grouse Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the sooty grouse; hence, the late seral open canopy coniferous forest effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the sooty grouse. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 75,000 acres of late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat on National Forest System lands in the Sierra Nevada. The trend is slightly decreasing (from 3% to 1% within the last decade on National Forest System lands).

Population Status and Trend. The sooty grouse has been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling, point counts, and breeding bird survey protocols, including California Department of Fish and Game Blue (Sooty) Grouse Surveys (Bland 1993, 1997, 2002, 2006); California Department of Fish and Game hunter survey, modeling, and hunting regulations assessment (CDFG 2004a, CDFG 2004b); Multi-species inventory and monitoring on the Lake Tahoe Basin Management Unit (LTBMU 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that sooty grouse continue to be present across the Sierra Nevada, except in the area south of the Kern Gap, and current data at the range wide, California, and Sierra Nevada scales indicate that the distribution of sooty grouse populations in the Sierra Nevada north of the Kern Gap is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Sooty Grouse Trend. Under Alternative 1, 13,302 acres (17.7% of Sierra Nevada habitat) of late seral open canopy coniferous forest will be directly or indirectly affected, which could substantially disturb, displace, or cause avoidance to sooty grouse from cross country motorized travel, including on existing motorized trails un-authorized for motorized use. Alternative 1 could result in a downward habitat trend for the sooty grouse.

The action alternatives all result in a low risk to blue grouse security habitat, where between 0 acres and 2,046 acres (or 0 and 2.7% of Sierra Nevada-wide habitat) are influenced by proposed motorized trail additions to the NFTS. The Tahoe NF Motorized Travel Management Project action alternatives will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of sooty grouse across the Sierra Nevada bioregion.

Late-seral Closed Canopy Forest Associated Species: Affected Environment

The late seral coniferous forest group is comprised of the California spotted owl (*Strix occidentalis occidentalis)*, northern goshawk (*Accipiter gentilis*), great gray owl (*Strix nebulosa*), American marten (*Martes americana*), Pacific fisher (*Martes pennanti*), and coniferous forest birds (brown creeper (*Certhia americana*). These species are associated with late-seral forests (closed and open canopy) that can be impacted by activities associated with motorized trails and roads. Gaines et al. (2003), conducted a

literature review where a number of late seral coniferous forest associated wildlife species were identified that were negatively impacted by a variety of road and trail-associated factors. These impacts include habitat loss and fragmentation, road avoidance or displacement, harassment, and others. Growing concern over habitat fragmentation for late seral coniferous forest associated species has been expressed by individuals, environmental groups, and agency biologists. In addition, studies have shown that species within this group are sensitive to disturbance.

According to the Sierra Nevada Forest Plan Amendment (2004), which amends the Tahoe NF Land and Resource Management Plan (1990), habitat types that are important for late seral coniferous forest associated species (spotted owl, goshawk, marten, and fisher.) are California Wildlife Habitat Relationship (CWHR) 4M, 4D, 5M, 5D, and 6 vegetation types (stands of trees ≥11" dbh with >40% canopy cover). In addition, the Sierra Nevada Forest Plan Amendment provides broad management direction for Old Forest Emphasis Areas where they are "managed to maintain or develop old forest habitat in areas containing the best remaining large blocks or landscape concentrations of old forest and areas that provide old forest functions (such as connectivity of habitat over a range of elevations to allow migration of wide-ranging old-forest-associated species)." Finally, the Tahoe NF developed a Carnivore Network based on suitable and potential suitable habitat for marten and fisher that provides another way of evaluating impacts to late seral coniferous forest species and their habitats.

Summary of trail and road associated impacts to late seral coniferous forest species (Gaines, et al. 2003):

- Mortality or injury resulting from a motorized vehicle running over or colliding with an animal
- Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities
- Changes to habitat microclimate associated with the edge induced by roads or trails
- Reduction in density of snags and down logs due to their removal near roads as facilitated by road and motorized trail access
- Collection of live animals for use as pets (such as amphibians and reptiles) as facilitated by the physical characteristics of roads or trails or by road or motorized trail access
- A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young
- Increase in heart rate or stress hormones when near a road or trail or network of roads or trails

Late Seral Closed Canopy Forest Associated Species: Environmental Consequences

Effects Common to All Late Seral Coniferous Forest Associated Species

Changes in Class of Vehicles: Although responses to motorized vehicle use varies by species and depends upon the type of vehicle, in addition to the intensity, timing, speeds, and amount motorized vehicle use, the specific species responses are not well understood. For this analysis, it is assumed that all

vehicle types result in the same disturbance to all late seral coniferous forest species. Therefore, changes in the class of vehicles would not vary in their effects to late seral coniferous forest associated species for all of the proposed alternatives.

Wet weather seasonal restrictions: Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where old forest species would be benefited through the reduction of noise and disturbance associated with motorized use, especially motorized routes that are within old forest species habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather restrictions on native surfaced motorized routes and therefore, late-seral closed canopied coniferous forest associated species would not benefit from wet weather seasonal restrictions.

Introduction to Analysis Measures for Late Seral Coniferous Forest Associated Species

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

1. **Motorized Route density**: Motorized route density analysis is conducted at a Forest-wide scale to give an approximate coarse measure of habitat effectiveness for late seral coniferous forest species represented in the this group. Motorized route density is presented at two scales, within mature and late seral coniferous forest habitats (CWHR vegetation types 4M, 4D, 5M, 5D, & 6) and Old Forest Emphasis Areas (OFEAs). The type of impacts to old forest associated species depends on the type of motorized route, amount and type of use, and season of use. Although motorized route density thresholds for late seral coniferous forest associated species are not well understood, route densities are presented to compare relative effects between the alternatives.
2. **Zone of influence**: the Zone of Influence is analyzed for each alternative to measure habitat fragmentation and other zonal effects associated with motorized roads and trails including noise disturbance, avoidance, edge effects, mortality, etc. The distance from routes used to calculate the Zone of Influence for selected species in the group was determined from a thorough review of available literature. For all species in this group, a Zone of Influence of 60 meters (length of one tree height of snags) along routes is used to determine the effects of habitat fragmentation from removal of snag and logs along routes for public safety. Delaney et al. (1999) found that late seral coniferous forest associated species, such as the spotted owl, have shown to be sensitive to noise disturbance generated by helicopters within a distance of 100 meters, therefore a 100 meter Zone of Influence was used to represent habitat effectiveness for late-seral forest associated species. A Zone of Influence within 200 meters of OFEAs encompasses a greater array of potential route associated effects to late-seral forest associated species including edge effects, habitat fragmentation, and habitat effectiveness.
3. **Disturbance at a specific site**: Disturbance at a specific site was analyzed for California spotted owl and northern goshawk by the determining the number of miles of proposed motorized routes within Protected Activity Centers. Also, the number of miles occurring within ¼ mile of a reproductive site (nest site or nest grove) were evaluated by alternative under the species discussions for California spotted owl and northern goshawk, since disturbances within ¼ mile of a reproductive site have the potential to disrupt or cause reproductive failure to these species.

Introduction to Cumulative Effects for late seral closed canopy coniferous species

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

For this analysis, cumulative effects are simply the sum total of direct and indirect effects of project alternatives plus past, and reasonably foreseeable future impacts of routes. Adverse cumulative impacts includes all motorized trails un-authorized for motorized use proposed for addition, existing motorized routes on both National Forest System (NFS) lands and non-NFS lands (private), and non-motorized routes. Non-motorized routes are considered to have some impact on old forest species, though they may or may not have similar impacts to motorized routes depending upon the intensity and level of use. Although, all motorized routes are not equal, and generally, routes that are Interstate highways have a higher severity of effect than unpaved motorized routes, this analysis assumes all motorized routes have the same negative impact on old forest species. In all cases, existing routes are nearly constant for all the alternatives and would not vary between the alternatives in a significant way. Routes that are either classified as closed or decommissioned are considered positive cumulative effects since disturbance and habitat fragmentation would no longer occur because routes would become overgrown with vegetation over time and noise disturbance from motorized use would not occur. Reasonably foreseeable impacts of motorized use is considered by assessing the potential for motorized route proliferation for each alternative.

Other cumulative effects to late-seral forest associated species include cumulative effects of vegetation management, fuels reduction, catastrophic wildfires, recreation, grazing and others. These cumulative effects are complex and difficult to quantify over space and time, and are qualitatively described.

Cumulative Effects Boundary in Space and Time

The boundary of the Tahoe NF (including NFS lands and non-NFS lands) is the geographic boundary used for analyzing cumulative effects of motorized vehicle routes on late seral coniferous forest associated species. This area is sufficiently large enough to include home ranges for the species occurring within this group and includes an array of forest vegetation types important to old forest species from low elevations to high elevations including mixed conifer types, true fir types, yellow pine types, lodgepole pine, and subalpine conifer types. The temporal scale used for analyzing is all past and present routes which comprise the current motorized route situation and future routes that may develop within the next 20 years out into the future. This timeframe sufficient analyzes any foreseeable future routes on the Tahoe NF.

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

Analysis Measures

Motorized Route Density in Late Seral Coniferous Forest (CWHR types 4M, 4D, 5M, 5D, & 6): The average route density of all motorized routes were determined within 7th field watersheds for mature/late

seral coniferous or old forest habitat as defined by CWHR types 4M, 4D, 5M, 5D, and 6 on the Tahoe NF for each alternative (Table 3.03-38). Mature and late seral coniferous forest habitats with lower motorized route densities provides higher habitat connectivity (i.e. less habitat fragmentation) than those with greater route densities.

Zone of Influence at 60, 100, and 200 meters

For each of the proposed alternatives, the Zone of Influence within late- successional forest habitat (CWHR 4M, 4D, 5M, 5D, 6) was determined at three scales - within 60 meters, 100 meters, and 200 meters of motorized trails un-authorized for motorized use (Table 3.03-38). The three different scales were used to represent the array of route-associated factors for various species represented in the group. In general, a 60 meter Zone of Influence represents habitat fragmentation to old forest species as it relates to habitat components, such as snag and down log removal along routes for public fuelwood and public safety hazards. Sixty meters represents the maximum height of a tree potentially removed as a hazard tree. Delaney et al. (1999) found that old forest species, such as the spotted owl, have shown to be sensitive to noise disturbance generated by helicopters within a distance of 100 meters, therefore a 100 meter Zone of Influence was used to represent habitat effectiveness for old forest species. Gaines et al. (2003) reported that brown creepers and other forest interior bird species avoided an area within 200 meters of motorized routes. Potential impacts within a 200 meter Zone of Influence to late seral coniferous forest associated species includes potential negative impacts including avoidance due to noise disturbance or edge effects, habitat fragmentation, introduction of invasive species (i.e. brown-headed cowbirds), microclimate changes, and others.

Zone of Influence may vary by species and by species responses to route type, level of use and intensity. Since absolute thresholds of concern thresholds for any given species are difficult to determine due to limited research on effects of routes, various zones of influence were selected that would represent the array of responses that route associated factors might influence fitness or distribution of species in the group. Species-specific discussion in relation to the various zones of influence will be discussed in detail.

Direct and Indirect Effects

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

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

Table 3.03-38. Proportion of Late Seral Coniferous Forest Habitat (CWHR types 4M, 4D, 5M, 5D, & 6) with motorized route densities between 0 and 6 miles/square mile (Average motorized route densities within 7th Field Watersheds)

Motorized Route Density (miles/square mile)	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
0 Miles/Square mile	<1%	<1%	<1%	<1%	<1%	<1%	<1%
0-2 Miles/Square mile	17%	26%	27%	26%	25%	25%	26%
2-4 Miles/Square mile	44%	57%	57%	57%	53%	58%	57%
4-6 Miles/Square mile	32%	13%	12%	13%	17%	13%	13%
>6 Miles/Square mile	7%	4%	4%	4%	5%	4%	4%

Zone of Influence at 60, 100, and 200 meters

Zone of Influence at 60 Meters

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

Zone of Influence at 100 Meters

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

Zone of Influence at 200 Meters

Comparing the Zone of Influence at 200 meters of motorized trails un-authorized for motorized use proposed to be added to the NFTS within mature and late seral coniferous forest as classified by CWHR types 4M, 4D, 5M, 5D, and 6, provides a relative indication of how the alternatives affect habitat effectiveness for many late seral coniferous forest associated species, such as forest carnivores (i.e. marten and fisher) and forest coniferous songbird species (i.e. brown creeper). As indicated above, a study by Gaines et al. 2003 indicated that brown creepers and other forest interior bird species avoided an area within 200 meters of motorized routes. Potential impacts within a 200 meter Zone of Influence to late seral coniferous forest associated species includes potential negative impacts including avoidance due to noise disturbance or edge effects, habitat fragmentation, introduction of invasive species (i.e. brown-headed cowbirds), microclimate changes, and others.

Alternative 1 contributes considerably to reduced habitat effectiveness for old forest species where 16% of mature/late seral coniferous forest habitat would be negatively influenced by cross-country motorized travel, including use of existing motorized trails un-authorized for motorized use. Alternative 5 contributes to 3% reduction in habitat effectiveness for old forest associated species, followed by

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

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

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

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

Summary of Direct and Indirect Effects

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

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

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

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects 267,952 acres of late seral coniferous forest habitat where cross country travel not prohibited, including within 16% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Increases fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 13% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits late seral coniferous forest habitat on 267,952 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.

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

Cumulative Effects

Cumulative Effects of Motorized Routes

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

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

60 Meter Zone of Influence

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

Table 3.03-41. Cumulative Effects for Proportion of Late-seral Forest within a 60 meters of All Routes *of* Percent of Late-seral Forest (CWHR 4M, 4D, 5M, 5D, 6) within Zone of Influence of 60 meters of Motorized Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and indirect effects of proposed alternatives							
Proposed motorized additions to NFTS (negative impact)[1]	0%	0%	0%	0%	1%	0%	0%
Existing motorized trails un-authorized for motorized use	6%	0%	0%	0%	0%	0%	0%
Routes unauthorized to motorized public use (positive impact)[3]	0%	6%	6%	6%	4%	6%	6%
Acres prohibited to cross country travel	0	267,695	267,695	267,695	267,695	267,695	267,695
Acres where cross country travel is not prohibited	267,695	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes- NFS lands (negative impact)	15%	15%	15%	15%	15%	15%	15%
Existing motorized routes on private land - non-NFS lands (negative impact)	4%	4%	4%	4%	4%	4%	4%
Existing non-motorized routes (negative impact)[2]	2%	2%	2%	2%	2%	2%	2%
Decommissioned routes (positive impact)	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Total cumulative effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**27%**	**15%**	**15%**	**15%**	**18%**	**15%**	**15%**

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

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

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

100 Meter Zone of Influence

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

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

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

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

200 Meter Zone of Influence

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

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

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

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

Overall Cumulative Effects from Past, Present and Reasonably Foreseeable Future

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System lands and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to late seral coniferous forest associated species within the cumulative effects boundary. See overall cumulative effects for spotted owl for a summary of cumulative effects from past, present, and reasonably foreseeable projects for all species.

Old Forest Emphasis Areas

Analysis Measures

Motorized Route density: Motorized route density analysis is conducted at a Forest-wide scale to give an approximate coarse measure of habitat effectiveness for late seral coniferous forest species represented in Old Forest Emphasis Areas (OFEAs). The type of impacts to old forest associated species depends on the type of motorized route, amount and type of use, and season of use.

Zone of influence: The Zone of Influence is analyzed for each alternative to measure habitat fragmentation and other zonal effects associated with motorized routes and trails including noise disturbance, avoidance, edge effects, mortality, etc. The distance from motorized routes used to calculate the Zone of Influence for OFEAs was determined from a thorough review of available literature. A Zone of Influence of 60 meters (length of one tree height of snags) along motorized routes is used to determine the effects of habitat fragmentation from removal of snag and logs along motorized routes for public safety. Zone of Influence within 200 meters of OFEAs provides encompasses a greater array of potential route associated effects to old forest species including edge effects, habitat fragmentation, and habitat effectiveness.

Direct and Indirect Effects

Motorized Route Density in Old Forest Emphasis Areas (OFEAs)

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

Table 3.03-44. Proportion of Old Forest Emphasis Areas with motorized route densities between 0 miles per square mile and >6 miles per square mile (average motorized route densities within 7th field watersheds)

Route Density (miles/mi^2)	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
0 Miles/Square Mile	<1%	<1%	<1%	<1%	<1%	<1%	<1%
0-2 Miles/Square Mile	17%	28%	28%	28%	27%	27%	28%
2-4 Miles/Square Mile	48%	59%	59%	60%	56%	60%	60%
4-6 Miles/Square Mile	32%	11%	12%	11%	15%	12%	11%
>6 Miles/Square Mile	3%	1%	1%	1%	2%	1%	1%

Zone of Influence in Old Forest Emphasis Areas (OFEAs)

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

Zone of Influence at 60 Meters

A comparison of alternatives for OFEAs indicates Alternative 1 contributes to the most habitat fragmentation (6%) through the loss of snags and down logs within 60 meters of proposed motorized trail

additions to the NFTS. Alternative 5 contributes to the next highest habitat fragmentation within the 60 meter Zone of Influence. Alternatives 2, 3, 4, 6, & 7 do not affect habitat fragmentation through potential loss of snags and logs within a 60 meter Zone of Influence for old forest associated species.

Zone of Influence at 200 Meters

Comparing the Zone of Influence at 200 meters of proposed motorized trails un-authorized for motorized use provides a relative indication of how the alternatives affect habitat effectiveness for late seral coniferous forest associated species within OFEAs. Potential negative impacts within a 200-meter Zone of Influence to late seral coniferous associated species includes avoidance due to noise disturbance or edge effects, habitat fragmentation, introduction of invasive species (i.e. brown-headed cowbirds), microclimate changes, and others. Alternative 1 contributes considerably to reduced habitat effectiveness for old forest species where 22% of OFEAs would be negatively influenced by continued cross-country travel and the associated continued use of existing motorized trails un-authorized for motorized use. Alternative 5 contributes to 5% reduction in habitat effectiveness for old forest associated species, followed by Alternative 2 at 2% reduction in habitat effectiveness. Alternatives 6 and 7 both contribute to 1% reduction in habitat effectiveness for old forest associated species. Alternatives 3 and 4 would not affect overall habitat effectiveness for old forest species within OFEAs.

Summary of Direct and Indirect Effects

Table 3.03-45 summarizes the overall net effect to Old Forest Emphasis Areas (OFEAs) from the proposed actions from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-45. Old Forest Emphasis Areas (OFEAs) - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Trail Additions to NFTS	Negatively affects the greatest proportion of OFEAs at 200 meters (16%) of existing motorized trails un-authorized for motorized use that would not be prohibited with cross country travel.	Negatively affects 1% of OFEAs within 200 meters of proposed motorized trail additions to NFTS	Does not affect late seral coniferous forest habitat, no motorized trail additions to NFTS proposed	Does not affect OFEAs within 200 meters of proposed motorized trail additions to NFTS.	Negatively affects 4% OFEAs within 200 meters of proposed motorized trail additions to NFTS.	Negatively affects 1% of OFEAs within 200 meters of proposed motorized trail additions to NFTS	Does not affect late OFEAs within a 200 meter zone of influence of proposed motorized trail additions to NFTS.
Cross Country Travel	Negatively affects 394,847 acres of OFEAs where cross country travel is not prohibited, including within 16% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 12% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	No effect	No effect	No effect	No effect	No effect	No effect	No effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects 394,847 acres of OFEAs where cross country travel is not prohibited, including within 16% habitat within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Increases fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing routes motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 12% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 15% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.	Benefits OFEAs on 394,847 acres of habitat where cross country travel is prohibited, including within 16% within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Reduces fragmentation.

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

Cumulative Effects OFEAs

Cumulative Effects from Motorized Routes

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

60-Meter Zone of Influence

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

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

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

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

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

200-Meter Zone of Influence

When comparing the relative cumulative effects to OFEAs within a 200-meter Zone of Influence by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions, Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 52%) that poses the greatest risk to habitat connectivity and other negative cumulative impacts associated with motorized routes within OFEAs due to approximately 16% of OFEAs that are influenced by motorized cross-country travel, including continued use of existing motorized trails un-authorized for motorized use. In addition, Alternative 1 would contribute significantly to the continued proliferation of motorized trails un-authorized for motorized use because unmanaged cross-country motorized travel would continue into the future and would have a high likelihood of increasing. Alternative 5 has the second greatest contribution to overall cumulative impacts within OFEAs (cumulative impact score = 44%) primarily due to the percentage of acres impacted by proposed additions of motorized trails to the NFTS. Alternatives 2 and 6 slightly contribute to existing cumulative impacts (overall cumulative impact scores = 41%). No direct or indirect impacts would occur in Alternatives 3, 4 or 7, since no motorized trails within OFEAs would be added to the NFTS, and therefore direct and indirect effects would not be added to existing cumulative effects.

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

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

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cumulative Effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	27%	27%	27%	27%	27%	27%	27%
Existing routes on non-NFS lands (private) (negative impact)	9%	9%	9%	9%	9%	9%	9%
Existing non-motorized routes (negative impact)[1]	4%	4%	4%	4%	4%	4%	4%
Decommissioned routes (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**52%**	**41%**	**40%**	**40%**	**44%**	**41%**	**40%**
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is prohibited (positive impact)	0	394,847	394,847	394,847	394,847	394,847	394,847
Acres of CWHR 4M, 4D 5M 5D, 6 where cross country motorized travel is not prohibited (negative impact)	394,847	0	0	0	0	0	0

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

Overall Cumulative Effects from Past, Present and Reasonably Foreseeable Future

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest system lands and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to late seral coniferous forest associated species within the cumulative effects boundary. See overall cumulative effects for spotted owl for a summary of cumulative effects from past, present, and reasonably foreseeable projects for all late seral coniferous forest species.

Compliance with the Forest Plan and Other Direction

The Record of Decision (ROD) for the 2004 Sierra Nevada Forest Plan Amendment identified the following standards and guidelines applicable to habitat connectivity for old forest associated species, including the California spotted owl, Northern goshawk, American marten, and Pacific fisher.:

- *Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest-associated species (particularly fisher and marten) in biological evaluations (standard and guideline 27).*

  All of the action alternatives reduce fragmentation of old forest habitat. The Biological Evaluation for old forest (late seral) - associated species, including the California spotted owl, Northern goshawk, American marten, and the Pacific fisher determined that the action alternatives for the Tahoe NF Travel Management Project may affect individual species, but would not lead to a downward trend toward federal listing.
- *Assess the potential impact of projects on the connectivity of habitat for old forest associated species standard and guideline 28).*

The analysis conducted as described in the above sections, indicated that the action alternatives all reduce habitat fragmentation for old forest (late seral) – associated species, by prohibiting motorized cross country travel on 394,847 acres within Old Forest Emphasis Areas, 267,952 acres within CWHR 4M, 4D, 5M, 5D, and 6 habitat types, and 396,602 acres within the Tahoe NF Forest Carnivore Network; all which are important habitats for old forest (late seral) associated species.

Alternative 1 complies the least with the LRMP direction for minimizing habitat fragmentation, by allowing the continuance of cross country travel within OFEAs, CWHR 4M, 4D, 5M, 5D, and 6 habitat types, and the Tahoe NF Forest Carnivore Network on over 250,000 acres. In addition, Alternative 1 directly, indirectly, and cumulatively affects the greatest amount of habitat for old forest-associated species from the continuance of cross country travel, including on motorized trails un-authorized for motorized use. Alternative 3 minimizes fragmentation of old forest habitat the most of all the action alternatives since no motorized trail additions to the NFTS are proposed within old forest habitats, and therefore minimizes habitat fragmentation the most of all the action alternatives.

Spotted Owl: Affected Environment

The California spotted owl is designated by the Regional Forester as a Sensitive Species and is identified as a Management Indicator Species on the Tahoe NF. The Tahoe NF has 180 designated California spotted owl Protected Activity Centers. Protected Activity Centers are delineated around spotted owl territorial pairs or territorial individuals. The Sierra Nevada Forest Plan Amendment (2004) provides direction to designate Protected Activity Centers (PACs) and Home Range Core Areas (HRCAs) by using CWHR types 6, 5D, 5M, 4D, and 4M. These CWHR types are in essence considered suitable habitat (nesting and foraging) for California spotted owls. Pure eastside pine types are not considered suitable for California spotted owls. Currently, there are 294,487 acres suitable spotted owl habitat with CWHR types 6, 5D, 5M, 4D, and 4M on the Tahoe NF (not including the pure eastside pine type).

The Tahoe NF has conducted surveys for spotted owl presence and reproductive status across the forest since the early 1980s. Approximately 85% of suitable habitat has been surveyed on the Tahoe National Forest following R-5 USDA Forest Service Protocol. Based on survey results to date, 181 Protected Activity Centers (PACs) and Home Range Core Areas (HRCA) have been designated covering 184,000 acres within the Tahoe NF administrative boundary (Table 3.03-48). PACs and HRCAs are comprised of the best available habitat encompassing approximately 300 and 700 acres, respectively.

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

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

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

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

Year PACs Monitored	Number of PACs monitored
1980	12
1981	21
1982	37
1983	22
1984	8
1985	16
1986	20
1987	35
1988	23
1989	39
1990	60
1991	75
1992	68
1993	21
1994	27
1995	26
1996	36
1997	37
1998	7
1999	16
2000	21
2001	45
2002	57
2003	31
2004	29
2005	26
2006	12

Spotted Owl: Environmental Consequences

Introduction

Gaines et al. (2003) reviewed studies on the northern spotted owl and determined that road and trail associated factors that were likely to affect spotted owls were collisions, disturbance at a specific site, physiological response, edge effects, and snag reduction. These same factors are expected to affect the California spotted owl in a similar way based upon available literature (Verner et al. 1992, Seamans 2005, Blakesley 2003).

Collisions: Collisions with vehicles are known to be a source of mortality for spotted owls. The degree to which this occurs on the Tahoe NF is unknown. However, at least two spotted owls were killed by a vehicle on the Eldorado NF. The risk of spotted owl mortality from illegal shooting is also a possibility, but the degree to which this is happening is unknown as well.

Disturbance at a specific Site and Physiological Response: The Forest Service considers activities greater than 0.25 miles (~400 meters) from a spotted owl nest site to have little potential to affect spotted owl nesting. In addition, Delaney et al. (1999) found that Mexican spotted owls were found to show an alert response to chainsaws at distances less than 0.25 miles. Preliminary study results on a Northern spotted owl study in northern California, indicated that spotted owls did not flush from nest or roost sites when motorcycles were greater than 105 meters away during the post-fledgling period (Delaney and Grubb 2001). In addition, Delaney and Grubb (2003) found that spotted owl responses to motorcycle noise depended upon an array of complex factors, including sound level and frequency distribution, stimulus distance and event duration, motorcycle type and condition, frequency of motorcycle events, number of motorcycles per group, trail slope, topography, road substrate and condition, and microphone position relative to sound source. In general, motorcycle noise did not appear to affect reproductive success. However, this study is ongoing and impacts of motorcycle noise is not conclusive at this point.

A study by Wasser et al. (1997) found that stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located <0.41 km from a major logging road compared to spotted owls in areas >0.41 km from a major logging road. It is not well understood how elevated stress hormones affect spotted populations. However, Marra and Holberton (1998) reported that chronic high levels of stress hormones (corticosterone) may have negative effects on reproduction or physical condition of individual owls. Swarthout and Steidl (2001) found hikers caused juvenile and adult

spotted owls to flush at <12meters and <24 meters, respectively. Mexican spotted owls did not elicit any response from hikers that exceeded a distance of 55 meters.

Habitat Loss, Fragmentation and Edge Effects: California spotted owls may be affected by edge effects from roads when roads and motorized trails fragment suitable habitat. Several studies indicate the California spotted owl is sensitive to changes in forest canopy closure and habitat fragmentation (Seamans 2005, Blakesley 2003) that could result from a network of roads. Roads and motorized trails can result in a reduction in interior forest patch size which decreases the amount of habitat available and increases the distance between suitable interior forest patches for late seral coniferous forest species such as the spotted owl.

Snags and down logs are important habitat components for spotted owls, as well as many other species associated with old forest conditions. Forest system roads and motorized trails can contribute to the fragmentation of old forest habitat components through the reduction of snags and logs. Few snags would be expected to be retained along roads used by the public that are considered to be hazard trees. Hazard trees are those trees that pose a risk of falling on a road or facility including recreational facilities such as campgrounds, trailheads, etc. In addition, the amount of logs and snags along roadsides are expected to be reduced from public fuelwood gathering.

Caveats for determining the alternatives impacts to spotted owl from motorized routes: Although the type and amount of use along the different types of routes may result in different effects to spotted owls, all motorized routes are treated equally in this analysis because the relationship between effects and motorized route type and intensity of use is complex and not well understood.. For example, the type of motorized road or trail likely varies in how roads and motorized trails contribute to spotted owl disturbance and habitat fragmentation: high clearance roads generally receive less use than roads used by passenger vehicles, which would equate to less noise disturbance to owls, and single track motorcycle trails would likely fragment habitat less than would a passenger road due to the narrower width of the single track motorcycle routes that would result in removing less habitat. However, noise generated from motorcycles along trails may contribute to greater noise disturbance to spotted owls than would a 4x4 jeep. Since impacts to spotted owls are not well understood, impacts from all motorized routes, regardless of motorized route type and intensity of use, are treated the same.

Spotted Owl Nesting Habitat (PACs) and Nest Locations

Analysis Measures

Disturbance at a specific site: Disturbance to spotted owl PACs and nest sites is analyzed for the alternatives at two scales - within PACs and within .25 miles of spotted owl Activity Centers or nest sites or nest groves.

1) Protected Activity Centers (PACs): PACs are delineated surrounding each territorial spotted owl activity center detected since 1986. PACs are delineated to include known and suspected nest stands and encompass the best available 300 acres of habitat (2 or more canopy layers, trees in the dominant and co-dominant crown classes averaging 24” dbh or greater, at least 70 percent tree canopy cover, and in descending order of priority, CWHR classes 6, 5D, 5M, 4D, and 4M and other stands with at least 50%

canopy cover). The miles of proposed motorized trail additions to the NFTS within spotted owl PACs is compared to determine how the various alternatives have the potential to impact breeding spotted from noise disturbance and other factors associated with motorized use.

2) A 0.25 miles radius circle of spotted owl Activity Centers (nest or nest stand). Activity Centers represent known spotted owl nesting locations that may include most recently known nest site or nest stand. The miles of proposed motorized trail additions within a 0.25 mile radius of spotted owl Activity Centers is compared by each of the alternatives to display the potential impact to spotted owl breeding sites from noise disturbance and other factors associated with motorized use.

Direct and Indirect Effects to Breeding Spotted Owls (Disturbance at a Specific Site)

Protected Activity Centers

The miles of proposed motorized trails to be added to the NFTS are compared to determine how the various alternatives have the potential to impact breeding spotted from noise disturbance and other factors associated with motorized use.

Table 3.03-50 displays by alternative the total miles of motorized trail additions to the NFTS within spotted owl Protected Activity Centers (PACs), and the number and percentage of PACs affected. Alternatives 3 and 4 do not propose any motorized trail additions to the NFTS within spotted owl PACs. Alternative 1 clearly is a worse case scenario, where cross-country motorized travel, including use on approximately 81 miles of existing motorized trails un-authorized for motorized use, would continue to contribute to direct and indirect impacts to 133 (74%) spotted owl Protected Activity Centers. Alternative 5 proposes approximately 13 miles of motorized trails to be added to the NFTS that would contribute to direct and indirect effects to 34 spotted owl PACs (19%). Alternatives 2 & 6 are similar in their impacts to spotted owl PACs. Alternative 2 proposes approximately 3 miles of motorized trail additions to the NFTS within 11 PACs (6%), while Alternative 6 proposes approximately 3 miles of motorized trails to be added to the NFTS within 10 PACs (6%). Within Alternative 6, four PACs (PC096, PC116, SI015, SI060) are impacted by proposed motorized trail additions to the NFTS ranging from over ¼ mile up to 1 mile per PAC. The remaining six PACs are affected by short spurs that provide access to dispersed recreation sites, totaling less than ¼ mile for Alternative 6.

Table 3.03-50. Miles of Proposed Motorized trail additions to the NFTS within Spotted Owl Protected Activity Centers on the Tahoe NF

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of Proposed motorized trail additons to the NFTS within Spotted Owl Protected Activity Centers (PACs)	0	3.2	0	0	12.5	2.5	2.3
Miles of Existing motorized trails un-authorized for motorized use associated with not prohibiting cross country travel	80.6	0	0	0	0	0	0
Number of Spotted Owl PACs Intersected by motorized trail additions to the NFTS	133	11	0	0	34	10	4
Percent of PACs Affected by motorized trail additions to the NFTS (Total Tahoe NF PACs = 180)	0%	6%	0%	0%	19%	6%	2%
Percent of PACs Affected by continued cross country travel on motorized trails un-authorized for motorized use (N= 180)	74%	0%	0%	0%	0%	0%	0%
Acres of PACs enhanced by prohibition of cross country travel	0	50,712	50,712	50,712	50,712	50,712	50,712
Acres of PACs where cross country travel would not be prohibited	50,712	0	0	0	0	0	0

* Alternative 1 includes existing motorized trails un-authorized for motorized use due to the continuance of cross country travel.

Within 0.25 Mile Radius Circle of Activity Centers (Nest Site or Nest Stand)

When considering the potential effects of the alternatives on breeding spotted owls within a 0.25 mile radius circle (Table 3.03-51), Alternative 1 clearly poses the greatest risk from noise disturbance to breeding owls by allowing motorized cross-country travel to continue, including on approximately 13 miles of existing motorized trails un-authorized for motorized use. Alternative 5 poses the next greatest risk of noise disturbance to breeding owls, where approximately 2 miles of motorized trails would be proposed for addition to the NFTS. Alternatives 3 and 4 do not pose a risk to breeding spotted owls, since no motorized trail additions to the NFTS are proposed within 0.25 mile radius circle of known or suspected nest stands. Alternatives 2, 6, and 7 pose a negligible potential impact to breeding spotted owls, since 0.1 miles of motorized trails or less are proposed to be added to the NFTS within the 0.25 mile radius circle of spotted owl activity centers.

Table 3.03-51. Miles of motorized trails added to the National Forest Transportation System (NFTS) within 0.25 Mile Radius Circle of California Spotted Owl Activity Center (Nest Site or Nest Stand)

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of Proposed motorized trails added to NFTS within 0.25 mile radius circle of Activity Centers (nest site or nest stand)	0	0.1	0	0	2.1	<0.1	<0.1
Miles of Existing motorized trails un-authorized for motorized use associated with Continued Cross Country Travel	12.8	0	0	0	0	0	0
Acres of Cross Country Travel Prohibition within 0.25 miles of Activity Centers	0	18,560	18,560	18,560	18,560	18,560	18,560
Acres of Cross Country travel not prohibited within 0.25 miles of Activity Centers	18,560	0	0	0	0	0	0

* Alternative 1 includes existing motorized trails un-authorized for motorized use due to the continuance of cross country travel.

Cumulative Effects to Breeding Spotted Owl

Cumulative Effects Boundary (space and time)

The cumulative density of motorized routes increases within the larger cumulative effects analysis area that includes private lands within the Forest. The cumulative effects geographic boundary for the California spotted owls includes all spotted owl Protected Activity Centers and their associated Activity Centers (nest site or nest stand) within the boundary of the Tahoe NF. This is an appropriate scale for determining cumulative effects to spotted owls, since the Tahoe NF boundary is sufficiently large which includes 180 spotted owl territories and their home ranges across the Forest. In addition, the Tahoe NF boundary encompasses an array of spotted owl habitat conditions from low elevation to high elevation, including several vegetation types from westside mixed conifer, ponderosa pine, true fir, and eastside mixed conifer. The cumulative effects timeframe is the same as other species - 20 years out into the future and approximately 20 years or more into the past.

General Cumulative Effects of Past and Future Vegetation Management Projects and Wildfires

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on the and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the California spotted owl within the cumulative effects boundary. In its Notice of Finding on a petition to list the California spotted owl, the U.S. Fish and Wildlife Service indicated that loss of habitat to stand replacing wildfires and habitat modification for fuels reduction were the primary risk factors to California spotted owls occurring on NFS lands (USDI Fish and Wildlife Service 2006).

Between 1994 and 2007, four wildfires (Cottonwood, Pendola, Star, and Bassetts) resulted in burning approximately 4,000 acres of spotted owl habitat (1,869 PAC acres; 2,172 HRCA acres outside PACs) affecting 10 spotted owl PACs. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all have resulted in impacts to spotted owl habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels thinning and mastication projects were completed, which were designed to reduce the risk of additional habitat loss to wildfires. These treatments generally do not result in habitat removal, but may result in habitat quality changes. Between 1960 and present, private land harvest within the boundaries of the Tahoe NF has resulted in over 87,000 acres of vegetation treatments including clearcuts, sanitation, shelterwood, and thinning. Much of the private land harvest has resulted in the loss or reduction in spotted owl habitat.

These wildfires and vegetation treatment projects have resulted in a reduction in the amount and quality of spotted owl habitat on the Tahoe NF since 1960.

Thinning projects designed to reduce hazardous fuels will continue to be the primary activity affecting spotted owl habitat on the Tahoe (see Appendix Q, Wildlife Cumulative Effects). Although these treatments may reduce habitat quality (i.e. nesting habitat reduced to foraging habitat), it expected that suitable habitat will be maintained, and it is anticipated that these treatments will reduce the amount spotted owl habitat potentially lost from future stand replacing wildfires (USDA Forest Service 2004). The California Department of Forestry and Fire Protection currently lists approximately 12,000 acres of

private land within the Tahoe NF administrative boundary for which timber harvest plans have been submitted. Timber harvest on private lands is generally more intensive and does not typically maintain habitat in a suitable condition for spotted owls.

Assessing Cumulative Effects from Motorized Routes

Cumulative effects to breeding spotted owls are assessed by determining the sum total miles of all motorized routes (proposed and existing) and non-motorized routes on the Tahoe NF including NFS lands and non-NFS lands (private) within spotted owl PACs and within 0.25 mile radius of spotted owl Activity Centers. For each alternative, cumulative effects are calculated by adding the total miles of proposed motorized trail additions to the NFTS (direct and indirect impacts) to the existing motorized routes (NFS lands and non-NFS lands) and non-motorized routes, then subtracting any routes that are either classified as “motorized trails un-authorized for motorized use” or “decommissioned.” Motorized trails un-authorized for motorized use and decommissioned routes are subtracted from the total of all motorized routes because these routes would not receive motorized use, and therefore would not contribute to noise disturbance to breeding spotted owls. Although non-motorized routes are likely to have lesser impacts to spotted owls compared to motorized routes, non-motorized routes are included in this analysis because non-motorized routes potentially may pose some level of disturbance to nesting owls depending on the level and duration of use during the breeding season.

Cumulative Effects to Breeding Owls within Protected Activity Centers

When considering the cumulative effects of all motorized and non-motorized routes on both National Forest System lands and non-National Forest System lands, Alternative 1 has the greatest cumulative miles of routes (298 miles) within spotted owl PACs on the Tahoe NF, and therefore poses the greatest overall potential risk and cumulative impacts to breeding spotted owls on the Tahoe NF (Table 3.03-52). Given the magnitude of potential effects upon spotted owl nest sites and habitat, and considering the projections for future increases in recreation uses and OHV activity, Alternative 1 may, over time, contribute to cumulative effects upon spotted owl populations. Because Alternative 1 does not prohibit public motor vehicle cross-country travel on 56,540 acres of spotted owl PACs, it is expected that cumulative effects to spotted owl PACs would increase with the continued increased route proliferation in the future.

Alternative 5 has the next highest cumulative impact to breeding spotted owls, which cumulatively has approximately 230 miles of routes, both motorized and non-motorized. Alternatives 2, 6, & 7 have similar cumulative impacts to breeding spotted owls, where total cumulative route miles are approximately 220 miles. Alternatives 3 and 4 do not add to existing cumulative impacts, since no motorized trails within PACs are proposed to be added to the NFTS. All the action alternatives would benefit from prohibiting cross country travel on 56,540 acres within spotted owl PACs.

Table 3.03-52. Cumulative Miles of Motorized and Non-motorized Routes within Spotted Owl Protected Activity Centers

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Miles of proposed motorized trail additions to NFTS (negative impact)[1]	0	3.2	0	0	12.5	2.5	2.3
Miles of existing motorized trails un-authorized for motorized use associated with cross country travel (negative impact)	80.1	0	0	0	0	0	0
Miles of motorized trails prohibited to motorized use (positive impact)	<1	77	80.1	80.1	68	78	78
Acres of Spotted Owl PACS where cross country travel is prohibited (positive impact)	0	50,712	50,712	50,712	50,712	50,712	50,712
Acres of Spotted Owl PACS where cross country travel is not prohibited (positive impact)	50,712	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Miles of Existing Routes on NFS lands (negative)	189	189	189	189	189	189	189
Miles of Existing Routes on non NFS lands (private) (negative)	8	8	8	8	8	8	8
Miles of Non-motorized routes (negative)	20	20	20	20	20	20	20
Miles of Decommissioned Routes (positive)	5	5	5	5	5	5	5
Net Cumulative Effect[2]							
Miles of All Motorized Routes witin PACs (overall negative cumulative effect)	**297.6**	**220.2**	**217**	**217**	**229.5**	**219.5**	**219.3**
Acres of Spotted Owl PACS where cross country travel is prohibited (positive cumulative effect)	**0**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**
Acres of Spotted Owl PACS where cross country travel is not prohibited (negative cumulative effect)	**50,712**	**0**	**0**	**0**	**0**	**0**	**0**

[1]Alternative 1 includes existing motorized trails un-authorized for motorized use with the continuance of cross country travel.

[2] Net Cumulative Impact = Sum Total of Impacts both positive and negative

0.25 mile Radius Circle of Activity Centers (Nest Site or Nest Stand)

When analyzing the cumulative effects within the 0.25 mile radius circle of spotted owl activity centers (nest site or nest stand), it can be noted that a similar theme emerges as compared to the cumulative effects of the proposed alternatives within PACs. Alternative 1 has the most cumulative miles (127 miles) of motorized and non-motorized routes compared to the rest of the alternatives (range 95 to 100 miles) (Table 3.03-53). Alternatives 2, 3, 4, 6, and 7 each have approximately 95 cumulative route miles within the 0.25 mile radius analysis circle; however, the actual miles of proposed additions of motorized trails un-authorized for motorized use, potentially affecting an owl nest site or nest grove site, is very low (range 0 miles to 0.2 miles). Therefore, it can be concluded that implementing alternatives 2, 3, 4, 6, or 7 would have very little additional cumulative impact to spotted owl PACs on the Tahoe compared to Alternative 1. Alternative 1 clearly poses the greatest cumulative risk to nesting spotted owls by allowing continued cross-country motorized travel, including motorized travel on approximately 32 miles of existing motorized trails un-authorized for motorized use, followed by Alternative 5, which proposes to add 5 miles of motorized trails to the NFTS within 0.25 miles of activity centers.

Table 3.03-53. Cumulative Miles of Motorized and Non-motorized Routes within a .25 Mile Radius Circle of Spotted Owl Activity Centers (Nest/Roost Sites)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Miles of proposed motorized trail additions to NFTS (negative impact)	0	0.2	0	0	5.4	0.2	0.2
Miles of Existing motorized trails un-authorized for motorized use where cross country travel would not be prohibited (negative impact)	32.1	0	0	0	0	0	0
Miles of motorized trails where use would be prohibited (positive impact)	0.0	31.9	32.1	32.1	26.8	31.9	32.0
Acres within 0.25 mile radius circle of Spotted owl Activity Centers where cross country travel is prohibited (positive impact)	0	18,560	18,560	18,560	18,560	18,560	18,560
Acres within 0.25 mile radius circle of Spotted owl Activity Centers where cross country travel is not prohibited (negative impact)	18,560	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Miles of existing motorized routes - NFS lands (negative impact)	77.7	77.7	77.7	77.7	77.7	77.7	77.7
Miles of existing routes on non-NFS lands (private) (negative impact)	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Miles of existing non-motorized routes (negative impact)	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Miles of decommissioned routes (positive impact)	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Net Cumulative Effect[2]							
Miles of All Motorized Routes (overall negative impacts)	127.0	94.9	94.7	94.7	100.3	94.7	94.7
Acres within 0.25 mile radius circle of Spotted owl Activity Centers where cross country travel is prohibited (positive impacts)	0	18,560	18,560	18,560	18,560	18,560	18,560
Acres within 0.25 mile radius circle of Spotted owl Activity Centers where cross country travel is not prohibited (negative impact)	18,560	0	0	0	0	0	0

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use associated with the continuance of cross country travel.

[2] Net Cumulative Impact = Sum Total of Impacts both positive and negative

Summary of Cumulative Effects to Breeding Spotted Owls

An analysis of breeding spotted owls on the Tahoe NF at two scales (within PACs and within a 0.25 mile radius circle), indicates that cumulative effects are considerably greater in Alternative 1 (No Action) compared to all the other action alternatives. In addition, under Alternative 1, unmanaged cross country motorized travel would continue to occur, and potentially pose even greater threats to breeding spotted owl populations on the Tahoe NF. Under all of the other alternatives, cross-country motorized travel would be prohibited.

Spotted Owl Habitat Fragmentation and Edge Effects

Analysis Measures

Zone of Influence within PACs and HRCAs: In addition to determining the habitat fragmentation within CWHR types 4M, 4D, 5M, 5D, & 6, described previously, zones of influence were determined within spotted owl PACs and HRCAs at three scales - within 60 meters, 100 meters, and 200 meters of motorized routes.

Direct and Indirect Effects

Zone of Influence within PACs

Habitat fragmentation and edge effects were described for late seral coniferous forest associated species within late seral coniferous forest types (CWHR types 4M, 4D, 5M, 5D, & 6) and within Old Forest Emphasis Areas (OFEAs) under the section "Effects Common to All Late Seral coniferous forest Associated Species." Those analyses provided a forest-wide view of how the project alternatives affect spotted owl habitat fragmentation within late seral coniferous forest habitats and OFEAs. This section provides a focused analysis of spotted owl habitat fragmentation and edge effects (including noise disturbance) from motorized routes at the site-specific PAC scale, where known spotted owl nest territories are located.

Zone of Influence at 60, 100, and 200 meters

Spotted owl Protected Activity Centers (PACs) are delineated land allocations (SNFPA 2004), comprised of the best available spotted owl habitat, which are managed specifically for sustaining viable populations of spotted owls. For all spotted owl PACs on the Tahoe NF, the effects of the project alternatives are analyzed for the amount of habitat fragmentation and edge effects occurring by considering the Zone of Influence within PACs at three spatial scales - within 60 meters, 100 meters, and 200 meters of motorized trails un-authorized for motorized use (Table 3.03-54). The 60 meters Zone of Influence represents habitat fragmentation to the spotted owl as it relates to habitat components, such as snag and down log removal along routes for public fuelwood and public safety hazards. Since absolute noise disturbance thresholds of concern for California spotted owls has not been established, the best available science indicates that 100 meters and 200 meters may be important noise disturbance thresholds for spotted owls and other birds of prey (Delaney 1999, Delaney and Grubb 2001, Delaney and Grubb 2003).

Zone of Influence at 60 Meters

A comparison of alternatives within spotted owl PACs on the Tahoe NF indicates Alternative 1 contributes to the most habitat fragmentation (7%) through the loss of snags and down logs within 60 meters of existing motorized trails un-authorized for motorized use which would be expected to continue to be used under continued cross-country travel. Alternative 5 contributes to the next highest habitat fragmentation (1%) within the 60 meter Zone of Influence within mature and late seral coniferous forest habitat. Alternatives 2, 6, & 7 affect an insignificant amount (<1%) of spotted owl PACs and, therefore, overall fragmentation would not be affected. Alternatives 3 and 4 do not propose any additions of

motorized trails un-authorized for motorized use within 60 meters of PACs and, therefore, would not affect habitat within spotted owl PACs through the potential loss of snags and logs within a 60-meter Zone of Influence.

Zone of Influence at 100 Meters

The spotted owl has been shown to be sensitive to noise disturbance generated by helicopters within a distance of 100 meters (Delaney et al. 1999). At a 100-meter Zone of Influence, Alternative 1 adversely reduces spotted owl habitat effectiveness within PACs by 11% of spotted owl PACs. Alternative 5 reduces habitat effectiveness of spotted owl PACs by 2%. Alternatives 2, 3, 4, 6, and 7 do not pose a concern for habitat fragmentation within spotted owl PACs across the Tahoe NF within a 100-meter Zone of Influence. Less than 1% of habitat within PACs would be affected by the addition of motorized trails to the NFTS in Alternatives 2, 6 and 7.

Zone of Influence at 200 Meters

Comparing the Zone of Influence at 200 meters of proposed motorized trail additions to the NFTS, within spotted owl PACs shows Alternative 1 reduces habitat effectiveness for spotted owls considerably at 20%. Alternative 5 contributes to 3% reduction in habitat effectiveness of spotted owl PACs. Alternatives 2 and 6 reduce habitat effectiveness within PACs by 1% or less. Alternatives 3 and 4 would not effect overall habitat effectiveness of spotted owl PACs since no motorized trails un-authorized for motorized use are proposed in spotted owl habitat within PACs.

Table 3.03-54. Proportion of California spotted owl PACs within 60, 100, and 200 Meters of Proposed Motorized Route Additions

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Percent of spotted owl PACs within a 60 meter Zone of Influence of Proposed Additions of motorized trails to the NFTS	7%	<1%	0%	0%	1%	<1%	<1%
Percent of spotted owl PACs within a 100 meter Zone of Proposed Additions of motorized trails to the NFTS	11%	<1%	0%	0%	2%	<1%	<1%
Percent of spotted owl PACs within a 200 meter Zone of Influence of Proposed Additions of motorized trails to the NFTS	20%	1%	0%	0%	3%	1%	<1%

*Alternative 1 includes existing motorized trails un-authorized for motorized use with the continuance of cross country travel.

Cumulative Effects to Habitat Fragmentation and Edge Effects within California Spotted Owl PACs

Zone of Influence at 60, 100, and 200 meters

The cumulative effects to spotted owl PACs within a 60-, 100-, 200-meter Zone of Influence are compared for the proposed alternatives (Tables 3.03-55., 3.03-56, and 3.03-57).

60-Meter Zone of Influence

When comparing the relative cumulative effects to spotted owl PACs within a 60-meter Zone of Influence (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past,

present, and future actions), Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 23%) and, therefore, poses the greatest risk to spotted owl PAC habitat fragmentation through potential loss of snags and down logs that may be removed for public safety along motorized and non-motorized routes. In addition, Alternative 1 would contribute significantly to the proliferation of motorized trails un-authorized for motorized use because unmanaged cross country motorized travel would continue into the future and has a high likelihood of increasing. Alternative 5 slightly increases cumulative impacts from habitat fragmentation within spotted owl PACs (cumulative impact score = 17%) where 1% of spotted owl PACs would be influenced by the addition of motorized trails to the NFTS. Alternatives 2, 3, 4, 6, and 7 do not add to cumulative effects or add a nominal impact, since less than 1% are proposed for addition to the NFTS that influence PACS within 60 meters of proposed motorized trails to be added to the NFTS. In addition, under the action alternatives, cross country travel would be prohibited, including on motorized trails un-authorized for motorized use, affecting 6% to 7% of PACs. In addition the prohibition of cross country travel would enhance habitat effectiveness within 50,712 acres within all PACs.

Table 3.03-55. Cumulative Effects - Percent of Spotted Owl Protected Activity Centers within 60 meter Zone of Influence of All Routes

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Proposed motorized trail additions to NFTS (negative impact)[1]	0%	<1%	0%	0%	1%	<1%	<1%
Miles of Existing motorized trails un-authorized for motorized use, where cross country travel is not prohibited (negative impact)	7%	0%	0%	0%	0%	0%	0%
Miles of motorized trails un-authorized for motorized use, where cross country travel would be prohibited (positive impact)	0%	7%	7%	7%	6%	7%	7%
Acres of Spotted owl Activity Centers, where cross country travel is prohibited (positive impact)	0	50,712	50,712	50,712	50,712	50,712	50,712
Acres of Spotted owl Activity Centers, where cross country travel is not prohibited (negative impact)	50,712	0	0	0	0	0	0

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	14%	14%	14%	14%	14%	14%	14%
Existing routes on non-NFS lands (private) (negative impact)	1%	1%	1%	1%	1%	1%	1%
Existing non-motorized routes (negative impact)[2]	1%	1%	1%	1%	1%	1%	1%
Decommissioned routes (positive impact)	0%	0%	0%	0%	0%	0%	0%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**23%**	**16%**	**16%**	**16%**	**17%**	**16%**	**16%**
Acres of spotted PACs where cross country travel is prohibited (positiive impact)	**0**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**
Acres of Spotted owl Activity Centers, where cross country travel would continue (negative impact)	**50,712**	**0**	**0**	**0**	**0**	**0**	**0**

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use associated with the continuance of cross country travel.

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

100-Meter Zone of Influence

Table 3.03-56 displays the relative cumulative impacts for each of the alternatives within a 100- meter Zone of Influence. Comparing the relative cumulative effects to spotted owl PACs within a 100-meter Zone of Influence (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions) indicates that, Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 36%) and, therefore, poses the greatest risk to habitat connectivity and edge effects associated with routes within spotted owl PACs. In Alternative 1, approximately 11% of PAC acres are influenced by the continued use of existing motorized trails un-authorized for motorized use associated with the continuation of cross-country motorized travel,. In addition, Alternative 1 would contribute significantly to the continued proliferation of motorized trails un-authorized for motorized use because unmanaged cross-country motorized travel would continue into the future and would have a high likelihood of increasing. Alternative 5 has the second greatest contribution to overall cumulative impacts within spotted owl PACs on the Tahoe NF (cumulative impact score = 27%), due to 2% of acres impacted by proposed additions of motorized trails to the NFTS. Alternatives 2, 3, 4, 6 and 7 either do not add or only minimally add to existing cumulative impacts within 100 meters of spotted owl PACs across the Tahoe NF.

Table 3.03-56. Cumulative Effects - Proportion of Spotted Owl Protected Activity Centers within 100 meters Zone of Influence of All Routes

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Proposed motorized trail additions to the NFTS (negative impact)	0%	<1%	0%	0%	2%	<1%	<1%
Miles of Existing motorized trails un-authorized for motorized use, where cross country travel would not be prohibited (negative impact)	11%	0%	0%	0%	0%	0%	0%
Miles of motorized trails un-authorized for motorized use, where cross country travel would be prohibited (positive impact)	0%	11%	11%	11%	9%	11%	11%
Acres of spotted PACs where cross country travel would not be prohibited (negative impact)	0	50,712	50,712	50,712	50,712	50,712	50,712
	50,712	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	21%	21%	21%	21%	21%	21%	21%
Existing routes on non-NFS lands (private) (negative impact)	2%	2%	2%	2%	2%	2%	2%
Existing non-motorized routes (negative impact)[1]	2%	2%	2%	2%	2%	2%	2%
Decommissioned routes (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**36%**	**25%**	**25%**	**25%**	**27%**	**25%**	**25%**
Acres of spotted PACs where cross country travel is prohibited (positiive impact)	**0**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**
Acres of spotted PACs where cross country travel is not prohibited (negative impact)	**50,712**	**0**	**0**	**0**	**0**	**0**	**0**

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use with the continuance of cross country travel.

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

200 Meter Zone of Influence

Table 3.03-57 displays the cumulative effects of the proposed alternatives of motorized and non-motorized routes on NFS and non-NFS lands. When comparing the cumulative effects of routes to spotted owl PACs within a 200 meter Zone of Influence (by summing the direct and indirect effects of the alternatives and the cumulative effects of past, present, and future actions), Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 59%) and, therefore, poses the greatest risk to habitat connectivity and other negative cumulative impacts (including noise disturbance) associated with continued motorized cross-country travel, including use of existing motorized trails un-authorized for motorized use within spotted owl PACs. In addition, Alternative 1 would contribute to continued route proliferation because unmanaged cross-country motorized travel would continue into the future. Alternative 5 has the second greatest contribution to overall cumulative impacts within PACs (cumulative impact score = 42%), primarily due to the percentage of acres impacted by proposed additions of existing motorized trails un-authorized for motorized use to the NFTS. Alternatives 3 and 4 do not add to existing

cumulative effects, since no routes within 200 meters of PACs would be added to the NFTS. Alternatives 2, 6, and 7 affect 1% or less spotted owl habitat within 200 meters of PACs. In addition, cross country travel including use on existing motorized trails un-authorized for motorized use would be prohibited under all the action alternatives.

Table 3.03-57. Cumulative Effects - Proportion of Spotted Owl Protected Activity Centers within 200 meter Zone of Influence of All Routes

	Alt1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Proposed motorized trail additions to the NFTS (negative impact)[1]	0%	1%	0%	0%	3%	1%	<1%
Miles of Existing motorized trails un-authorized for motorized use, where cross country travel would continue (negative impact)	20%	0%	0%	0%	0%	0%	0%
Miles of motorized trails un-authorized for motorized use, where cross country travel would be prohibited (positive impact)	0%	20%	20%	20%	17%	20%	20%
Acres of spotted PACs where cross country travel is prohibited (positiive impact)	0	50,712	50,712	50,712	50,712	50,712	50,712
Acres of spotted PACs where cross country travel would not be prohibited (negative impact)	50,712	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	32%	32%	32%	32%	32%	32%	32%
Existing routes on non-NFS lands (private) (negative impact)	4%	4%	4%	4%	4%	4%	4%
Existing non-motorized routes (negative impact)[2]	3%	3%	3%	3%	3%	3%	3%
Decommissioned routes (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**59%**	**40%**	**39%**	**39%**	**42%**	**40%**	**39%**
Acres of spotted PACs where cross country travel is prohibited (positiive impact)	**0**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**	**50,712**
Acres of spotted PACs where cross country travel would not be prohibited (negative impact)	**50,712**	**0**	**0**	**0**	**0**	**0**	**0**

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use with the continuance of cross country travel.

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

Cumulative Effects Summary to PACs at 60, 100, and 200 meter Zones of Influence

Cumulative effects of habitat fragmentation within California spotted owl PACs were assessed by determining the amount of spotted owl PACs that are influenced by all routes including both motorized and non-motorized routes on National Forest System lands and non-National Forest System lands. The Zone of Influence at 60, 100, and 200 meters were used to determine potential habitat fragmentation from the influence of noise, edge effects, and habitat alteration associated with motorized and non-motorized routes. Ultimately, Alternative 1 clearly poses the greatest cumulative effects at all three scales (60, 100, and 200 meter of Zone of Influence), followed by Alternative 5. Continued motorized cross-country

travel, including continued use of existing motorized trails un-authorized for motorized use, under Alternative 1 would add to existing cumulative impacts by 7% within PACs at 60 meters and increases to 11% and 20% at 100 and 200 meters Zone of Influence, respectively. Implementing Alternative 1 poses the greatest concern to habitat fragmentation to spotted owl habitat within PACs. Alternative 5 would add to existing cumulative impacts by 1%, 2%, and 3% within a 60-meter, 100-meter, and 200-meter Zone of Influence, respectively. The remaining alternatives only slightly contribute to additional cumulative impacts at all 3 zones of influence, but would not likely affect overall habitat fragmentation within spotted owl PACs at the Forest-wide scale and, therefore, should not affect breeding success for spotted owls on the Tahoe NF.

Direct and Indirect Effects to Fragmentation and Edge Effects within Home Range Core Areas (HRCAs)

Zone of Influence at 60, 100, and 200 meters

Delineated California spotted owl Home Range Core Areas (HRCAs) are comprised of approximately 1,000 acres (including the PAC) of the best available spotted owl habitat (SNFPA 2004). For this analysis, the Home Range Core Area is the approximately 700 acres surrounding the ~300 acre core nest area (PAC). HRCAs are delineated to represent spotted owl foraging habitat, whereas, PACs are delineated as spotted owl nesting habitat.

To evaluate habitat fragmentation, noise disturbance, and edge effects on spotted foraging habitat or HRCAs, the Zone of Influence of proposed motorized routes within spotted owl HRCAs was determined for each alternative within 60, 100, and 200 meters (Table 3.03-58).

Zone of Influence at 60 Meters

A comparison of alternatives within spotted owl HRCAs on the Tahoe NF indicates Alternative 1 contributes to the most habitat fragmentation (7%) through the potential loss of snags and down logs within 60 meters and due to continued cross country travel, including use on existing motorized trails un-authorized for motorized use. Alternative 5 contributes to the next highest habitat fragmentation (1%) within the a 60-meter Zone of Influence within HRCAs. Alternatives 2, 4, 6 and 7 affects less than 1% of all HRCA acres on the Tahoe NF from habitat fragmentation along proposed routes within a 60 meter distance. Alternative 3 does not affect habitat connectivity or habitat fragmentation within HRCAs through the potential loss of habitat components such as snags or down logs.

Zone of Influence at 100 Meters

At a 100 meter Zone of Influence, Alternative 1 adversely reduces spotted owl habitat effectiveness due to habitat fragmentation and noise disturbance within HRCAs by 11%. Alternative 5 reduces habitat effectiveness within spotted owl HRCAs by 2%, followed by Alternative 2 and 6 at 1%. Alternatives 3, 4, and 7 do not pose a concern for habitat fragmentation within spotted owl PACs across the Tahoe NF within a 100 meter Zone of Influence.

Zone of Influence at 200 Meters

Comparing the Zone of Influence at 200 meters of motorized trails to be added to the NFTS within spotted owl HRCAs, shows Alternative 1 reduces habitat effectiveness for spotted owls considerably at 20%. Alternative 5 contributes to 3% reduction in habitat effectiveness within spotted owl HRCAs on the Tahoe NF. Alternatives 2, 4, 6 and 7 reduce habitat effectiveness within HRCAs by 1%. Alternatives 3 would not effect overall habitat effectiveness within spotted owl HRCAs at a 200 meter Zone of Influence.

Table 3.03-58. Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within 60, 100, and 200 Meters influenced by Proposed Motorized Routes

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Percent of spotted owl HRCAs within a 60- meter Zone of Influence of Proposed motorized trail additions to NFTS	7%	<1%	0%	<1%	1%	<1%	<1%
Percent of spotted owl HRCAs within a 100- meter Zone of Proposed motorized trail additions to NFTS	11%	1%	0%	<1%	2%	1%	<1%
Percent of spotted owl HRCAs within a 200- meter Zone of Influence of Proposed motorized trail additions to NFTS	20%	1%	0%	1%	3%	1%	1%

* Alternative 1 includes existing motorized trails un-authorized for motorized use associated with the continuance of cross country travel.

Cumulative Effects to HRCAs

Zone of Influence at 60, 100, and 200 meters

The cumulative effects to spotted owl HRCAs within a 60, 100, 200 meter Zone of Influence are compared for the proposed alternatives (Tables 3.03-59., 3.03-60, and 3.03-61). As previously discussed, the cumulative effects analysis presented here only provides a relative comparison of cumulative effects to spotted owl foraging habitat from motorized and non-motorized routes.

60 Meter Zone of Influence

Comparing the relative cumulative effects to spotted owl HRCAs within a 60-meter Zone of Influence (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions), indicates Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 23%) that poses the greatest risk to spotted owl HRCAs habitat fragmentation through potential loss of snags and down logs that may be removed for public safety along motorized and non-motorized routes (Table 3.03-59). In addition, Alternative 1 would contribute significantly to the proliferation of motorized trails un-authorized for motorized use because unmanaged cross country motorized travel would continue into the future and has a high likelihood of increasing. Alternative 5 has the second greatest overall cumulative impacts from habitat fragmentation within spotted owl HRCAs (cumulative impact score = 17%), followed by Alternatives 2, 3, 4, 6, and 7 (cumulative impact score = 16%). Habitat connectivity within HRCAs would be maintained for all the action alternatives, since these alternatives add 1% or less to cumulative effects of existing, past, and reasonably foreseeable future impacts, since few or no proposed motorized trail additions to the NFTS would affect spotted owl HRCAs across the Tahoe NF within a 60 meter Zone of Influence. In addition, route proliferation would not

continue into the future for all of the action alternatives due to the prohibition of cross country motorized travel.

Table 3.03-59. Cumulative Effects - Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within a 60 meter Zone of Influence of Motorized Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Proposed motorized trail additions to the NFTS (negative impact)	0%	<1%	0%	<1%	1%	<1%	<1%
Continued use of existing motorized trails un-authorized for motorized use (negative impact)	7%	0%	0%	0%	0%	0%	0%
Routes prohibited for motorized use as a result of prohibition of cross country travel (positive impact)	0%	7%	7%	7%	6%	7%	7%
Acres of HRCAs where cross country travel is prohibited (positive impact)	0	98,806	98,806	98,806	98,806	98,806	98,806
Acres of HRCAs where cross country travel is not prohibited (negative impact)	98,806	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	14%	14%	14%	14%	14%	14%	14%
Existing motorized routes on non-NFS lands (private) (negative impact)	1%	1%	1%	1%	1%	1%	1%
Existing non-motorized routes (negative impact)[2]	1%	1%	1%	1%	1%	1%	1%
Decommissioned routes (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**23%**	**16%**	**16%**	**16%**	**17%**	**16%**	**16%**
Acres of HRCAs where cross country travel is prohibited (positive impact)	**0**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**
Acres of HRCAs where cross country travel is not prohibited (negative impact)	**98,806**	**0**	**0**	**0**	**0**	**0**	**0**

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

100 Meter Zone of Influence

Table 3.03-60 displays the relative cumulative impacts for each of the alternatives within a 100 meter Zone of Influence. Comparing the relative cumulative effects to spotted owl HRCAs within a 100 meter Zone of Influence (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions) indicates that, Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 35%) and, therefore, poses the greatest risk to habitat connectivity and edge effects associated with routes within spotted owl HRCAs. In Alternative 1, by not prohibiting cross-country travel, approximately 11% of HRCA acres are influenced by continued use of existing motorized trails un-authorized for motorized use. In addition, Alternative 1 would contribute significantly to the continued proliferation of motorized trails un-authorized for motorized use because unmanaged cross-country motorized travel would continue into the future and would have a high likelihood of increasing. Alternative 5 has the second greatest contribution to overall cumulative impacts within spotted owl HRCAs on the Tahoe NF (cumulative impact score = 26%). Alternatives 2 and 6 contribute slightly less (25%) to overall cumulative impacts when compared to Alternative 5. Alternatives 3, 4, and 7 do not add

to existing cumulative impacts within spotted owl HRCAs across the Tahoe NF, and, therefore would not affect habitat connectivity within HRCAs.

Table 3.03-60. Cumulative Effects - Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within a 100-meter Zone of Influence of Proposed Addition Motorized Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and indirect effects of proposed alternatives							
Proposed motorized trail additions to NFTS (negative impact)	0	1%	0%	<1%	2%	1%	<1%
Continued use on motorized trails un-authorized for motorized use	11%	0%	0%	0%	0%	0%	0%
Routes prohibited to motorized use as a result of prohibition of cross country travel (positive impact)	0%	11%	11%	11%	10%	11%	11%
Acres of spotted owl HRCAs where cross country travel is prohibited (positive impact)	0	98,806	98,806	98,806	98,806	98,806	98,806
Acres of spotted owl HRCAs where cross country travel is not prohibited (negative impact)	98,806	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	20%	20%	20%	20%	20%	20%	20%
Existing routes on non-NFS lands (private) (negative impact)	2%	2%	2%	2%	2%	2%	2%
Existing non-motorized routes (negative impact)[1]	2%	2%	2%	2%	2%	2%	2%
Decommissioned routes (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**35%**	**25%**	**24%**	**24%**	**26%**	**25%**	**24%**
Acres of spotted owl HRCAs where cross country travel is prohibited (positive impact)	**0**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**
Acres of spotted owl HRCAs where cross country travel is not prohibited (negative impact)	**98,806**	**0**	**0**	**0**	**0**	**0**	**0**

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

200 Meter Zone of Influence

Table 3.03-61 displays the cumulative effects of the proposed alternatives of motorized and non-motorized routes on NFS and non-NFS lands within spotted owl HRCAs. When comparing the cumulative effects of routes to HRCAs within a 200 meter Zone of Influence (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions), Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 35%) and, therefore, poses the greatest risk to habitat connectivity and other negative cumulative impacts (including noise disturbance) associated with routes within spotted owl HRCAs. In addition, Alternative 1 would contribute to continued route proliferation on 98,806 HRCA acres because unmanaged cross-country motorized travel would not be prohibited into the future. Overall cumulative effects of the action alternatives are similar (cumulative impact scores range from 24% to 26%). Alternatives 2, 5, 6, and 7 slightly add to cumulative impacts, where 1% of HRCA acres would be influenced by the addition of motorized trails to the NFTS. Alternative 4 minimally adds to existing cumulative effects, since only a small percentage (<1%) of HRCAs would be affected by motorized trail additions to the NFTS.

Alternative 3 would not add to cumulative effects, since no motorized trail additions to the NFTS are proposed. Finally, all cross country travel would be prohibited on 98,806 HRCA acres, including the use on existing motorized trails un-authorized for motorized use that affect approximately 11% of HRCAs within Alternatives 2, 3, 4, 5, 6, and 7.

Table 3.03-61. Cumulative Effects - Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within a 200-meter "Zone of Influence" of Proposed Motorized Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Proposed motorized trail additions to NFTS (negative impact)	0%	1%	0%	1%	3%	1%	1%
Continued use on motorized trails un-authorized for motorized use (negative)	20%	0%	0%	0%	0%	0%	0%
Cross country travel prohibited, including on existing motorized trails un-authorized for motorized use (positive impact)	0%	19%	20%	20%	17%	19%	20%
Acres of spotted owl HRCAs where cross-country travel is prohibited (positive impact)	0	98,806	98,806	98,806	98,806	98,806	98,806
Acres of spotted owl HRCAs where cross-country travel is not prohibited (negative impact)	98,806	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	30%	30%	30%	30%	30%	30%	30%
Existing routes on non-NFS lands (private) (negative impact)	4%	4%	4%	4%	4%	4%	4%
Existing non-motorized routes (negative impact)[1]	4%	4%	4%	4%	4%	4%	4%
Decommissioned routes (positive impact)	2%	2%	2%	2%	2%	2%	2%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**58%**	**39%**	**38%**	**39%**	**41%**	**39%**	**39%**
Acres of spotted owl HRCAs where cross-country travel is prohibited (positive impact)	**0**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**	**98,806**
Acres of spotted owl HRCAs where cross-country travel is not prohibited (negative impact)	**98,806**	**0**	**0**	**0**	**0**	**0**	**0**

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

Cumulative Effects Summary of Habitat Fragmentation and Edge Effects within Spotted Owl HRCAs

The proportion of spotted owl Home Range Core Areas (HRCAs) within a 60-meter, 100-meter, and 200-meter Zone of Influence of all motorized and non-motorized within NFS and non-NFS were determined to assess the cumulative effects from the proposed alternatives. Alternative 1 poses the greatest cumulative effects within spotted owl HRCAs that would be used for foraging spotted owls from route associated factors including noise, edge effects, and habitat fragmentation. Alternative 1 affects approximately 7%, 11%, 20% of spotted owl HRCAs within a 60-meter, 100-meter, and 200-meter Zone of Influence, respectively. In the future, motorized route proliferation would continue at an unknown rate because unmanaged cross-country travel would continue.

Sensitive Species Determinations

The Tahoe NF Biological Evaluation for Birds, Mammals, Amphibians, Reptiles, Fish, and Invertebrates is incorporated by reference (see Appendix L, Wildlife Biological Evaluation). Based on the spotted owl analysis of effects, the Biological Evaluation for the Tahoe NF Travel Management EIS made a determination that implementation of all the actions alternatives may affect spotted owls, but are not likely to lead to a trend toward listing or a loss in population viability.

Although, some habitat fragmentation and edge effects would occur from the action alternatives, none of the action alternatives would likely cause enough fragmentation to be a concern to spotted owl population viability on the Tahoe NF when considering the combined effects of the project alternatives and the additional activities occurring within the cumulative effects analysis area. Based on this information and the findings from U.S. Fish and Wildlife Service, the project alternatives as proposed are not expected to result in a loss of viability or lead to a trend toward Federal listing for the California spotted. The project alternatives will not likely affect Forest-wide spotted owl population trends. In addition, recent studies between off highway vehicles and spotted owls indicate that disturbance associated with off-highway vehicle do not affect reproductive success. However, the uncertainty of long term effects to spotted owls from increasing disturbance from motorized vehicle use poses an unknown risk. Under Alternative 1, cross country travel would continue on 50,712 PAC acres and 98,806 HRCA acres, which could cause long-term chronic effects to spotted owl from factors associated with motorized routes. In addition, the uncontrolled motorized route proliferation over time may contribute to downward spotted owl population trends on the Tahoe NF.

MIS Summary

The California spotted owl was selected as an MIS for late seral closed canopy coniferous forest (5M, 5D, 6M, 6D within ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. The Sierra Nevada Forests Bioregional MIS Report and the Tahoe NF Motorized Travel Management MIS Project-level Report are incorporated by reference.

Based on the MIS analysis conducted, Alternative 1 directly, indirectly, and cumulatively affects the greatest amount of late seral closed canopy coniferous forest with a 200-meter zone of influence of existing motorized trails un-authorized for motorized use, which would continue without prohibiting cross country travel. Alternative 1 reduces habitat effectiveness by 17% (28,200 acres out of 164,957 Tahoe NF habitat acres), with the potential to disturb, cause avoidance, and abandonment of California spotted owl, American marten, and northern flying squirrel. Considering the checkerboard pattern of land ownership within the Tahoe NF boundary, Alternative 1 could cause a downward trend in habitat effectiveness for these species. In addition, the cross country travel would continue and proliferate on 119,091 acres of late seral closed canopy coniferous forest habitat.

Alternative 5 affects approximately 6,807 acres (0.7% of Tahoe NF habitat), and Alternatives 2, 4, and 6 similarly affect 972 acres of late seral closed canopy coniferous forest habitat or 0.1% of Tahoe NF habitat within a 200-meter zone of influence of proposed motorized trail additions to the NFTS. Alternatives 3 and 7 do not affect late seral closed canopy coniferous forest habitat within a 200-meter zone of influence of proposed motorized trail additions to the NFTS. The Tahoe NF Motorized Travel

Management Project action alternatives will not result in a direct or indirect change in the amount of late seral closed canopy coniferous forest habitat affected by motorized routes for all the alternatives. Therefore, habitat effectiveness for these species would be maintained at current levels.

For all the alternatives, the change in the class of vehicles would not directly, indirectly, or cumulatively affect late seral closed canopy coniferous forest habitats or their habitat effectiveness. Wet weather seasonal restrictions on all native surfaced roads and motorized trails under Alternatives 4, 5, and 6 would enhance late seral closed canopy coniferous forest habitat effectiveness for the California spotted owl, American marten, and the northern flying squirrel through the reduced disturbance, avoidance, and abandonment. Finally, the prohibition of motorized cross country travel on 119,091 acres of late seral habitats, would benefit these species over time, thereby preventing the continued cumulative increase in motorized route proliferation in the future.

Summary of Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the California spotted owl; hence, the late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 994,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands in the Sierra Nevada. The trend is slightly increasing (from 7% to 9% within the last decade on National Forest System lands).

Population Status and Trend California spotted owl has been monitored in California and throughout the Sierra Nevada through general surveys, monitoring of nests and territorial birds, and demography studies (Verner et al. 1992; USDA Forest Service 2001, 2004, 2006; USFWS 2006; Sierra Nevada Research Center 2007). Current data at the range wide, California, and Sierra Nevada scales indicate that, although there may be localized declines in population trend [e.g., localized decreases in "lambda" (estimated annual rate of population change)], the distribution of California spotted owl populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trends for the species. Based on the small proportion of late seral closed canopy coniferous forest habitat that is directly, indirectly and cumulatively affected (0% to 3% of Sierra Nevada habitat) by the alternatives, the Tahoe NF Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of California spotted owl across the Sierra Nevada bioregion.

Summary of Direct and Indirect, Impacts to Spotted Owls

When considering all the direct, indirect, and cumulative impact to spotted owls within PACs, within 0.25 miles of activity centers, and within HRCAs, Table 3.03-62 summarizes the overall net effect to California spotted owl from the proposed actions from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-62. California Spotted Owl - Summary of Overall Net Direct, Indirect, and Cumulative Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Trail additions to NFTS	Negatively affects the greatest proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs (i.e. 20% motorized trails un-authorized for motorized use	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H	Does not affect spotted owl PACs, within 0.25 miles of activity centers, and within HRCAs	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H .	Negatively affects a small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 3% H	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H
Cross Country Travel	Negatively affects PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is not prohibited	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 19% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 20% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 19% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 17% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 19% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited public use (i.e., 20% HRCAs would receive reduced impacts within 200 meters of motorized trails un-authorized for motorized use)
	0%	19%	20%	20%	17%	19%	20%
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	No effect	No effect	No effect	No effect	No effect	No effect	No effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is not prohibited. Increases disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.

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

Compliance with the Forest Plan and Other Direction

The Tahoe NF LRMP, as amended by the SNFPA ROD (2004) provided management standards and guidelines for the California spotted owl as follows:

> *Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites (Management Standard & Guideline 82).*

Alternatives under the Tahoe NF Travel Motorized Management Project were evaluated for their potential to disturb California spotted owl nest sites at two scales—(1) within spotted owl Protected Activity Centers (PACs) and (2) within a 0.25 mile radius of known nest sites or activity centers. Analysis of the alternatives indicates Alternative 1 disturbs nest sites the most from allowing cross country travel to continue on 50,712 PAC acres, affecting between 7 to 20% PAC acres within a 60 to 200-meter zone of influence of existing routes unauthorized to motorized public use. Compared to Alternative 1, The action alternatives all reduce overall effects to spotted owl PACs by prohibiting cross country travel, including between 7% to 20% PAC acres within a 60 to 200-meter zone of influence of existing routes unauthorized to motorized public use. Analysis of the alternatives within 0.25 mile of activity centers (i.e. nest sites) indicates a similar pattern as found for spotted owl PACs.

Northern Goshawk: Affected Environment

The northern goshawk is designated as a Forest Service Sensitive Species in Region 5. There are currently 285,695 acres of suitable goshawk habitat on NFS lands within the Tahoe NF as defined by CWHR types 4 M, 4D, 5M, 5D, and 6. Northern goshawk territories are managed on the Tahoe National Forest as Protected Activity Centers (PACs) as prescribed by the Sierra Nevada Forest Plan Amendment (2004). To date, the Tahoe National Forest has 94 known northern goshawk PACs.

Collection, habitat loss or fragmentation, disturbance at a specific site, and edge effects were described by Gaines et al. (2003) as being road and trail-associated factors that potentially affect the northern goshawk.

Collection: The Sierra Nevada Forest Plan Amendment (USDA Forest Service 2001) cited that northern goshawks were harassed and shot in areas where human recreation was concentrated. Additionally, the Forest Service identified illegal harvest may pose a risk to local populations in certain areas. Both illegal and legal harvest have the potential to affect local individual territories that receive repeated visits and harvesting. No specific incidence of illegal goshawk harvest is known from the Tahoe NF area, though local falconers have knowledge of specific goshawk territories on the Forest which are likely getting repeated visitation and harvesting.

Disturbance at a Specific Site: Human disturbance has the potential to cause goshawk to abandon nesting during the nesting and post fledging period (February 15 through September 15). Goshawk initiate breeding when the ground is still covered in snow and sometimes nests are located along roads and trails when they are not yet in use. Additionally, roads and trails provide flight access for goshawk. When the snow melts, these sites can potentially be areas of conflict as these roads and trails are used by people. Joslin and Youmans (1999) recommends maintaining low road densities to minimize disturbance

to goshawk. Grubb et al. (1998) reported that vehicle traffic from roads did not elicit any discernable behavioral response from goshawk at distances exceeding 400 meters (0.25 miles) from nests.

Habitat Loss and Fragmentation and Edge Effects: a network of roads and motorized trails can fragment goshawk habitat by reducing canopy closure (Beier and Drennan 1997, Daw and DeStefano 2001) and by reducing forest interior patch size. However, how habitat fragmentation from roads and trails affects goshawk habitat suitability is not well understood. Generally, the wider the road, the more the fragmentation. Native surfaced roads and trails probably do not pose as much a risk to habitat fragmentation compared to smooth surfaced roads. For obvious reasons, state and federal highways create the greatest habitat fragmentation due to the width of the road and associated edge effects.

Northern Goshawk: Environmental Consequences

Analysis Measures

Disturbance to Breeding Northern Goshawk

The direct and indirect effects to breeding Northern goshawk may be measured by the amount of disturbance that may be generated from noise or other motorized trail and road associated factors within the following:

1) **Protected Activity Centers (PACs)**. PACs are delineated surrounding all known and newly discovered breeding territories on National Forest System lands on the Tahoe NF . PACs are designated to include the latest documented nest site and location of alternate nests (SNFPA 2004). PACs encompass the best available 200 acres of forested habitat which include (1) 2 or more canopy layers, (2) trees in the dominant and co-dominant crown classes averaging 24” dbh or greater; (3) in westside conifer and eastside mixed conifer forest types, stands have at least 70 percent tree canopy cover; and (4) in eastside pine forest types, stands have at least 60 percent tree canopy cover.

2) 0.25 miles radius circle of goshawk Activity Centers (nest or nest stand).

Activity Centers are known nest sites or suspected nest stands. Nest abandonment and failure can result from excessive noise disturbance that may be associated with use of motorized routes.

Direct and Indirect Effects to Breeding Northern Goshawks

Disturbance to Breeding Northern Goshawk

Protected Activity Centers

The miles of proposed motorized trails to be added to the NFTS are compared to determine how the various alternatives have the potential to impact breeding Northern goshawks from noise disturbance and other factors associated with motorized use.

Table 3.03-63 displays the total miles of motorized trails that are proposed to be added to the NFTS within goshawk Protected Activity Centers (PACs) by alternative. It also displays the number and percentage of PACs affected by proposed motorized trail additions to the NFTS for each alternative. There are a total of 97 goshawk PACs designated on the Tahoe NF. Alternative 3 does not propose any motorized trails to be added to the NFTS within goshawk PACs, and therefore, would not cause direct or

indirect effects to breeding goshawk within PACs. Alternative 1 contributes significantly to direct and indirect effects to breeding goshawk, where cross-country motorized travel would continue, including motorized use of over 29 miles of existing motorized trails un-authorized for motorized use, where 68% of goshawk PACs (66 PACs) on the Tahoe NF would be subjected to disturbance from continued use. Alternative 5 proposes approximately 6 miles of motorized trails to be added to the NFTS that would contribute to direct and indirect effects to 18% of the Tahoe NF goshawk PACs (25 PACs). Alternative 6 proposes approximately 1 mile of motorized trail additions to the NFTS (SV-005, TKN-JN, and TKN-5) affecting 3 goshawk PACs (Perazzo Meadow PAC, Wornmill PAC, Castle Valley PAC).;; over 1 mile of additional motorized trails affecting 4 PACs, and approximately ¼ mile of routes accessing dispersed recreation sites affecting 3 PACs.

Alternative 2 would affect a total of 4 goshawk PACs, where approximately 1 mile of motorized trail additions to the NFTS (SV-005, TKN-J9, TKN-J5) would affect 3 PACs (Perazzo Meadow PAC, Wornmill PAC, and Castle Valley PAC. Alternative 6 would include the same impacts as Alternative 2, except route SV-005 within the Perazzo Meadow PAC would not be added to the NFTS. Implementing Alternative 7 would impact 2% of goshawk PACs on the Tahoe NF, where the Wornmill and Castle Valley PACs could be negatively affected with additions of routes TKN-J9 and TKN-J5, respectively.

Table 3.03-63. Miles of Proposed Motorized Trail Additions to the NFTS within Northern Goshawk Protected Activity Centers on the Tahoe NF

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of Proposed motorized trail additions to the NFTS within Goshawk Protected Activity Centers (PACs)	0	1.4	0	0.02	5.8	1.1	0.8
Miles of Existing motorized trails un-authorized for motorized use within Goshawk Protected Activity Centers (PACs) that would continue to be use under cross country travel	29.4	0	0	0	0	0	0
Miles of motorized trails un-authorized for motorized use within Goshawk Protected Activity Centers (PACs) prohibited to motorized use with cross country travel	0	28	29.4	29.4	23.6	28.3	28.6
Number of Goshawk PACs Intersected by motorized trails added to the NFTS	66	4	0	0	17	3	2
Percent of Goshawk PACs Affected by Motorized trail additions to the NFTS (Total Tahoe NF Goshawk PACs = 97)	68%	5%	0%	0	18%	4%	2%
Acres Prohibited to Motorized Cross Country Travel within Goshawk PACs	0	20,036	20,036	20,036	20,036	20,036	20,036
PAC Acres Where Cross Country Travel is not prohibited	20,036	0	0	0	0	0	0

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

0.25 Mile Radius Circle of Goshawk Activity Centers (Nest Site or Nest Stand)

Table 3.03-64 displays the potential effects of the proposed alternatives on breeding goshawk within a 0.25 mile radius circle of goshawk Activity Centers (nest site or nest stand). Alternative 1 poses the greatest risk from noise disturbance to breeding goshawk by allowing continued cross-country motorized travel, including motorized use on over 17 miles of existing motorized trails un-authorized for motorized use within 0.25 miles of goshawk activity centers. Alternative 5 poses the next greatest risk of noise

disturbance from motorized vehicles to breeding goshawk, where approximately 4 miles of motorized trails would be added to the NFTS within the 0.25 mile radius circle of goshawk nest sites. Alternatives 2, 6, and 7 poses the next greatest direct and indirect impacts compared to Alternative 5, where approximately 1 mile of motorized trails within the 0.25 mile radius circle of goshawk activity centers would be added to the NFTS. Alternatives 3 and 4 do not, or only minimally, directly or indirectly affect breeding goshawk, where 0 - <0.1 mile are proposed within 0.25 mile radius circle of known or suspected goshawk nest sites/stands.

Table 3.03-64. Miles of Proposed Motorized Routes within 0.25 Mile Radius Circle of Northern Goshawk Activity Center (Nest Site or Nest Stand)

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of motorized trail additions to the NFTS within 0.25 mile radius circle of Activity Centers (nest site or nest stand)	0	0.7	0	0.01	3.6	0.3	0.2
Continued use on existing motorized trails un-authorized for motorized use	17.6	0	0	0	0	0	0
Acres within 0.25 mile of Activity Centers where cross-country travel is prohibited (positive impact)	0	10,384	10,384	10,384	10,384	10,384	10,384
Acres within 0.25 mile of Activity Centers where cross-country travel is not prohibited (negative impact)	10,384	0	0	0	0	0	0

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

Summary of Direct and Indirect Impacts to Northern Goshawk

When considering all the direct, indirect, and cumulative impact to the northern goshawk within PACs, and within 0.25 miles of activity centers, Table 3.03-65 summarizes the overall net effect to the northern goshawk from the proposed actions from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-65. Northern Goshawk - Summary of Overall Net Direct and Indirect, Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized trail additions to NFTS	Negatively affects the greatest proportion of goshawk habitat within PACs and within 0.25 miles of activity centers, (i.e. 29 miles of motorized trails un-authorized for motorized use affecting 68% of PACs continued with cross country travel	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., approx. 1 mile of proposed route additions affecting 5% of PACs.	Does not affect goshawk habitat within PACs and within 0.25 miles of activity centers	Negatively affects a very small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., 0.02 mile of	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., approx. 6 miles of proposed route additions affecting 18% of PACs.	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., 1 mile of proposed route additions affecting 4% of PACs.	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., approx. 1 mile of proposed route additions affecting 2% of PACs.
Cross Country Travel	Negatively affects 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is not prohibited (i.e. 29.4 miles of motorized routes affects 68% of PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28 miles of motorized trails un-authorized for motorized use within 64% of TNF PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of motorized trails un-authorized for motorized use, within 68% of TNF PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of motorized trails un-authorized for motorized use within 68% of TNF PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 23.6 miles of motorized trails un-authorized for motorized use within 50% of TNF PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28.3 miles of motorized trails un-authorized for motorized use within 64% of PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited public use (i.e., reduces impacts of 28.6 miles of motorized trails un-authorized for motorized use within 66% of PACs)
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	No effect	No effect	No effect	No effect	No effect	No effect	No effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel continues (i.e. 29.4 miles of motorized routes affects 68% of PACs). Increases disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28 miles of motorized trails un-authorized for motorized use within 64% of TNF PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of motorized trails un-authorized for motorized use, within 68% of TNF PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of motorized trails un-authorized for motorized use within 68% of TNF PACs) Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 23.6 miles of motorized trails un-authorized for motorized use within 50% of TNF PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28.3 miles of motorized trails un-authorized for motorized use within 64% of PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited public use (i.e., reduces impacts of 28.6 miles of motorized trails un-authorized for motorized use within 66% of PACs). Reduces disturbance and habitat fragmentation.

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

Cumulative Effects to Breeding Goshawk

Cumulative Effects Boundary (space and time)

The cumulative effects geographic boundary for breeding goshawks includes all goshawk Protected Activity Centers and their associated Activity Centers (nest site or nest stand) within the boundary of the Tahoe NF. This is an appropriate scale for determining cumulative effects to the goshawk, since the Tahoe NF boundary is sufficiently large which includes 97 goshawk territories and their home range. In addition, the Tahoe NF boundary encompasses an array of goshawk habitat conditions from low elevation to high elevation, including several vegetation types including westside mixed conifer, ponderosa pine, true fir (red fir and white fir), eastside mixed conifer, pure eastside pine, lodgepole pine, and subalpine conifer. The cumulative effects timeframe is the same as other species - 20 years out into the future and approximately 20 years or more into the past. In addition, cumulative effects of all past actions are incorporated into the existing condition (see discussion of cumulative effects).

Assessing Cumulative Effects

Cumulative effects to breeding goshawk are assessed by determining the sum total miles of all motorized routes (proposed and existing) and non-motorized routes on the Tahoe NF including NFS lands and non-NFS lands (private) within goshawk PACs and within 0.25 mile radius of goshawk Activity Centers. For each alternative, cumulative effects are calculated by adding the total miles of proposed motorized routes (direct and indirect impacts) with existing motorized routes (NFS lands and non-NFS lands) and non-motorized routes. The ban of cross country travel on motorized trails un-authorized for motorized use and decommissioned routes would result in the number of miles and acreage that would benefit goshawk because motorized use would no longer occur on these routes, since they would become revegetated over time. Although non-motorized routes may have lesser impacts to goshawk compared to motorized routes, non-motorized routes are included in this analysis because human disturbance potentially may pose some level of disturbance to nesting goshawk depending on the level and duration of use during the breeding season. Non-motorized routes associated with high use non-motorized trails, such as the Pacific Crest Trail, may have considerable impacts to goshawk if nest sites are located nearby. Goshawk are known to exhibit territorial behavior, and have been known to dive bomb hikers during critical breeding periods.

Disturbance to Breeding Northern Goshawk

Protected Activity Centers

Considering the cumulative effects of all motorized and non-motorized routes on both National Forest System lands and non-National Forest System lands, indicates Alternative 1 has the most cumulative miles of routes (123 miles) within goshawk PACs on the Tahoe NF, and therefore poses the greatest overall potential risk and cumulative impacts to breeding goshawk on the Tahoe NF (Table 3.03-66). Alternative 5 has the next highest cumulative impact to breeding goshawk, with a cumulative total of 99 miles of routes. Alternatives 2, 6, & 7 have similar cumulative impacts to breeding goshawk, where total cumulative route miles within PACs range between 93 and 95. Alternatives 3 and 4 do not add to existing cumulative impacts, since no motorized routes within goshawk PACs are proposed.

Table 3.03-66. Cumulative Miles of All Routes within Goshawk PACs on Tahoe NF

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Miles of motorized trails added to NFTS (negative impact)	0	1.4	0	0	5.8	1.1	0.8
Miles of motorized trails un-authorized for motorized use, where cross country travel is not prohibited (negative impact)	29.4	0	0	0	0	0	0
Miles of motorized trails un-authorized for motorized use, where cross country travel is prohibited (positive impact)	0	28.0	29.4	29.3	23.6	28.3	28.5
Acres within goshawk PACs where cross-country travel is prohibited (positive impact)	0	20,036	20,036	20,036	20,036	20,036	20,036
Acres within goshawk PACs where cross-country travel is not prohibited (negative impact)	20,036	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Miles of existing motorized routes - NFS lands (negative impact)	85.2	85.2	85.2	85.2	85.2	85.2	85.2
Miles of Existing motorized routes on private land - non-NFS lands (negative impact)	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Miles of Existing non-motorized routes (negative impact)	7.94	7.94	7.94	7.94	7.94	7.94	7.94
Miles of Decommissioned routes (positive impact)	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Total Cumulative Effects							
Total Cumulative Impact = Sum Total of Negative Impacts minus positive impacts	**122.9**	**94.5**	**93.5**	**93.5**	**99.3**	**94.6**	**94.3**
Acres within goshawk PACs where cross-country travel is prohibited (positive impact)	**0**	**20,036**	**20,036**	**20,036**	**20,036**	**20,036**	**20,036**
Acres within goshawk PACs where cross-country travel is not prohibited (negative impact)	**20,036**	**0**	**0**	**0**	**0**	**0**	**0**

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

0.25 mile Radius Circle of Activity Centers (Nest Site or Nest Stand)

When analyzing the cumulative effects within the 0.25 mile radius circle of goshawk activity centers (nest site or nest stand), a similar theme emerges as compared to the cumulative effects of the proposed alternatives within PACs. Alternative 1 has the most cumulative route miles (76 miles) followed by Alternative 5 (62 miles) (Table 3.03-67). Alternatives 2, 3, 4, 6, and 7 have slightly lower cumulative route miles within the 0.25 mile radius analysis circle; however, the actual miles of motorized trails un-authorized for motorized use to be added potentially affecting goshawk nest sites or nest groves, are very low (approximately range 0 to <1 mile) across all goshawk territories on the Tahoe NF. Therefore, it can be concluded that implementing alternatives 2, 3, 4, 6, or 7 would have very little additional cumulative impact to breeding goshawks on the Tahoe compared to Alternative 1. Alternative 1 clearly poses the greatest cumulative risk to nesting goshawk, with continued cross-country motorized travel on 10,384 acres, including continued use on approximately 18 miles of existing motorized trails un-authorized for motorized use within 0.25 mile of goshawk activity centers, followed by Alternative 5, with approximately 4 miles of motorized trails added to the NFTS.

Table 3.03-67. Miles of All Routes within 0.25 mile of Goshawk Activity Centers (nest site or nest stand) on the Tahoe NF

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Miles of motorized trail additions to NFTS (negative impact)	0	0.7	0	0	3.6	0.3	0.2
Miles of existing motorized trails un-authorized for motorized use (negative impact)	17.6	0	0	0	0	0	0
Miles of motorized trails prohibited for motorized use (positive impact)	0.1	17.0	17.7	17.7	14.7	17.5	17.5
Acres within 0.25 mile of goshawk activity center where cross country travel is prohibited (positive impact)	0	10,384	10,384	10,384	10,384	10,384	10,384
Acres within 0.25 mile of goshawk activity center where cross country travel is not prohibited (negative impact)	10,384	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Miles of existing motorized routes - NFS lands (negative impact)	51.1	51.1	51.1	51.1	51.1	51.1	51.1
Miles of existing motorized routes on private land - non-NFS lands (negative impact)	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Miles of existing non-motorized routes (negative impact)	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Miles of decommissioned routes (positive impact)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Total Cumulative Effects							
Net Cumulative Impact = Sum Total of Negative Impacts minus positive impacts							
Miles of routes of motorized public use	**76.0**	**59.1**	**58.4**	**58.4**	**62.0**	**58.7**	**58.6**
Acres within 0.25 mile of goshawk activity center where cross country travel is prohibited (positive impact)	**0**	**10,384**	**10,384**	**10,384**	**10,384**	**10,384**	**10,384**
Acres within 0.25 mile of goshawk activity center where cross country travel is not prohibited (negative impact)	**10,384**	**0**	**0**	**0**	**0**	**0**	**0**

Analysis Measures for Fragmentation and Edge Effects within Northern Goshawk Protected Activity Centers

Zone of Influence within PACs to assess potential habitat fragmentation and edge effects: In addition to determining the habitat fragmentation potential from zones of influence within suitable goshawk habitat within CWHR types 4M, 4D, 5M, 5D, & 6 (See effects to late seral coniferous forest habitats in effects common to all late seral coniferous forest associated species), zones of influence were determined within goshawk PACs at 400 meters (0.25 mile) of proposed motorized routes.

Direct and Indirect Effects to Fragmentation and Edge Effects within Northern Goshawk Protected Activity Centers

Habitat fragmentation and edge effects were described for late seral coniferous associated species within late seral coniferous forest types (CWHR types 4M, 4D, 5M, 5D, & 6) and within Old Forest Emphasis Areas (OFEAs) under the section “Effects Common to All Late Seral Coniferous Associated Species.” Those analyses provided a forest-wide view of how the project alternatives affect spotted owl habitat fragmentation within late seral coniferous forest habitats and OFEAs. This section provides a focused analysis of goshawk habitat fragmentation and edge effects (including noise disturbance) from motorized routes at the site-specific goshawk PAC scale, where known goshawk nest territories are located.

Zone of Influence at 400 meters (0.25 miles)

Goshawk Protected Activity Centers are delineated land allocations (SNFPA 2004), comprised of the best available goshawk habitat, which are managed specifically for sustaining viable populations of goshawks. For all goshawk PACs on the Tahoe NF, the effects of the project alternatives are analyzed for the amount of habitat fragmentation and edge effects are occurring by considering the Zone of Influence within goshawk PACs within 400 meters (0.25 miles) of motorized trails added to the NFTS (Table 3.03-68). Although absolute disturbance thresholds for goshawk are not readily available in the literature, Grubb et al. (1998) reported that goshawk were found to react negatively (flush) when noise associated with logging trucks occurred less than 400 meters (0.25 miles) from nests. Determining the proportion of a goshawk PAC that is influenced by motorized routes within 400- meters (0.25 mile) gives a relative index of habitat fragmentation or habitat effectiveness at the site specific goshawk territory scale.

Comparing the direct and indirect effects to goshawk PACs within a 400-meter Zone of Influence of proposed motorized routes indicates Alternative 1 reduces habitat effectiveness and associated habitat fragmentation (including noise disturbance) within PACs by 34%. Alternative 5 reduces habitat effectiveness of goshawk PACs by 6%. Alternatives 2 and 6 each reduce habitat effectiveness within goshawk PACs by 2%. Alternative 4 and 7 each reduce habitat effectiveness of goshawk PACs by 1%. Habitat effectiveness within goshawk PACs would not be affected by implementing Alternative 3.

Table 3.03-68. Percent of Tahoe NF Goshawk Protected Activity Centers within a 400-meter Zone of Influence of All Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Percent of Goshawk PACs affected by motorized trail additions to NFTS (negative impact)	0%	2%	0%	1%	6%	2%	1%
Percent of Goshawk PACs affected by continued use on existing motorized trails un-authorized for motorized use	34%	0	0	0	0	0	0
Acres of Goshawk PACs where cross country travel is prohibited (positive impact)	0	20,036	20,036	20,036	20,036	20,036	20,036
Acres of Goshawk PACs where cross country travel is not prohibited (negative impact)	20,036	0	0	0	0	0	0

Cumulative Effects within a 400-meter Zone of Influence

Table 3.03-69 displays the cumulative effects of the proposed alternatives in combination with motorized and non-motorized routes on NFS and non-NFS lands. When comparing the cumulative effects of routes within a 400-meter Zone of Influence of goshawk PACs (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions), Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 85%) and, therefore, poses the greatest risk to habitat connectivity and other negative cumulative impacts (including noise disturbance) associated with routes within goshawk PACs. In addition, Alternative 1 would contribute to continued route proliferation on 20,036 PAC acres because unmanaged cross-country motorized travel would continue into the future. Alternative 5 has the second greatest contribution to overall cumulative impacts within

goshawk PACs (cumulative impact score = 61%). Overall cumulative effects of the remaining alternatives are similar (cumulative impact score ranges from 55% to 57%). Alternatives 2 and 6, would increase existing cumulative effects by 2%, and Alternatives 4 and 7 would increase existing cumulative impacts by 1%, from the addition of motorized trails to the NFTS. Alternative 3 does directly or indirectly effect habitat within 400 meter zone of influence within goshawk PACs, and therefore no cumulative impacts would be added to the existing situation. In addition, under the prohibition of cross country travel, including the use on existing motorized trails un-authorized for motorized use, goshawk would benefit 26% to 30% of goshawk PAC acres. Over time, these routes would eventually become revegetated and recover. The rate of recovery would depend on the site specific vegetation and soil conditions. Finally, the prohibition of cross country travel would benefit goshawk on 20,036 PAC acres, where disturbance, avoidance, and abandonment would be reduced.

Table 3.03-69. Cumulative Effects - Proportion of Goshawk Protected Activity Centers within a 400-meter (0.25 mile) Zone of Influence of All Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized trail additions to NFTS (negative impact)[1]	0%	2%	0%	1%	6%	2%	1%
Continued use on existing motorized trails un-authorized for motorized use (negative impact)	34%	0	0	0	0	0	0
Motorized trails prohibited for motorized use (positive impact)[2]	0%	29%	30%	30%	26%	30%	30%
Acres of goshawk PACs where cross country travel is prohibited (positive impact)	0	20,036	20,036	20,036	20,036	20,036	20,036
Acres of goshawk PACs where cross country travel is not prohibited (positive impact)	20,036	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	42%	42%	42%	42%	42%	42%	42%
Existing motorized routes on private land - non-NFS lands (negative impact)	8%	8%	8%	8%	8%	8%	8%
Existing non-motorized routes (negative impact)	5%	5%	5%	5%	5%	5%	5%
Decommissioned routes (positive impact)	4%	4%	4%	4%	4%	4%	4%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**85%**	**57%**	**55%**	**56%**	**61%**	**57%**	**56%**
Acres of goshawk PACs where cross country travel is prohibited (positive impact)	**0**	**20,036**	**20,036**	**20,036**	**20,036**	**20,036**	**20,036**
Acres of goshawk PACs where cross country travel is not prohibited (positive impact)	**20,036**	**0**	**0**	**0**	**0**	**0**	**0**

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

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

Cumulative Effects from Past, Present and Future Vegetation/Fuels Management Projects and Past Wildfires

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on the and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the Northern goshawk within the cumulative effects boundary.

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. The following information summarizes recent past cumulative impacts from wildfires and fuels/vegetation projects that have impacted goshawk habitats.

Between 1994 and 2007, four wildfires (Cottonwood, Pendola, Star, and Bassetts) resulted in burning approximately 4,000 acres of suitable goshawk acres burned affecting 8 goshawk PACs across an estimated 1,300 acres. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all have resulted in impacts to goshawk habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels thinning and mastication projects were completed, which were designed to reduce the risk of additional habitat loss to wildfires. These treatments generally do not result in habitat removal, but may result in habitat quality changes. Between 1960 and present, private land harvest within the boundaries of the Tahoe NF has resulted in over 87,000 acres of vegetation treatments including clearcuts, sanitation, shelterwood, and thinning. Much of the private land harvest has resulted in the loss or reduction in goshawk habitat. These wildfires and vegetation treatment projects have resulted in a reduction in the amount and quality of goshawk habitat on the Tahoe NF since 1960.

Thinning projects designed to reduce hazardous fuels will continue to be the primary activity affecting goshawk habitat on the Tahoe (see Appendix Q, Wildlife Cumulative Effects). Although these treatments may reduce habitat quality (i.e. nesting habitat reduced to foraging habitat), it is expected that suitable habitat will be maintained, and it is anticipated that these treatments will reduce the amount goshawk habitat potentially lost from future stand replacing wildfires (USDA Forest Service 2004). The California Department of Forestry and Fire Protection currently lists approximately 12,000 acres of private land within the Tahoe NF administrative boundary for which timber harvest plans have been submitted. Timber harvest on private lands is generally more intensive and does not typically maintain habitat in a suitable condition for goshawk.

Sensitive Species Determinations

The Tahoe NF Biological Evaluation for Birds, Mammals, Amphibians, Reptiles, Fish, and Invertebrates is incorporated by reference (see Appendix L, Wildlife Biological Evaluation). Based on the northern goshawk analysis of effects, the Biological Evaluation for the Tahoe NF Travel Management EIS made a determination that implementation of all the actions alternatives may affect northern goshawks, but are not likely to lead to a trend toward listing or a loss in population viability.

Although, some habitat fragmentation and edge effects would occur from the action alternatives, none of the action alternatives would likely cause enough fragmentation to be a concern to goshawk population viability on the Tahoe NF when considering the combined effects of the project alternatives and the additional activities occurring within the cumulative effects analysis area. Based on this information, the project alternatives as proposed are not expected to result in a loss of viability or lead to a trend toward Federal listing for the northern goshawk. The project alternatives will not likely affect Forest-wide northern goshawk population trends. However, the uncertainty of long term effects to goshawk from increasing disturbance from motorized vehicle use poses an unknown risk. Alternative 1 could cause long-term chronic effects to northern goshawk from increased motorized route proliferation over time, and therefore may contribute to downward population trends on the Tahoe NF.

When considering the direct, indirect, and cumulative impacts to goshawk, Alternative 1 poses a considerable risk to nesting goshawk on the Tahoe NF where greater than 50% goshawk activity centers would be impacted by continued cross-country travel, including use on existing motorized trails un-authorized for motorized use. Cross-country travel would continue to increase and proliferate. Goshawk are extremely sensitive to human disturbance during the breeding season where continued motorized route proliferation could impact the productivity of nesting goshawk which could cause chronic impacts which may ultimately affect the abundance and distribution of goshawk on the Tahoe NF. Alternative 5 also poses a moderate amount of risk to nesting goshawk, where the addition of motorized trails to the NFTS would influence an additional 17% of goshawk nest sites within ¼ mile. Therefore, Alternatives 1 and 5 could contribute to downward goshawk habitat and population trends over time.

All the remaining action alternatives would influence known goshawk nest sites between 0 and 4% within ¼ mile, and this should not affect the distribution and abundance of goshawk on the Tahoe NF. Therefore, alternatives 2, 3, 4, 6, and 7 do not affect habitat or population trends on the Tahoe NF.

Compliance with the Forest Plan and Other Direction

The Tahoe NF LRMP, as amended by the SNFPA ROD (2004) provided management standards and guidelines for the Northern goshawk as follows:

> *Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites (Management Standard & Guideline 82).*

Alternatives under the Tahoe NF Travel Motorized Management Project were evaluated for their potential to disturb Northern goshawk nest sites at two scales - *(1)* within goshawk Protected Activity Centers (PACs) and *(2)* within a 0.25 mile radius of known nest sites or activity centers. Analysis of the alternatives indicates Alternative 1 disturbs nest sites the most from allowing cross country travel to continue on 20,036 PAC acres, affecting 68% of PACs from 29 miles of existing routes unauthorized to motorized public use. Compared to Alternative 1, the action alternatives all reduce overall effects to goshawk PACs by prohibiting cross country travel on 20,036 PAC acres, where disturbance to 50% (Alt 5 - reduces the least) to 68% (Alt 3 - reduces the most) of PACs would be reduced, including on 23 to 29 miles of existing routes unauthorized to motorized public use. Analysis of the alternatives within 0.25 mile of activity centers (i.e. nest sites) indicates a similar pattern as found for goshawk PACs.

Forest Carnivores: American Marten, Pacific Fisher, Sierra Nevada Red Fox, and Wolverine

Forest Carnivores include the American marten, Pacific fisher, the Sierra Nevada red fox, and Wolverine. The Sierra Nevada red fox and the wolverine are addressed under the Wide-ranging Carnivore Group. This section will focus on the marten and fisher. Impacts to the marten and fisher will be considered together, since effects to these species are similar. More detailed information for these species can be found in the Biological Evaluation and Management Indicator Species reports, which are hereby incorporated by reference. Limited research or information on road and trail impacts to Forest Carnivores is available in the literature, but some information is available as described below for species considered here.

The Tahoe NF developed a Forest Carnivore Network in 1998 by modeling suitable marten and fisher habitat using a focal mean analysis based on the home ranges of marten and fisher. The purpose of the Forest Carnivore Network is to provide a framework for managing and maintaining linkages and connectivity for Forest Carnivore species including the marten, fisher, Sierra Nevada red fox, and the wolverine. Forest Carnivores are considered to be interior Forest Species where habitat fragmentation is a concern.

American Marten and Pacific Fisher: Affected Environment

American Marten

Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersion of riparian areas and meadows. Important habitat attributes are: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1987). Martens selected stands with 40 to 60 percent canopy closure for both resting and foraging and avoided stands with less than 30 percent canopy closure (Spencer et al. 1983). Martens generally avoid habitats that lack overhead cover, presumably because these areas do not provide protection from avian predators (Allen 1982, USDA 1994, Spencer et al. 1983).

At a landscape scale, patches of preferred habitat and the distribution of openings with respect to habitat patches may be critical to the distribution and abundance of martens (USDA 1994). While marten use small openings, and particularly meadows for foraging, these openings must occupy a small percent of the landscape. Martens have not been found in landscapes with greater than 25 percent of the area in openings (Hargis and Bissonette 1999; Potvin et al. 2000). As landscapes become fragmented, the combination of increasing isolation and decreasing patch size of suitable habitat compounds the results of simple habitat loss (Andren 1994). For species like marten, this is likely to result in a decrease of greater magnitude than can be explained solely by the loss of suitable habitat. Marten may be a species that demonstrate exponential population declines at relatively low levels of fragmentation (Bissonette et al. 1997, *in* USDA Forest Service 2004). Gaines et al. (2003) reported than marten may be affected by the following road and motorized trail-associated factors: trapping, collisions, displacement or avoidance, habitat loss or fragmentation, snag reduction, down log reduction, edge effects, movement barrier or filter, and route for competitors. These factors are discussed below.

Pacific Fisher

The Tahoe NF falls within an area considered to be a distribution gap within the range of the fisher (Zielinski et al. 2005). However, roads can impact fisher in ways similar to the marten through direct mortality and habitat fragmentation. Vehicular collision is a known source of fisher mortality (Heinemeyer 1993 In USDA 2001). Approximately 3.4 percent of 147 radio-collared fishers studied in Massachusetts (York 1996) and Maine (Krohn et al. In USDA 1994) were killed by vehicles. The risk of collision mortality increases with road density, but possibly increases with the density of highways and freeways where vehicle speeds are highest.

Suitable habitat for the fisher occurs primarily on the west side of the Tahoe NF. Roads can contribute to habitat fragmentation where the fisher generally avoids entering open areas that have no overstory or shrub cover; roads, and the associated presence of vehicles and humans, can cause animals to modify their behavior near roads (USDA Forest Service 2001). These indirect effects on fisher habitat could negatively affect the ability for fishers to be successfully reintroduced to the Tahoe NF. Previous studies have reported a negative correlation between detections of fisher and roads (Dark 1997, Golightly et al. 2006). Road construction associated with timber harvest activities could directly and indirectly affect fishers. If fishers avoid areas in proximity of roads, then these areas constitute habitat loss. Indirect effects would also include the effects on prey populations that may also avoid or be killed by vehicles.

Summary of road and trail associated factors to marten and fisher:

- Mortality or injury resulting from a motorized vehicle running over or colliding with an animal
- Loss and resulting fragmentation of habitat due to the establishment of roads or trails and associated human activities
- Changes to habitat microclimate associated with the edge induced by roads or trails
- Reduction in density of snags and down logs due to their removal near roads as facilitated by road access
- Collection of live animals for use as pets as facilitated by the physical characteristics of roads or trails or by road or trail access
- A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young
- Increase in heart rate or stress hormones when near a road or trail

Human-caused mortality: Marten are known for their vulnerability to trapping in many parts of their range. In California, however, body-gripping traps have been banned since 1998 and, as a result, the likelihood of incidental capture of marten by legal fur trapping has been dramatically reduced. Illegal harvest threats remain and could increase in relation to greater accessibility. At present, illegal trapping or shooting of marten is not known to be a substantial source of mortality (USDA Forest Service 2001). The increased opportunity for poaching provided by increased public access may represent a substantial risk for fisher, based upon findings in the southern Sierra Nevada. Of nine recently documented fisher

mortalities, two were suspected of being the result of poaching (Truex et al 1998 In USDI Fish and Wildlife Service 2004).

Collision: Highways and roads can result in the direct and indirect mortality of individual martens. Road collisions with vehicles have been identified as a source of marten mortality (Buskirk and Ruggerio 1994), including in the Sierra Nevada (Spencer 1981, Martin 1987). Marten road mortality on the Tahoe NF, may be of concern since Interstate-80, State highways 89, 49, and 20 bisect their habitat. Collisions are much less likely to occur along the slower-speed native surface trails that are being evaluated for addition to the NFTS in this project.

Habitat Loss and Fragmentation, Edge Effects, Movement Barriers, Displacement or Avoidance: Martens are known to be sensitive to changes in overhead cover, such as can result from roads or trails (Hargis and McCullough 1984, USDA 1994). Roads and trails can fragment habitat, thus affecting the ability of marten to use otherwise suitable habitat on either side of the route.

The loss and fragmentation of suitable habitat by roads and development is thought to have played a significant role in both the loss of fisher from the central Sierra Nevada and its failure to re-colonize this area (USFWS 2004). Campbell (2004, *in* USFWS 2004) found that sample units within the central and southern Sierra Nevada region occupied by fishers were negatively associated with road density. This relationship was significant at multiple spatial scales (from 494 to 7,413 acres). The USFWS (2004) concluded that, “vehicle traffic during the breeding season in suitable habitat may impact foraging and breeding activity” and that “hiking, biking, off-road vehicle and snowmobile trails, may adversely affect fishers.” Dark (1997) found that fishers in the Shasta-Trinity National Forest used landscapes with more contiguous, unfragmented forests and less human activity.

Roads can fragment habitat and affect the ability of the animals to use otherwise suitable habitat on either side of the road, and the associated presence of vehicles and humans, can cause animals to avoid otherwise suitable habitats near roads. Robitaille and Aubrey (2000), studied marten in an area of low road density and traffic (primarily logging roads), and found that marten use of habitat within 300 and 400 meters of roads was significantly less than habitat use at 700 or 800 meters distance. Although marten are detected in close proximity to roads, it appears that significantly less marten activity occurs within these zones.

If highways, with their high traffic speeds, jersey barriers, and often steep side-slopes, limit the success and frequency of marten crossings, then effects on marten dispersal may be of concern. Interstate I-80 and state highways 89, 49, and 20 bisect marten habitat. If marten avoid these highways, then marten populations could become fragmented into small isolated populations. In their assessment of connectivity in the California landscape, Penrod et al. (2001) identified Interstate-80 in particular as a threat to wildlife movement, and roads and highways in general as the most common barriers to movement.

Roads may decrease prey and food availability for marten and fisher (Allen 1987) due to prey population reductions from road kills and/or behavioral avoidance of roads. Occasional one and two lane forest roads with moderate levels of traffic should not limit marten movements.

In a study conducted on the Lake Tahoe Basin Management Unit and Sierra National Forest, however, Zielinski (2007) found that marten occupancy or probability of detection did not change in relation to the presence or absence of motorized routes and OHV use when the routes (plus a 50 meter

buffer) did not exceed about 20 percent of a 50 square kilometer area, and traffic did not exceed one vehicle every 2 hours. The study did not, however, measure behavioral changes or changes in use patterns and the study authors caution that application of their results to other locations would apply only if OHV/OSV use at the other locations is no greater than reported in their study.

Standards and guidelines in the Sierra Nevada Forest Plan Amendment ROD (2004), provides management direction for habitat connectivity for old forest associated species to "minimize old forest habitat fragmentation" and "assess the potential impacts of projects on the connectivity of habitat for old forest associated species," particularly marten and fisher.

Routes for Competitors: Martens avoid habitats that lack overhead cover presumably because these areas do not provide protection from avian predators. Roads that are driven during the winter months may allow coyotes to enter into marten winter habitat, affecting marten through competition or direct mortality from predation. This has been identified as a significant threat within lynx habitat. Since both lynx and marten have unique morphologies that allow them to occupy deep snow habitats where they have a competitive advantage over carnivores, such as coyotes and bobcats, human modifications of this habitat, such as winter road use, over-the-snow travel, and snowmobile trails, can eliminate this advantage and increase access for predators and competitors. This has been identified as a potentially significant risk factor in the Sierra Nevada worthy of further investigation.

Snag and Down Log Reduction: High levels of coarse woody debris (snags, downed logs, root masses, large branches) is an essential component of marten habitat, especially during the winter months when marten require subnivian structures for cover and hunting opportunities. In addition, large logs with cavities provide rest and den sites for marten and fisher. Activities that remove large logs are therefore likely to degrade marten and fisher habitat (USDA 1994). Hazard tree removal along roads will reduce numbers of snags (future down logs) within a distance of about 60 meters alongside roads. In addition , motorized routes provide access for fuelwood collection, which will also contribute to decreased levels of snag and down wood within roadside corridors. However, snag removal within 60 meters of roads may be incidental compared to the displacement and avoidance factors that seem to influence marten habitat use adjacent to motorized routes.

Disturbance at a Specific Location (meadows) - marten only: Various studies in the Sierra Nevada indicate marten to have a strong preference for meadows and forest-meadow edges for foraging (USDA Forest Service 2001). Microtine rodents (meadow voles) are important for the marten diet, and therefore, the quality of meadow habitat (especially meadows surrounded by mature lodgepole and red fir forests) influences the quality of marten habitat (Spencer et al. 1983). Routes that are adjacent to and intersect meadows can alter meadow hydrology and vegetation which may have a negative effect on prey abundance. The combination of route use and increased human activity, as well as the potential impacts of routes upon meadow vegetation, may result in loss of these more easily exploitable "prey patches."

American Marten and Pacific Fisher: Environmental Consequences

Based upon a review of the literature, fisher were found likely to be affected by the same road and motorized trail-associated factors as marten: trapping, poaching, collisions, displacement or avoidance, habitat loss or fragmentation, snag reduction, down log reduction, edge effects, movement barrier or filter,

and route for competitors (Gaines et al. 2003, Buskirk and Ruggierro In USDA 1994). The current absence of fisher on the Tahoe NF eliminates these risk factors, but this analysis will be conducted to analyze impacts of the alternatives to fisher if populations were to be re-established on the Tahoe NF.

Environmental consequences for marten and fisher are analyzed at three different scales - within late seral coniferous forest habitat (CWHR types 4M, 4D, 5M, 5D & 6), Old Forest Emphasis Areas (OFEAs), and Tahoe NF Forest Carnivore Network. Late seral coniferous forest habitat (CWHR types 4M, 4D, 5M, 5D & 6) is considered to be suitable for marten (USDA 2004). The OFEAs, as previously described, are land allocations designated to manage for old forest dependent species, including marten. Although no management direction is specifically designated within the Tahoe NF Forest Carnivore Network, the network provides a broad framework for considering habitat connectivity issues for Forest Carnivores, including the marten. These 3 scales are used for comparison, since habitat connectivity within these habitats are important considerations for marten populations. Although all 3 scales have considerable overlap because older forest types are included in all of them, there are slight differences between them because they were derived in different manners. The late seral coniferous forest habitat types are comprised of individual patches of habitat types that may not necessarily be connected. Whereas, both the OFEAs and the Carnivore Network incorporates larger blocks of older forest types.

Analysis Measures

Wet Weather Seasonal Closures and Change in Class of Vehicles: The effects of Wet Weather Seasonal Closures and Change in Class of Vehicles are discussed previously under the section "Effects Common to All Late Seral Coniferous Forest Associated Species."

Prohibition of Cross Country Travel

Motorized Route and Area Additions

Route Density: The magnitude of effects caused by habitat loss and fragmentation, displacement or avoidance, routes for competitors (as described above) will correspond, to some degree, with the density of motorized routes and the associated extent of public access and use. Marten have been found to be less active near motorized routes, and higher densities of motorized routes are therefore likely to result in less marten activity or occurrence in an area. In general, several studies indicate that factors associated with higher route densities are negatively correlated with numbers of marten and fisher. Habitat fragmentation effects also increase in relation to increased route densities. Forest Plan standards and guidelines direct that projects "minimize old forest habitat fragmentation" and emphasize old forest habitat connectivity. Since the "Old Forest Emphasis Area" land allocation and the Tahoe Forest Carnivore Network are intended to provide for structurally complex forests and connectivity of old forest habitat, route densities within this land allocation are evaluated.

Zone of Influence: Studies indicate marten habitat use declines within a distance within exceeding 300 meters from roads. For this analysis, a Zone of Influence of 300 meters from motorized routes was determined, and the proportion of marten habitat occurring within this zone was analyzed. Within this zone, changes to habitat such as fragmentation, edge effects, and the reduction of snags and down wood, would also occur. These factors would be expected to influence a smaller area (probably about 60 meters)

adjacent to motorized routes. Thresholds associated with this measure have not been established, but relative changes in habitat effectiveness for marten can be evaluated and compared.

Number of Meadows Affected by Motorized Routes – marten only: In the Sierra Nevada, marten to have a strong preference for meadows and forest-meadow edges for foraging (USDA Forest Service 2001). Routes that are adjacent to and intersect meadows can alter meadow hydrology and vegetation which may have a negative effect on prey abundance. The number of meadows that are intersected by proposed routes is the indicator used to measure the effects on wet meadow habitat that is important for the marten.

Direct and Indirect Effects: American Marten and Pacific Fisher

Prohibition of Cross Country Travel

Motorized cross country travel is not prohibited under Alternative 1, where habitat for American marten and Pacific fisher habitat would be at risk of habitat fragmentation, disturbance, avoidance, and abandonment from motorized use within 394,847 OFEA acres, 267,952 late seral habitat (CWHR 4M, 4D, 5M, 5D, & 6) acres, and 396,602 Carnivore Network acres (acres may overlap). All the action alternatives prohibit cross country travel on over 250,000 acres of marten and fisher habitat, where habitat fragmentation, disturbance, avoidance, and abandonment would be reduced.

Motorized Trail Additions and Open Areas Designations

Designation of Open Areas. Alternative 2 designates motorized open areas at Greenhorn, Eureka Diggings, and Reservoir Areas at Stampede, Boca, and Prosser Reservoirs. In general, suitable habitat for marten and fisher is not available in these areas, and therefore motorized use of these areas would not alter habitat for these species. The Greenhorn area is below the elevation range for the marten. Eureka Diggings is devoid of vegetation. The reservoirs open areas are also devoid of vegetation and occur within eastside pine and sagebrush/bitterbrush habitats that are generally not important for these species. If animals are traveling through in the vicinity of these open areas, some direct disturbance could occur, although this is expected to be low.

Motorized Trail Additions – Motorized Route Density, Zones of Influence, and Meadows

Motorized Route Density

The proportion of area with moderate to high motorized route densities (greater than 2 miles per square mile) are shown in Table 3.03-70 within late seral coniferous forest habitat (suitable marten habitat), within Old Forest Emphasis Areas, and within the Tahoe Forest Carnivore Network for each of the alternatives. Habitat connectivity for marten within these areas are important considerations, since higher route densities may affect marten population densities. Alternative 1 results in 83% to 85% of areas managed for marten (OFEAs-83%, Carnivore Network-85%, and late seral coniferous forest forests (CWHR 4, 5, 6)-83%) with motorized route densities that are greater than 2 miles per square mile. Since marten may demonstrate population declines at relatively low levels of fragmentation (USDA Forest Service 2001), Alternative 1 could result in population declines, especially since cross-country motorized travel would continue and route proliferation would be expected to increase over time.

The action alternatives result in about 10% less of the landscape with moderate to high motorized route densities when compared to Alternative 1. These alternatives result in greater than 74% of areas managed for marten (OFEAs, Forest Carnivore Network, and late seral coniferous forest forests) with route densities exceeding 2 miles per square mile.

As motorized route densities are reduced, habitat connectivity for marten is likely to be improved (Robitaille and Aubry 2000). The connectivity of higher elevation habitats that are unaffected by motorized routes is improved substantially in the action alternatives as compared to the Alternative 1. On the Tahoe NF, there are 11 Inventoried Roadless Areas (IRAs). These areas include Westside mixed conifer, red fir and lodgepole pine types that are preferred habitat for marten in the Sierra Nevada (USDA Forest Service 2001) and increase the size and connectivity of undisturbed habitat that occurs in the wilderness areas. Since Alternative 3 does not add any motorized trails to the NFTS in IRAs, it provides greater connectivity of marten and fisher habitat as compared to the other alternatives which propose some motorized trail additions to the NFTS within these areas.

Table 3.03-70. Proportion of Tahoe NF Lands with Motorized Route Densities >2 miles/square mile within Late Seral Coniferous Forest, Old Forest Emphasis Areas, & Tahoe Carnivore Network

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Late seral coniferous forest Forest (CWHR 4M, 4D, 5M, 5D, & 6)	83%	74%	73%	74%	75%	75%	74%
Old Forest Emphasis Areas	83%	72%	72%	72%	73%	73%	72%
Carnivore Network	85%	76%	75%	76%	77%	76%	76%

* For Alternative 1, route density within mature and late seral coniferous forest forest (CWHR 4M, 4D, 5M, 5D & 6), Old Forest Emphasis Areas (OFEAs), and Carnivore Network includes existing motorized trails un-authorized for motorized use, as well as existing NFTS routes and non-NFTS routes.

60-meter Zone of Influence: Effects to Snags and Logs

Table 3.03-71 shows the proportion of late seral coniferous forest, OFEAs, and Forest Carnivore Network within a 60-meter Zone of Influence of motorized trail additions to the NFTS. Alternative 1 would result in an additional 6 percent of late-seral forest and OFEAs occurring within 60-meter Zone of Influence of existing motorized trails un-authorized for motorized use, which could continue to be used as part of cross-country travel. Seven percent of Tahoe NF Carnivore Network would be affected by these routes in Alternative 1. Road and trail-associated factors within this zone are thought to affect marten in a variety of ways, including human-caused mortality, changes in behavior, and changes to habitat. Changes to habitat, such as reduction in the amount of coarse woody debris, add to disturbance effects within this zone, reducing the suitability of habitat within approximately 60 meters of existing motorized trails un-authorized for motorized use. Considering the variety of ways that road and trail-associated factors are suspected of affecting marten (habitat avoidance, habitat loss through fragmentation, increased competition and predation), cross-country travel, including use of existing motorized trails un-authorized for motorized use, will have a high degree of influence on marten habitat in Alternative 1 (Table 3.03-71). Alternative 5 would influence late seral coniferous forest marten habitat and OFEAs within a 60-meter Zone of Influence by 1% each, and would influence the Carnivore Network by 2%. The remaining alternatives (Alternatives 2, 3, 4, 6, & 7) would not affect overall habitat connectivity within late seral

coniferous forest habitat, OFEAs, or within the Forest Carnivore Network since proposed motorized routes would influence between 0 and <1% of these habitats depending on the alternative.

Table 3.03-71. Percent of mature and late seral coniferous forest (CWHR 4M, 4D, 5M, 5D & 6), Old Forest Emphasis Areas (OFEAs), and Carnivore Network within 60 meters of Motorized Trail Additions to the National Forest Transportation System NFTS) on the Tahoe NF

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Percent of late seral coniferous habitat (CWHR 4M, 4D, 5M, 5D & 6) within a 60-meter "Zone of Influence" of motorized trail additions to the NFTS	6%	<1%	0%	<1%	1%	<1%	<1%
Percent of OFEAs within a 60-meter "Zone of Influence" of motorized trail additions to the NFTS	6%	<1%	0%	0%	1%	<1%	<1%
Percent of Forest Carnivore Network within a 60-meter "Zone of Influence" of motorized trail additions to the NFTS	7%	0%	0%	0%	2%	0%	<1%

[1] Alternative 1 is the percent of mature and late seral coniferous forest (CWHR 4M, 4D, 5M, 5D & 6), Old Forest Emphasis Areas (OFEAs), and Carnivore Network within 60 meters of existing motorized trails un-authorized for motorized use associated with the continuance of cross country travel.

300-meter Zone of Influence within Carnivore Network, OFEAs, and Old Forest CWHR types (4M, 4D, 5M, 5D, & 6)

The proportion of Carnivore Network, OFEAs, and Old Forest CWHR types (4M, 4D, 5M, 5D, & 6) within a 300-meter Zone of Influence is displayed in Table 3.03-72.

When increasing the Zone of Influence to 300-meter, substantially higher amounts of marten and fisher habitat are influenced by motorized trail additions to the NFTS. Within a 300-meter Zone of Influence, Alternative 1 results in the greatest amount of habitat fragmentation and reduced habitat connectivity within the Carnivore Network, late seral coniferous forest habitat, and within OFEAs, where marten and fisher habitat suitability may be reduced. Alternative 1 results in contributing to 25% reduction in habitat connectivity within the Carnivore Network, a 20% reduction in habitat connectivity in Old Forest Emphasis Areas, and a 21% reduction in habitat connectivity in Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6).

Within a 300-meter Zone of Influence, Alternative 5 would reduce habitat connectivity for marten and fisher by 6% in the Carnivore Network, 5% in the Old Forest Emphasis Areas, and 5% in the Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6).

The remaining alternatives would reduce habitat connectivity substantially less than Alternative 1 and somewhat lower than Alternative 5. Reduction in habitat connectivity would range between 0 and 2 percent within the Carnivore Network, OFEAs, and Old Forest habitats (CWHR 4M, 4D, 5M, 5D, 6) for the remaining alternatives.

Table 3.03-72. Percent of Carnivore Network, OFEAs, and Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6) within a 300-meter "Zone of Influence" of motorized trail additions to the National Forest Transportation System (NFTS)

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Carnivore Network	25%	2%	0%	1%	6%	2%	1%
Old Forest Emphasis Areas (SNFPA)	20%	1%	0%	1%	5%	1%	1%
Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6)	21%	1%	0%	1%	5%	1%	1%

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

Number of Meadows Affected by Motorized Trail Additions to the National Forest Transportation System (NFTS) (Foraging habitat: marten only)

The number of wet meadows that are intersected by proposed motorized trail additions to the NFTS under each alternative is shown in Table 3.03-73. Out of 518 wet meadow sites on the Tahoe NF, Alternative 1 would result in 81 meadow sites (16%) intersected by existing motorized trails un-authorized for motorized use. These meadows could continue to receive motorized use under continued cross-country travel with the potential to directly and indirectly affect marten is considerable. Direct impacts to marten may occur from direct disturbance while marten are foraging within and adjacent to these 81 meadow sites. Indirect affects to marten can occur from the intersection of motorized routes and wet meadows through changes in wet meadow condition, particularly meadow drying and loss of meadow vegetation. Loss of meadow vegetation and drying of meadows can affect the abundance and distribution of prey species available to marten, particularly meadow voles.

Alternative 5 would result in 9 wet meadows (2%) that are intersected by motorized trail additions to the NFTS. Alternatives 2 and 6 result in approximately 1% wet meadows (Alt 2 - 7 meadows, Alt 6 – 5 meadows) intersected by motorized trail additions to the NFTS. Alternatives 4 and 7 result in yet fewer wet meadows intersected by motorized trail additions to the NFTS, where less than one percent of all wet meadows would be directly and indirectly affected by proposed additions. Alternative 3 does not propose any additions of motorized trails to the NFTS, and therefore would not affect marten prey species within wet meadows. Under alternative 1, cross country travel could continue within 9,167 acres of wet meadow habitat; whereas, cross country travel would be prohibited in 9,167 acres of wet meadow habitat, which would be beneficial to marten and their prey species.

Table 3.03-73. Number of Meadows Intersected by Motorized Trail Additions to the National Forest Transportation System (NFTS)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Wet Meadows Intersected by motorized trail additions to the NFTS (518 total)	0	7	0	1	9	5	3
Miles Intersected by motorized trail additions to the NFTS	0	0.5	0	0.04	1.1	0.5	0.4
Number of Wet Meadows Intersected by motorized trails un-authorized for motorized use that would continue to be used associated with cross country travel	81	0	0	0	0	0	0
Miles Meadows Intersected motorized trails un-authorized for motorized use that would continue to be used associated with cross country travel	14	0	0	0	0	0	0
Acres of Wet Meadows Where Cross Country Travel Would Be Prohibited	0	9,167	9,167	9,167	9,167	9,167	9,167
Acres of Wet Meadows Where Cross Country Travel is not prohibited	9,167	0	0	0	0	0	0

Summary of Direct and Indirect, Impacts to American Marten and Pacific Fisher

When considering all the direct, indirect, and cumulative impact to the American marten and the Pacific fisher within American marten and Pacific fisher habitat, Table 3.03-74 summarizes the overall net effect to the American marten and Pacific fisher from the proposed actions from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-74. American marten and Pacific fisher - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized trail additions to the NFTS	Negatively affects the greatest proportion of marten and fisher habitats with continued with cross country travel	Negatively affects a small proportion of marten and fisher habitat	Does not affect marten and fisher habitats	Negatively affects a small proportion of marten and fisher habitat .	Negatively affects a small proportion of marten and fisher habitat	Negatively affects a small proportion of marten and fisher habitat	Negatively affects a small proportion of marten and fisher habitat
Cross Country Travel	Negatively affects between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is not prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	No effect	No effect	No effect	No effect	No effect	No effect	No effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is not prohibited. Increases disturbance and habitat fragmentation, with the greatest proportion of motorized route densities >2 mi/mi^2.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation, by reducing motorized route densities by approx. 10%, compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 10% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited). Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 10% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 9% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 9% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 10%, compared to Alternative 1.

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

Cumulative Effects

Cumulative Effects of Motorized Routes

Forest Carnivore Network within a 60-meter Zone of Influence

Comparing the relative cumulative effects to Forest Carnivore Network within a 60-meter Zone of Influence (by summing the direct and indirect effects of proposed alternatives and the cumulative effects of past, present, and future actions), indicates Alternative 1 has the greatest overall cumulative impact (cumulative impact score = 23%) and, therefore, poses the greatest risk to marten and fisher by increased habitat connectivity fragmentation through potential loss of snags and down logs that may be removed for public safety along motorized and non-motorized routes (Table 3.03-75). In addition, Alternative 1 would contribute significantly to the proliferation of motorized trails un-authorized for motorized use because unmanaged cross-country motorized travel would continue into the future and has a high likelihood of increasing based on estimates in growth of ATV and motorcycle use and sales in recent years. Alternative 5 has the second greatest overall cumulative impacts from habitat fragmentation and other road and trail associated factors such as avoidance, loss of snags and logs, and edge effects within the Tahoe NF Forest Carnivore Network (cumulative impact score = ~18%), followed by Alternatives 2, 6, and 7 (cumulative impact scores = ~17%). Habitat connectivity within the Forest Carnivore Network would be maintained for all the action alternatives since motorized trail additions to the NFTS would either minimally affect or would have no effect on the Tahoe Forest Carnivore Network (range 0-2%), and route proliferation would not continue into the future for all of the action alternatives due to prohibition of cross country motorized travel.

Table 3.03-75. Cumulative Percent of Carnivore Network within a 60-meter "Zone of Influence" of Motorized Routes

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized trail additions to the NFTS (negative impact)[1]	0%	1%	0%	0%	2%	0%	0%
Continued use on existing motorized trails un-authorized for motorized use (negative impact)	7%	0%	0%	0%	0%	0%	0%
Motorized trails prohibited to motorized public use (positive impact)[2]	0%	7%	7%	7%	6%	7%	7%
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	14%	14%	14%	14%	14%	14%	14%
Existing routes on private land - non-NFS lands (negative impact)	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Existing non-motorized routes (negative impact)	2%	2%	2%	2%	2%	2%	2%
Decommissioned routes (positive impact)	0%	0%	0%	0%	0%	0%	0%
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**~23%**	**17%**	**~16%**	**~16%**	**~18%**	**17%**	**<17%**

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

[2] May include both system roads and motorized trails un-authorized for motorized use.

300-meter Zone of Influence within Carnivore Network, OFEAs, and Old Forest CWHR types (4M, 4D, 5M, 5D, & 6)

The cumulative proportion of Carnivore Network, OFEAs, and Old Forest CWHR occurring within a 300-meter Zone of Influence of motorized trail additions to the NFTS, existing motorized routes on NFS and non-NFS lands, and non-motorized routes for all the alternatives types is shown in Tables 3.03-76, 3.03-77, and 3.03-78. In addition, the zones of influence where positive cumulative impacts are realized where motorized routes are decommissioned or cross country travel is prohibited, including use on motorized trails un-authorized for motorized use, is also displayed for each of the alternatives.

Within the Carnivore Network, OFEAs and Old Forest habitat types, Alternative 1 would pose the greatest risk to habitat fragmentation where considerable cumulative impacts would be added to existing cumulative effects to marten and fisher. Existing motorized routes in the NFTS influence between 32 and 35% of marten and fisher habitat within the Carnivore Network, OFEAs, and Old Forest CWHR types. Under Alternative 1, continued cross-country motorized travel, with continued use of existing motorized trails un-authorized for motorized use, would influence an additional 20 to 25% (cumulative impact score) of the Carnivore Network, OFEAs, and Old Forest habitat types, further reducing habitat connectivity, where cumulative impacts to marten and fisher habitat would be substantial. Future route proliferation could substantially add to cumulative impacts due to unmanaged cross-country travel which would further add to habitat fragmentation which could seriously limit the distribution of marten and the future reestablishment potential of the fisher on the Tahoe NF.

Alternative 5 poses the next greatest risk of cumulative impacts to habitat connectivity for marten and fisher, where 5 to 6% of the Carnivore Network, OFEAs, and Old Forest CWHRs would be influenced by motorized trail additions to the NFTS. The remaining action alternatives are similar in their contribution to existing cumulative impacts. Within the Carnivore Network, OFEAs, and Old Forest CWHRs, marten and fisher habitat connectivity is reduced slightly (0% to 2%) within a 300- meter Zone of Influence. This amount of cumulative impact should not affect the overall distribution and abundance of marten on the Tahoe NF, and should not affect the future reintroduction of fisher on the Tahoe NF. Therefore, population viability for the marten would not be affected by alternatives 2, 3, 4, 6, and 7. Under these alternatives cross-country motorized travel would be prohibited and future route proliferation should be minimized.

Table 3.03-76. Cumulative Percent of Carnivore Network within a 300-meter Zone of Influence of Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of Proposed Alternatives							
Motorized trail additions to the NFTS (negative impact)	0%	2%	0%	1%	6%	2%	1%
Continued use on existing motorized trails un-authorized for motorized use (negative impact)	25%	0%	0%	0%	0%	0%	0%
motorized trails un-authorized for motorized use (positive impact)	0%	24%	25%	25%	21%	24%	25%
Acres of Carnivore Network where cross-country travel is prohibited (positive impact)	0	396,602	396,602	396,602	396,602	396,602	396,602
Acres of Carnivore Network where cross-country travel is not prohibited (negative impact)	396,602	0	0	0	0	0	0

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cumulative Effects of Past and Present							
Existing motorized routes - NFS lands (negative impact)	35%	35%	35%	35%	35%	35%	35%
Existing motorized routes on private land - non-NFS lands (negative impact)	4%	4%	4%	4%	4%	4%	4%
Existing non-motorized routes (negative impact)[1]	2%	2%	2%	2%	2%	2%	2%
Decommissioned routes (positive impact)	2%	2%	2%	2%	2%	2%	2%
Total Cumulative Effects							
Overall Relative Cumulative Impact Score = Sum Total of All Routes (**Note**: Some overlap may occur where route categories intersect)	**66%**	**43%**	**41%**	**42%**	**47%**	**43%**	**42%**
Acres of Carnivore Network where cross-country travel is prohibited (positive impact)	**0**	**396,602**	**396,602**	**396,602**	**396,602**	**396,602**	**396,602**
Acres of Carnivore Network where cross-country travel is not prohibited (negative impact)	**396,602**	**0**	**0**	**0**	**0**	**0**	**0**

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

Table 3.03-77. Cumulative Percent of Old Forest Emphasis Areas within a 300-meter Zone of Influence

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect Effects of proposed alternatives							
Motorized trail additions to the NFTS (negative impact)	0%	1%	0%	1%	5%	1%	1%
Continued use on existing motorized trails un-authorized for motorized use (negative)	20%	0%	0%	0%	0%	0%	0%
motorized trails un-authorized for motorized use (positive impact)	0%	20%	21%	20%	17%	20%	20%
Acres of Carnivore Network where cross-country travel is prohibited (positive impact)	0	394,847	394,847	394,847	394,847	394,847	394,847
Acres of Carnivore Network where cross-country travel is noty prohibited (negative impact)	394,847	0	0	0	0	0	0
Cumulative Effects of Past and Present							
Existing motorized routes - NFS lands (negative impact)	32%	32%	32%	32%	32%	32%	32%
Existing motorized routes on private land - non-NFS lands (negative impact)	11%	11%	11%	11%	11%	11%	11%
Existing non-motorized routes (negative impact)[1]	5%	5%	5%	5%	5%	5%	5%
Decommissioned routes (positive impact)	1%	1%	1%	1%	1%	1%	1%
Total Cumulative Effects							
Overall Relative Cumulative Impact Score (Percent of Tahoe NF OFEA) = Sum Total of all routes both positive and negative (**Note**: Some overlap may occur where route categories intersect)	**68%**	**49%**	**48%**	**49%**	**53%**	**49%**	**49%**
Acres of OFEAs where cross-country travel is prohibited (positive impact)	**0**	**394,847**	**394,847**	**394,847**	**394,847**	**394,847**	**394,847**
Acres of Carnivore Network where cross-country is not prohibited (negative impact)	**394,847**	**0**	**0**	**0**	**0**	**0**	**0**

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

Table 3.03-78. Cumulative Percent of Forest-wide Late-seral Forest (CWHR 4, 5, 6) within 300-meter "Zone of Influence" of Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and indirect effects of proposed alternatives							
Motorized trail additions to the NFTS (negative impact)	0%	1%	0%	1%	5%	1%	1%
Continued use on existing motorized trails un-authorized for motorized use where cross-country travel is not prohibited (negative impact)	21%	0%	0%	0%	0%	0%	0%
motorized trails un-authorized for motorized use where cross country travel is prohibited (positive impact)	0%	20%	21%	21%	18%	20%	21%
Acres of late-seral forests (CWHR 4, 5, 6) where cross-country travel is prohibited (positive impact)	0	267,952	267,952	267,952	267,952	267,952	267,952
Acres of late-seral forests (CWHR 4, 5, 6) where cross-country travel is not prohibited (negative impact)	267,952	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)	34%	34%	34%	34%	34%	34%	34%
Existing motorized routes on - non-NFS lands (private) (negative impact)	13%	13%	13%	13%	13%	13%	13%
Existing non-motorized routes (negative impact)[1]	5%	5%	5%	5%	5%	5%	5%
Decommissioned routes (positive impact)	2%	2%	2%	2%	2%	2%	2%
Total cumulative effects							
Overall Relative Cumulative Impact Score = Sum Total of All Routes (negative impacts) (**Note**: Overlap occurs where route categories intersect, therefore percentages are only relative to each other and not actual amounts)	**73%**	**53%**	**52%**	**53%**	**57%**	**53%**	**53%**
Acres of late-seral forests (CWHR 4, 5, 6) where cross-country travel is prohibited (positive impact)	**0**	**267,952**	**267,952**	**267,952**	**267,952**	**267,952**	**267,952**
Acres of late-seral forests (CWHR 4, 5, 6) where cross-country travel is not prohibited (negative impact)	**267,952**	**0**	**0**	**0**	**0**	**0**	**0**

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

Cumulative Effects to Meadows from Past, Present, and Reasonably Foreseeable Actions

The cumulative effects geographic boundary for marten prey habitat includes 518 wet meadows occurring within the boundary of the Tahoe NF including NFS and non-NFS lands. This scale is sufficiently large to evaluate effects to microtine rodents that are important prey species for the marten. The cumulative effects timeframe is the same as stated for other species.

Livestock grazing occurs on 31 active grazing allotments on the Tahoe NF, totaling 538,431 acres of NFS and private lands. In some meadows, livestock grazing has reduced the suitability of meadow vegetation for microtine rodents and other marten prey (USDA Forest Service 2001). On the Tahoe NF , the impact of livestock grazing on meadows has been steadily decreasing as fewer allotments are grazed

and as forage utilization levels are being reduced by stricter standards established by the Sierra Nevada Forest Plan Amendment. These past and present effects contribute to the effects of the project Alternatives upon meadow habitat and condition.

Cumulative Effects to Meadows from Motorized and Non-motorized Routes

Cumulative effects are evaluated by assessing the number of wet meadows that are intersected by motorized trail additions to the NFTS, motorized routes on existing NFS lands and non-NFS lands (private). In addition, non-motorized routes are also evaluated. Finally, the prohibition of cross country travel, including on existing motorized trails un-authorized for motorized use or decommissioned routes are also evaluated for their beneficial cumulative impacts where the adverse impacts of motorized routes would be removed are considered.

Direct and indirect effects of the project alternatives would add to existing cumulative effects to wet meadows which provide habitat for foraging marten and microtine rodents which are preferred marten prey species (Alternative 1 to the greatest extent, followed by alternatives 5, 2, 3, 6, 4, and 7, in decreasing order). Alternative 1 directly and indirectly affects 81 of 518 meadows (16 % of all meadows) that would be impacted by continued cross-country motorized use, including use of existing motorized trails un-authorized for motorized use. Considering existing cumulative effects from existing motorized routes on both public and private lands and non-motorized routes, this additional 16% of meadow impacts is substantial. In addition, since Alternative 1 does not prohibit public motor vehicle cross-country travel on 9,167 acres of wet meadow habitat, which would continue and proliferate, and would result in cumulative impacts upon marten.

The remaining action alternatives would result in progressively fewer meadows being cumulatively impacted, with Alternative 5 contributing the most, to Alternative 3, which would not contribute to additional cumulative impacts since no motorized trails being added to the NFTS would intersect wet meadows. All the action alternatives benefit from the prohibition of cross country travel on 9,167 acres of wet meadow habitat, including on existing motorized trails un-authorized for motorized use, affecting between 78 and 81 meadows (15 to 16% of all meadows) where motorized vehicle use would be prohibited, as shown in Table 3.03-79.

Table 3.03-79. Cumulative Number of Wet Meadows Intersected by Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Wet Meadows Intersected by motorized trail additions to the NFTS (negative impact)[1]	0	7	0	1	9	5	3
Wet Meadows Intersected by existing motorized trails un-authorized for motorized use that would continue with the continuance of cross country travel (negative impact)	81	0	0	0	0	0	0
Wet Meadows Intersected by existing motorized trails un-authorized for motorized use due to the prohibition of cross country travel (positive impact)	1	78	82	81	76	78	80
Acres of wet meadow habitat prohibited to cross country travel	0	9,167	9,167	9,167	9,167	9,167	9,167
Acres of wet meadow where cross country travel is not prohibited	9,167	0	0	0	0	0	0

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cumulative effects of past, present, and proposed actions							
Wet Meadows Intersected by existing motorized routes - NFS lands (negative impact)	150	150	150	150	150	150	150
Wet Meadows Intersected by existing motorized routes on non-NFS lands (private) (negative impact)	96	96	96	96	96	96	96
Wet Meadows Intersected by existing non-motorized routes (negative impact)	39	39	39	39	39	39	39
Wet Meadows Intersected by decommissioned routes (positive impact)	11	11	11	11	11	11	11
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**370**	**296**	**275**	**289**	**300**	**296**	**288**

Overall Cumulative Effects Summary

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable vegetation and fuels management projects on NFS lands and private lands within the Tahoe NF boundary. Some, but not all, of these activities have contributed to effects on marten and have the potential to impact marten in the near future. In 2001 and 2004, the Forest Service amended Sierra Nevada Forest Plans to better address the needs of old forest-associated species (USDA Forest Service 2001 and 2004). In this assessment, the following key risk factors were identified for marten in the Sierra Nevada: (1) habitat alternation, particularly the removal of overhead cover, large diameter trees, or coarse woody material; (2) livestock grazing and other activities that might reduce the availability of prey in meadows; and (3) the use of roads and associated human access.

On the Tahoe NF, several activities have influenced these risk factors for marten. Past timber harvest and more recent fuels reduction treatments have reduced important habitat components in marten habitats. Between 2001 and 2006, fuels treatments on NFS lands have occurred on approximately 13,000 acres. These vegetation treatments have reduced habitat quality for marten and fisher by reducing canopy cover, structural complexity, and coarse woody material within treated units. At the larger landscape scale, these treatments may affect the size and connectivity of patches of high quality habitat. About 14,000 acres of fuels and vegetation treatments are planned to occur over the next few years based upon the projects listed in the Tahoe NF Schedule of Proposed Actions (see Appendix P). Some, but not all of them will affect marten and fisher habitat. Over time, fuels treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat removed by stand replacing wildfires will be reduced in response to these treatments (USDA Forest Service 2004).

The California Department of Forestry and Fire Protection currently lists approximately 12,000 acres of private land within the Tahoe NF administrative boundary for which timber harvest plans have been submitted. The portion of these projects occurring within the marten's range has not been determined. Timber harvest on private lands is generally more intensive and does not provide suitable habitat for marten and fisher.

Alternative 1 has the greatest likelihood of contributing to substantial adverse cumulative effects upon marten populations and may affect the ability to reestablish fisher over time. Alternatives 2, 4, 5, 6, and 7,

result in a lower adverse cumulative effects. Alternative 3 results in the least cumulative effects because, since no motorized trails are proposed for addition to the NFTS, motorized route densities in marten habitat remain lowest, and motorized trails would not be added to the NFTS in habitats of particular importance to marten (meadows). The combined effects of the project alternatives and other factors affecting marten and fisher habitats do not indicate that the magnitude of these combined effects will result in a loss of viability or lead to a trend toward Federal listing for the American marten under any alternative (see project Biological Evaluation).

These alternatives do not result in a loss of habitat (no route construction), but may add to existing cumulative effects, where an additional 20 to 25% of marten habitat may be influenced by continued cross-country travel, including continued use of existing motorized trails un-authorized for motorized use under Alternative 1; about 5% under Alternative 5; and from 0 to 2% under the remaining action alternatives. The cumulative effects under Alternative 1, including fuels treatment and livestock grazing effects upon marten habitat, could be considerable. Inventoried Roadless Areas (IRAs) and adjacent wilderness areas may become increasingly important as the cumulative effect of fuels treatment activities expand within other portions of marten and fisher habitat.

Existing motorized trails un-authorized for motorized use, may receive non-motorized use (hiking, mountain bicycling, equestrian). It is generally considered that non-motorized use would be less impactive to fisher and marten due to reduced noise and other factors. The extent and magnitude of non-motorized use is unknown. However, it is expected that over time, these routes will eventually become revegetated and recover either through active or passive restoration means.

Sensitive Species Determination – American Marten

The Biological Evaluation for the Tahoe NF Motorized Travel Management Project, which is incorporated by reference, made a determination that all the action alternatives may affect individual American martens, but are not likely to result in a loss of viability or lead to a trend toward federal listing. Motorized trails through wet meadows are not proposed to be added to the NFTS in Alternative 6, the preferred alternative. Motorized routes within riparian conservation areas, including meadows are significantly reduced compared to Alternative 1, no action. Habitat fragmentation from motorized routes will be considerably reduced. Future route proliferation will be minimized due to prohibition of unmanaged cross country motorized travel. In addition, wet weather restrictions on native surfaced routes will reduce potential erosion and sedimentation within meadow habitat, important to marten prey species.

MIS Summary – American Marten

The American marten was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures above 40% within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersion of riparian areas and meadows. Important habitat attributes are: vegetative diversity, with

predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1987). Key components for westside and eastside marten habitat can be found in the Sierra Nevada Forest Plan Amendment FEIS (USDA Forest Service 2001), Volume 3, Chapter 3, part 4.4, pages 20-21.

Based on the analysis conducted, Alternative 1 directly, indirectly, and cumulatively affects the greatest amount of late seral closed canopy coniferous forest with a 200-meter zone of influence of existing motorized trails un-authorized for motorized use, which would continue under continued cross country travel. Alternative 1 reduces habitat effectiveness by 17% (28,200 acres out of 164,957 Tahoe NF habitat acres), with the potential to disturb, cause avoidance, and abandonment of California spotted owl, American marten, and northern flying squirrel. Considering the checkerboard pattern of land ownership within the Tahoe NF boundary, Alternative 1 could cause a downward trend in habitat effectiveness for these species. In addition, the cross country travel would continue and proliferate on 119,091 acres of late seral closed canopy coniferous forest habitat.

Alternative 5 affects approximately 6,807 acres (0.7% of Tahoe NF habitat), and Alternatives 2, 4, and 6 similarly affect 972 acres of late seral closed canopy coniferous forest habitat or 0.1% of Tahoe NF habitat within a 200-meter zone of influence of motorized trail additions to the NFTS. Alternatives 3 and 7 do not affect late seral closed canopy coniferous forest habitat within a 200-meter zone of influence of motorized trail additions to the NFTS. The Tahoe NF Motorized Travel Management Project action alternatives will not result in a direct or indirect change in the amount of late seral closed canopy coniferous forest habitat affected by motorized routes for all the alternatives. Therefore, habitat effectiveness for these species would be maintained at current levels.

For all the alternatives, the change in the class of vehicles would not directly, indirectly, or cumulatively affect late seral closed canopy coniferous forest habitats or their habitat effectiveness. Wet weather seasonal restrictions on all native surfaced roads and motorized trails under Alternatives 4, 5, and 6 would enhance late seral closed canopy coniferous forest habitat effectiveness for the California spotted owl, American marten, and the northern flying squirrel through the reduced disturbance, avoidance, and abandonment. Finally, the prohibition of motorized cross country travel on 119,091 acres of late seral habitats, would benefit these species over time, thereby preventing the continued cumulative increase in motorized route proliferation in the future.

Summary of Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the American marten; hence, the late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008) and the Tahoe NF Motorized Travel Management Project-level MIS Report, which are hereby incorporated by reference.

Habitat Status and Trend. There are currently 994,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System

lands in the Sierra Nevada. The trend is slightly increasing (from 7% to 9% within the last decade on National Forest System lands).

Population Status and Trend. American marten has been monitored throughout the Sierra Nevada as part of general surveys and studies from 1996-2002 (Zielinski et al. 2005). Since 2002, the American marten has been monitored on the Sierra Nevada forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA Forest Service 2005, 2006, 2007b). Current data at the range-wide, California, and Sierra Nevada scales indicate that, although marten appear to be distributed throughout their historic range, their distribution has become fragmented in the southern Cascades and northern Sierra Nevada, particularly in Plumas County. The distribution appears to be continuous across high-elevation forests from Placer County south through the southern end of the Sierra Nevada.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trends. Based on the small proportion of late seral closed canopy coniferous forest habitat that is directly, indirectly and cumulatively affected (0% to 3% of Sierra Nevada habitat) by the alternatives within a 200-meter zone of influence of motorized trail additions to the NFTS, the Tahoe NF Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of American marten across the Sierra Nevada bioregion.

Pacific Fisher Sensitive Species Determination

Due to the absence of the Pacific fisher on the Tahoe NF, the Tahoe NF Travel Management Project EIS will not affect the Pacific fisher (The Tahoe NF Biological Evaluation is incorporated by reference). Furthermore, this project as proposed will not likely affect any future reintroduction efforts and the ability for the fisher to become reestablished on the Tahoe NF since habitat fragmentation by the addition of motorized routes is minimized. Cross country motorized use will be prohibited, including use on existing motorized trails un-authorized for motorized use within suitable fisher habitat.

Compliance with Forest Plan and Other Direction

The Tahoe LRMP and Tahoe LRMP, as amended by the 2004 SNFPA ROD, provides the following management direction for meadow and wetland habitat:

- *Locate roads away from meadow edges where alternative routes are available (Tahoe LRMP)(Management Standard and Guideline).*
- *Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.*
- *Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity (RCO#2, Management Standard & Guideline 100).*
- *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2)*

> *minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species (Management Standard & Guideline 92).*

Marten foraging habitat within wet meadow were analyzed for the alternatives. Based on the analysis of the alternatives, Alternative 1 least complies with this direction. Alternative 1 negatively affects 81 of 518 meadow (16%) from cross country travel on 14 miles of existing routes unauthorized to motorized public use. The action alternatives all meet the Forest Plan Standards and Guidelines by reducing motorized impacts to meadows by prohibiting cross country travel, including on 13 to 14 miles of existing motorized trails un-authorized for motorized use. Of the action alternatives, Alternative 5 reduces the impacts on meadows the least and Alternative 3 reduces the impacts on meadows the most.

The Tahoe LRMP, as amended by the 2004 SNFPA ROD provides management direction for the fisher and marten as follows:

> *Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites (Management Standard & Guidelines 87 and 89).*

Fisher are not known to occur on the Tahoe NF, and therefore this standard and guideline does not apply. However, marten does occur on the Tahoe NF, although known den sites have not been identified. The sections above thoroughly analyzes the alternatives for the potential to disturb suitable fisher and marten denning habitat (as defined by CWHR 4M, 4D, 5M, 5D, & 6 habitat types). The analysis of alternatives also analyzed the potential to disturb marten and fisher habitat within Old Forest Emphasis Areas and the Tahoe NF Carnivore Network, both of which provide important habitat attributes for these species.

Snags in Green Forest Ecosystem Component Associated Species: Affected Environment

Many wildlife species depend on snags or dead trees for nesting, roosting, denning, foraging, resting, or shelter. Snag associated species included in this group include both primary and secondary excavators. The hairy woodpecker and pallid bat are species chosen to represent this group, although many other species are snag dependent species including pileated woodpecker, white-headed woodpecker, red-breasted nuthatch, white-breasted nuthatch, and others. In addition, the hairy woodpecker was selected as the MIS on the Tahoe NF, as amended by the Sierra Nevada Forest Bioregion EIS, for the ecosystem component of snags in green forests. Medium (diameter breast height between 15 to 30 inches) and large (diameter breast height greater than 30 inches) snags are most important. The hairy woodpecker uses stands of large, mature trees and snags of sparse to intermediate density; cover is also provided by tree cavities (CDFG 2005). Mature timber and dead snags or trees of moderate to large size are apparently more important than tree species (Siegel and DeSante 1999).

Snags are the result of tree mortality that can result from insect outbreaks, diseases, fire, drought, and flooding. Such events maintain the snag resource through time, though snag numbers may fluctuate as forests undergo cycles of drought accompanied by higher tree mortality, followed by lower tree mortality after stands have thinned (Bull et al. 1997).

Habitat for snag associated species (cavity nesting birds and bats) is considered to be forested vegetation types with snags larger than 15 inches diameter. Road and motorized trail-associated factors likely to affect these species are: edge effects and the reduction of snags and down logs. Nests of cavity nesting birds are typically more secure from nest predation than other forest birds, and recreational disturbance is not known to be a limiting factor as it is for some other forest bird species (Gaines et al. 2003). Roads and trails have the potential to adversely affect bats by facilitating access to bat habitats which may directly or indirectly affect bats. Roads and trails may affect snag-associated species, including cavity-nesting birds and bats, in the following ways:

Snag and Log Reduction and Edge Effects: Snag and log reduction occurs as result of managing roads or trails for public use. Trees posing a potential safety hazard ("hazard trees") are removed along roads open for public use, as well as along roads receiving concentrated use during implementation of a specific project. Hazard trees are typically dead or dying trees that occur within a tree-height distance from the road. This safety policy results in a reduction in snags within a zone of about 60 meters from a road's edge. This, in turn, reduces habitat quality and availability for snag associated species (i.e. cavity nesting birds and tree nesting bat species) within these roadside corridors. Studies have shown cavity-nesting birds to decline 53 to 77 percent after snag removal (Scott and Oldemeyer 1983, Raphael and White 1984, Hejl 1997).

The amount of down wood is also influenced within this zone, both by the removal of hazard trees that would become future down wood, and by the access provided for woodcutters. Down wood is important as a foraging substrate, providing insects required by species like the pileated woodpecker.

Snags in Green Forest Ecosystem Component Associated Species: Environmental Consequences

Analysis Measures

Zone of Influence within 60 Meters: For the proposed alternatives, the habitat factor used in this analysis to assess effects to medium (15-30 inches dbh) and large (greater than 30 inches dbh) snags within green forest, was the amount of green forest that fell within a 60-meter zone of influence of motorized trails added to the National Forest Transportation System (NFTS). A 60-meter zone of influence represents the proportion of snag habitat along motorized routes that may be affected by fuelwood or hazard tree removal, resulting in a reduction of snag habitat for the hairy woodpecker. This distance represents the maximum height of a snag that could be removed along proposed routes.

The no action alternative (Alternative 1) was analyzed by determining the amount of green forest habitat that fell within a 60-meter zone of influence of existing motorized trails un-authorized for motorized use that could be affected by fuelwood or hazard tree removal.

Current Condition of the Habitat Factor(s) in the Project Area: On the Tahoe NF, snags in green forest ecosystem component vary in density, size, decay class, and distribution, depending upon the forest type, presence of decay factors (insects and diseases), and the amount of management activities that have taken place. Annual precipitation also affects the amount of snags present within green forests. Snag densities are generally higher in mixed conifer forests and true fir forests. Pure eastside pine forests

generally have lower snag densities compared to forest types that have higher concentrations of true fir species (red fir and white fir). Snag densities on the Tahoe NF vary from 0 snags per acre to well over 6 snags per acre.

Direct and Indirect Effects to Habitat

Change in Class of Vehicles. Overall, the change is the class of vehicles would not effect or alter the condition of snags in green forest ecosystem component for the hairy woodpecker. In addition, some existing motorized NFTS roads may receive different maintenance resulting in higher number of snags retained along routes within 60 meters, which would provide additional snags for foraging and nesting in localized areas. The resulting roadway condition would depend upon the amount and type of vegetation present and the type of maintenance any given road receives.

Wet Weather Seasonal Restrictions. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where hairy woodpecker habitat effectiveness of snags within green forests would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted during the wet weather season. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, the hairy woodpecker habitat effectiveness would not be enhanced when native surfaced motorized routes are under wet weather seasonal restrictions. Under Alternative 1, continued cross country travel, including on existing motorized trails un-authorized for motorized use, would result in the greatest amount of disturbance (reduced habitat effectiveness) to hairy woodpecker habitat within snags within green forests.

Prohibition of Cross Country Travel. Under Alternative 1, cross country travel would not be prohibited, potentially affecting 637,148 acres of green forest habitat, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment by the hairy woodpecker. For the action alternatives, cross country travel would be prohibited on 637,148 acres, where disturbance, avoidance, abandonment would be reduced or eliminated.

Addition of Motorized Trails to the National Forest Transportation System (NFTS). Table 3.03-80 displays the alternatives affect hairy woodpecker habitat within a 60-meter zone of influence of motorized trail additions to the NFTS, where snags could be removed for hazard tree removal or public fuelwood gathering. The Tahoe NF Motorized Travel Management Project could potentially directly or indirectly affect 1% (58,006 acres out of 4,381,000 Sierra Nevada habitat acres) of hairy woodpecker habitat, under Alternative 1, where snags could be removed for public safety along existing motorized trails un-authorized for motorized use. Alternative 5 affects 0.2% (10,547 acres of 4,381,000 Sierra Nevada habitat acres) of hairy woodpecker habitat. Alternatives 2, 4, and 7, similarly affects 0.1% hairy woodpecker habitat (2,637 out of 4,381,000 Sierra Nevada habitat acres), while Alternative 3 does not directly or indirectly affect hairy woodpecker habitat. It is not expected that all snags along motorized routes would be removed, but incidental removal of hazard trees for public safety and access to fuelwood gathering could result in the loss of incidental snags along proposed motorized route additions. The relatively small amount of habitat within a 60-meter zone of influence is not likely to result in a measurable change in the snag habitat component at the scale of the Sierra Nevada Bioregion.

Table 3.03-80. Prohibition of Cross Country Travel and Proportion of Snags in Green Forest Hairy Woodpecker habitat within a 60-meter "Zone of Influence" of Motorized Trail Additions to the National Forest Transportation System (NFTS)

Hairy Woodpecker (Snags in Green Forest Habitat Ecosystem component)		**Alt 1[1]**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Prohibition of Cross Country Travel within Tahoe NF project area								
Acres of Hairy Woodpecker habitat where cross country travel is prohibited		0	637,148	637,148	637,148	637,148	637,148	637,148
Acres of hairy woodpecker habitat where cross country travel where cross country travel is not prohibited		637,148	0	0	0	0	0	0
Proportion of Snag Ecosystem Component in Green Forest Habitat (Hairy Woodpecker MIS Habitat) within 60-meter "Zone of Influence" of Motorized Trail Additions to the NFTS								
Acres – Hairy Woodpecker Green Forest Habitat[2]		58,006	2,637	0	2,637	10,547	2,637	2,637
Proportion of Sierra Nevada Habitat (Based on total acres early, mid, late-open canopy, and late-closed canopy coniferous forests in SN bioregion)	4,381,000	1.3%	0.1%	0%	0.1%	0.2%	0.1%	0.1%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat	990,707	6%	0.3%	0%	0.3%	1%	0.3%	0.3%
Habitat Security Risk in Tahoe NF		Low	Low	Low	Low	Low	Low	Low

[1] Alternative 1 includes existing motorized trails un-authorized for motorized use that would continue with the continuance of cross country travel.

[2] The Zone of Influence within 60 meters of motorized routes include both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard ownership pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Summary of Direct and Indirect Effects

Table 3.03-81 summarizes the overall net direct and indirect effect of the alternatives from motorized route additions, prohibition of cross country travel, wet weather restrictions, and changes in class of vehicles to the hairy woodpecker.

Table 3.03-81. Hairy Woodpecker - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized trail additions to the NFTS	Negative effects to 6% hairy woodpecker habitat	Negative effects to 0.3% hairy woodpecker habitat	No effect to hairy woodpecker habitat	Negative effects to 0.3% hairy woodpecker habitat	Negative effects to 1% hairy woodpecker habitat	Negative effects to 0.3% hairy woodpecker habitat	Negative effects to 0.3% hairy woodpecker habitat
Cross Country Travel	Negative impact - Continues on 637,148 hairy woodpecker habitat acres, affecting 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 5% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact - Prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.
Wet Weather Restrictions	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat
Change in Class of Vehicles	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat	No effect to habitat
Overall Net Effect of Proposed Actions	Negative impact – cross country travel not prohibited on 637,148 hairy woodpecker habitat acres, affecting 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 5% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.	Positive Impact – cross country travel prohibited on 63,148 hairy woodpecker habitat acres, including within 6% hairy woodpecker habitat within a 60 meter zone of influence of existing motorized trails un-authorized for motorized use.

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

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to the hairy woodpecker includes all medium (15 to 30 inch dbh) and large snags (>30 inch dbh) within green forests within the boundary of the Tahoe NF. Past and current cumulative effects to the medium and large snag ecosystem component include loss of snags through catastrophic wildfires; timber and fuels management; urban development and expansion within a highly checkerboard land ownership pattern; and public fuelwood removal. In addition, hazard tree removal along NFTS roads and recreational facilities has had an impact on the snag resource. Snag recruitment and creation from natural levels and unnaturally high levels of tree mortality has also been a factor in the condition of snags on the Tahoe NF.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the late seral closed canopy coniferous forests within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to snags in green forest habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally due not result in a reduction of snags in green forest habitat because they generally retain snags throughout the project areas as required by LRMP standards and guidelines. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have resulted in the loss of hairy woodpecker habitat. Facilities maintenance through hazard tree removal along roads and near recreational facilities has resulted in a limited loss of snags.

Table 3.03-82 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, non-motorized trail development, and special use permit re-issuances.

Table 3.03-82. Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	Potential loss of snags through hazard tree removal. Short-term disturbance during harvest.	None to minimal cumulative impact
Special Use permit renewal	4	N/A administrative action	None

Cumulative Effects Conclusion

The Tahoe NF Motorized Travel Management Project could potentially add to existing cumulative effects by directly or indirectly affecting 6% (58,006 acres out of 990,707 Tahoe NF acres) of hairy woodpecker habitat, under Alternative 1, where snags could be removed for public safety along existing motorized

trails un-authorized for motorized use. Alternative 5 affects 1% (10,547 acres of 990,707 Tahoe NF acres) of hairy woodpecker habitat. Alternatives 2, 4, and 7, similarly affects 0.3% hairy woodpecker habitat, while Alternative 3 does not directly or indirectly affect hairy woodpecker habitat. Based on the small proportion of hairy woodpecker habitat potentially affected by the addition of motorized trails to the NFTS, the Tahoe NF Motorized Travel Management Project will not alter the existing trend in the snags in green forest ecosystem component.

The change is the class of vehicles would not effect or alter the condition of snags in green forest ecosystem component for the hairy woodpecker, but may result in higher snag densities along routes that receive different maintenance.

Hairy woodpecker habitat effectiveness may be enhanced under Alternatives 4, 5, and 6 where wet weather seasonal restrictions on all native surfaced roads and motorized trails would be implemented. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, the hairy woodpecker habitat effectiveness would not be enhanced when native surfaced motorized routes are under wet weather seasonal restrictions.

Under Alternative 1, cross country travel would continue, potentially affecting 637,148 acres of snags within green forest habitat, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment by the hairy woodpecker. For the action alternatives, cross country travel would be prohibited on 637,148 acres, where disturbance, avoidance, abandonment would be reduced or eliminated.

Summary of Hairy Woodpecker Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the hairy woodpecker; hence, the snag effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the hairy woodpecker. This information is drawn from the detailed information on habitat and distribution population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Ecosystem Component Status and Trend. The current (based on 2001-2004 inventory sources) average number of medium-sized and large-sized snags (≥ 15” dbh, all decay classes) per acre across major coniferous and hardwood forest types (westside mixed conifer, ponderosa pine, white fir, productive hardwoods, red fir, eastside pine) in the Sierra Nevada ranges from 1.4 per acre in eastside pine to 8.3 per acre in white fir. Detailed information by forest type, snag size, and snag decay class can be found in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Data from the mid-to-late 1990s were compared with the current data to calculate the trend in total snags per acre by Regional forest type for the 10 Sierra Nevada national forests and indicate that, during this period, snags per acre increased within westside mixed conifer (+0.80), white fir (+1.98), and red fir (+0.68) and decreased within ponderosa pine (-0.17), productive hardwoods (-0.17), and eastside pine (-0.16).

Population Status and Trend. The hairy woodpecker has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including 1997 to

present – Lassen National Forest (Burnett and Humple 2003, Burnett et al. 2005); 2002 to present - Plumas and Lassen National Forests (Sierra Nevada Research Center 2007); 1992 to 2005 – Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that the hairy woodpecker continues to be present at these sample sites, and current data at the range wide, California, and Sierra Nevada scales indicate that the distribution of hairy woodpecker populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Hairy Woodpecker Trend. Based on the small proportion of the snag ecosystem component in green forest that is directly, indirectly and cumulatively affected (0 to 1% of Sierra Nevada habitat) by the project alternatives, the Tahoe NF Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of hairy woodpecker across the Sierra Nevada bioregion.

Aquatic and Riparian Associated Species

Introduction: The Aquatic-Riparian group includes either terrestrial and aquatic species that spend a part or their entire life cycle within or adjacent to riparian and/or aquatic habitats. These include a large number of special status species on the Tahoe NF (Tables 3.03-1 and 3.03-2). This section will provide general information on road and trail-associated impacts to bald eagles, willow flycatchers, great gray owls, greater sandhill crane, frogs, fish, aquatic invertebrates, and general aquatic/riparian habitats that may be associated with this group. Species not included in detail here will be addressed in the Biological Evaluation and Management Indicator Species reports, which are hereby incorporated by reference.

The effects of roads and motorized trails on aquatic habitat are considered to be wide-ranging and potentially serious at local levels. The Tahoe NF utilized the Ecosystem Management Decision Support (EMDS) system which utilizes knowledge-based decision support for determining relative risk of motorized travel routes to aquatic species and habitats. EMDS integrated geographic information system (GIS) data with knowledge-based reasoning and decision modeling technologies. Aquatic habitats include streams, ponds, lakes, meadows, riparian habitat. The analysis consisted of GIS and EMDS modeling outputs which included data on road density, proximity to streams, erosion hazard ratings, and stream crossings at multiple watershed scales (5th field, 6th field, and 7th field). A detailed summary of the aquatic habitat modeling can be found in Chapter 3.02 (Soil and Watershed Resources).

The analysis measures used for aquatic and riparian species responds to the desired conditions and the management standards and guidelines for wetland, meadow, and aquatic systems as directed in the Tahoe LRMP, as amended by the SNFPA ROD (2004). See *Analysis Framework: Statute, Regulation, Forest Plan, and Other Direction* at the beginning of this Terrestrial & Aquatic Species section.

Riparian Associated Bird Species

Affected Environment

Under Executive Order 13186, migratory bird species are identified as a priority for planning efforts and for evaluating environmental effects of projects. In the Sierra Nevada bioregion, 53 species of birds

depend critically on or substantially utilize riparian or meadow habitats (Siegel and deSante 1999). Focal species associated with riparian habitats include the black-headed grosbeak, song sparrow, warbling vireo, Swainson's thrush, tree swallow, Wilson's warbler, and yellow warbler (RHJV 2004). These species are strongly associated with a range of riparian habitats on the Tahoe NF, from lower elevation streamside zones to higher elevation meadows.

Meadows provide some of the most important habitat for neotropical migrants and resident landbirds in the Sierra Nevada, providing important stopover habitat for many species (Siegel and deSante 1999). Thirty-seven species critically depend on, or are strongly associated with Sierra montane meadows. Of these species, six are stable, 14 are decreasing, and four are increasing (13 are inadequately sampled by the BBS to allow the calculation of a population trend, but among these 13 are two California endangered species (willow flycatcher and great gray owl) and a California Bird Species of Special Concern (Vaux's swift)). The preponderance of decreasing species is statistically significant. Riparian focal species that use meadow habitats include the song sparrow, yellow warbler, and Wilson's warbler (RHJV 2004). Meadows also provide important habitat for the red-breasted sapsucker which is identified as a "Watch List" species in the Partners in Flight North American Landbird Conservation Plan.

Effects Common to All Alternatives

Changes in Class of Vehicles: Although responses to motorized vehicle use varies by species and depends upon the type of vehicle, in addition to the intensity, timing, speeds, and amount motorized vehicle use, specific species responses are not well understood. For this analysis, it is assumed that all vehicle types result in the same disturbance to riparian associated bird species. Therefore, changes in the class of vehicles would not vary in their direct effects to riparian associated bird species for all of the proposed alternatives. Indirect effects to riparian habitats are discussed under each species, as appropriate.

Wet weather seasonal restrictions: Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails where riparian species would benefit from reduced noise disturbance when wet weather restrictions would be implemented.

Bald Eagle: Affected Environment

On July 9, 2007, USDI Fish and Wildlife Service in a Final Rule announced that the bald eagle would be removed (delisted) from the Federal List of Endangered and Threatened Wildlife in the lower 48 states. Official delisting of the bald eagle occurred 30 days from the date the Final Rule. The bald eagle will continue to be protected by the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. Upon delisting, the bald eagle was placed on the Regional Forester's list of Sensitive Species.

Bald eagles nest near or adjacent to large bodies of water. Within the Tahoe National Forest, twelve bald eagle breeding territories have been identified within the Tahoe NF boundary including National Forest System lands and private lands in recent years (Table 3.03-83). Eight bald eagle territories with recent nesting activity are located on National Forest System lands. Four territories occur on private land at Donner Lake, Fordyce Lake, Spaulding Reservoir, and Milton Reservoir.

Table 3.03-83. Known Bald Eagle Nest Territories on the Tahoe NF

Territory Name	Ranger District	Ownership
New Bullards Bar	Yuba River Ranger District	Tahoe NF
Deer Creek	Yuba River Ranger District	Tahoe NF
Spaulding Lake	Yuba River Ranger District	Private
Stampede #1 (Dam)	Truckee Ranger District	Tahoe NF
Stampede #2 (Sagehen Arm)	Truckee Ranger District	Tahoe NF
Boca Reservoir	Truckee Ranger District	Tahoe NF
Prosser Reservoir	Truckee Ranger District	Tahoe NF
Donner Lake	Truckee Ranger District	Private
Independence Lake	Sierraville Ranger District	Tahoe NF
Webber Lake	Sierraville Ranger District	Tahoe NF
Fordyce Lake	Sierraville Ranger District	Private
Milton Reservoir	Sierraville Ranger District	Private

The road and motorized trail-associated factors that have been identified for the bald eagle include poaching, disturbance at specific site (nests and roost sites), and avoidance and displacement (Skagen et al. 1991, Stalmaster and Newman 1978). Several studies reported that eagles avoid or are adversely affected by human disturbance during the breeding period and may result in nest abandonment and reproductive failure (Stalmaster and Newman 1978, Andrew and Mosher 1982, Fraser 1985, Fraser et al. 1985, Knight and Skagen 1987, Buehler et al. 1991, Grubb and King 1991, Grubb et al. 1992, Chandler et al. 1995, Grubb 1995, Mathisen 1968).

The response of bald eagles to human activities is variable. Individual bald eagles show different thresholds of tolerance for disturbance. The distance at which a disturbance causes bald eagles to modify their behavior also is affected by the sight distance of the motorized use. For example, forested habitat can reduce the noise generated by motorized activity. In addition, if the noise-generating activity is hidden from the nest site, disturbance thresholds may be reduced. Some studies report that bald eagles seem to be more sensitive to humans afoot than to vehicular traffic (Grubb and King 1991, Hamann 1999). Anthony et al. (1989) found that the mean productivity of bald eagle nests was negatively correlated with their proximity to main logging roads, and the most recently used nests were located in areas farther from all types of roads and recreational facilities when compared to older nests in the same territory. However, in 2005 a bald eagle nest was discovered near a well-used County Road to access a popular reservoir used for recreational activities including fishing and boating. In addition, other studies indicate bald eagles can tolerate a certain amount of human disturbance (Harmata and Oakleaf 1992 *IN* Gaines et al. 2003). Disturbance is most critical during: nest building, courtship, egg laying and incubation (Dietrich 1990). In general, recommended buffer distances to reduce potential disturbance to bald eagles during the breeding season have ranged from 300 to 800 meters (Anthony and Isaacs 1989, Fraser et al. 1985, McGarigal 1988, Stalmaster 1987 In Joslin and Youmans 1999, Mathisen 1968). Grubb et al. (1992) found that eagles are disturbed by most activities that occur within 1500 feet; and they take flight when activities occur within 600 feet. Grubb and King (1991) assessed pedestrian traffic and vehicle traffic on bald eagle nesting activities and recommended buffers of 550 meters for pedestrians and 450 meters for vehicles. The USDA Forest Service routinely institutes a Limited Operating Period for ground disturbing projects within 0.25 mile (400 meters) of bald eagle nest sites.

Nest site protection through area closures is one of the primary ways that the Forest Service has implemented measures to prevent the potential for bald eagle nest failure and/or abandonment due to

human disturbances (USFWS 1986). There are currently two seasonal area closures for bald eagle nest site protection - one at Boca Reservoir and one at New Bullards Bar Reservoir.

In addition, roads and motorized trails have the potential to indirectly affect bald eagles by degrading water quality which may impact the distribution and abundance of fisheries upon which bald eagles prey.

Bald Eagle: Environmental Consequences

Analysis Measures

Changes in Class of Vehicles: Although responses to motorized vehicle use can vary by individual bald eagles, and depends upon the type of vehicle, in addition to the intensity, timing, speeds, and amount motorized vehicle use, specific species responses are not well understood. For this analysis, it is assumed that all vehicle types result in the same disturbance to the bald eagle species. Therefore, changes in the class of vehicles would not vary in their direct effects of disturbance to the bald eagle for the alternatives. Changes in class of vehicle will also have no effect to nesting bald eagle habitats that comprise of coniferous forests adjacent to large bodies of water.

Prohibition of Cross Country Travel: The proliferation of routes associated with cross country travel can have an adverse impact to nesting bald eagles, and is analyzed for the alternatives at two scales within 400 meters and 800 meters of known nest sites.

Motorized Access to Boca, Stampede, and Prosser Reservoirs: Motorized access across dry land to Boca, Stampede, and Prosser Reservoirs during low water are assessed to determine their impact to nesting bald eagles.

Disturbance at a Specific Site (Motorized Route Miles): Motorized route miles within ¼ mile and ½ mile of known bald eagle nest sites were determined to assess direct, indirect and cumulative effects.

Direct and Indirect Effects to Nesting Bald Eagles

Change in Class of Vehicles. Although responses to motorized vehicle use can vary by individual bald eagles, and depends upon the type of vehicle, in addition to the intensity, timing, speeds, and amount motorized vehicle use, specific species responses are not well understood. For this analysis, it is assumed that all vehicle types result in the same disturbance to the bald eagle species. Therefore, changes in the class of vehicles would not vary in their direct effects of disturbance to the bald eagle for all the alternatives. Changes in class of vehicle will also have no effect to nesting bald eagle habitats that comprise of coniferous forests adjacent to large bodies of water.

Wet Weather Seasonal Restrictions. Under Alternatives 4, 5, and 6, when wet weather restrictions on all native surfaced roads and motorized trails overlap with critical bald eagle nesting periods (overlap January – March), bald eagle would benefit from reduced noise disturbance associated with motorized use. The remaining alternatives do not impose wet weather restrictions, and therefore would not benefit bald eagle during critical nesting periods.

Prohibition of Cross Country Travel. Cross country travel will be prohibited on 814 acres within 400 meters and on 3,299 acres within 800 meters of bald eagle nest sites, for all the action alternatives. The prohibition of cross country travel will prevent the proliferation of new routes unauthorized to motorized public use and will reduce disturbance associated with motorized use on these routes within

foraging and nesting habitat for bald eagles. The prohibition of cross country travel also results in a reduction of the total amount of roads and trails available for motorized use by preventing cross-country motorized use, including use of the existing motorized trails un-authorized for motorized use in all the action alternatives. The prohibition of cross country travel will reduce the potential for disturbance to nesting bald eagles that may be vulnerable to activities associated with motorized cross country travel. Alternative 1 does not prohibit cross country motorized use, and may result in increased disturbance to nesting bald eagles on between 814 acres and 3,299 acres.

Additions of Motorized Trails to the National Forest Transportation System and Designation of Open Areas

Motorized Access to Boca, Stampede, and Prosser Reservoirs: Motorized access to Boca, Stampede, and Prosser reservoirs will not affect bald eagle nest territories under all the action alternatives, except for Alternative 2. Under Alternative 2, two bald eagle territories may potentially be impacted by "motorized access to Boca, Stampede, and Prosser reservoirs," where motorized access to the shoreline below high water mark is allowed when soils are dry. Bald eagle territories potentially affected by motorized access are located at Stampede Reservoir #2 (Sagehen Arm) and Prosser Reservoir. Although motorized access to the shoreline at Boca Reservoir is also proposed, there is currently a seasonal closure to protect bald eagles during the nesting season at this location. A second territory near Stampede Dam would not be affected by motorized access at Stampede Reservoir, since the nest site is located outside of the area where motorized access to the shoreline would be permitted.

Generally, low water conditions at these reservoirs occur during the latter part of the summer. However, the timing and duration of low water conditions occurring at Stampede Reservoir nest #2 and Prosser Reservoir will vary depending upon the yearly precipitation condition and upon the level of water drawn down. Reservoir water levels are regulated by the Bureau of Reclamation. Considerable water draw down levels can result during very dry years. Depending upon the timing and the actual water levels, overlap between the bald eagle nesting period (January though August) and motorized access may occur at Prosser and Stampede reservoirs. In general, overlap between motorized access and bald eagle nesting would likely occur toward the latter part of the bald eagle nesting season which could potentially cause nest disturbance and/or failure depending upon the timing when the activities overlap. However, the bald eagle nest territory at Prosser Reservoir was recently discovered and is located at the end of a well-used County Road. For Alternative 2, it is uncertain how providing motorized access to the shoreline during low water would impact nesting bald eagles at Stampede Reservoir nest #2 and Prosser Reservoir in the future because the nesting eagles may either become habituated to the motorized or may be subject to nest disturbance from increased use over time. Current levels of motorized use seem to be compatible with bald eagles nesting at Prosser Reservoir. However, if motorized and dispersed use increases in the future, this could potentially cause disturbance and ultimately loss in reproductive productivity for bald eagles at this site.

Disturbance at a Specific Site (Motorized Route Miles)

Disturbance to bald eagle nest sites from project alternatives is analyzed by determining the number of miles of motorized trails added to the NFTS occurring between 0 and 400 meters, and between 400 and 800 meters from each bald eagle territory (Table 3.03-84). Factors associated with motorized trails at a distance between 0 to 400 meters of bald eagle nest sites will likely cause the greatest potential disturbance to nesting bald eagles during the nesting season. Disturbance from motorized trails between 400 and 800 meters away from nest sites will likely have a lesser effect since noise associated with vehicles diminishes at greater distances, but may still modify behavior of nesting eagles, particularly for foraging eagles.

Table 3.03-84 indicates that Alternative 1 poses the greatest risk to nesting bald eagles on the Tahoe NF. Alternative 1 would potentially impact 6 bald eagle territories where continued cross-country travel would allow continued use on approximately 4 miles of existing motorized trails un-authorized for motorized use within 400 meters of bald eagle nest sites. An additional 6 miles would potentially affect bald eagle nest sites between 400 and 800 meters. Territories at Deer Creek, Boca Reservoir, Prosser, and Webber Lake would receive the greatest amount of impacts where motorized trails within 400 meters of a nest site range between about 0.5 mile to 1 mile per territory.

Alternative 5 would pose the next greatest impact from motorized trail additions to the NFTS, where 5 bald eagle territories could potentially be impacted. However, under Alternative 5, 3 of the 5 bald eagle territories would only have about 0.1 mile of motorized trails added to the NFTS within 400 meters of nest sites (Stampede Dam, Stampede at Sagehen Arm, and Prosser Reservoir). Under Alternative 5, Boca Reservoir and Deer Creek territories would potentially be impacted by about 1 mile of motorized trail additions to the NFTS each where disturbance to nesting bald eagle could potential pose a risk to reproductive success, especially if dispersed recreation adjacent to nest sites occurs. Nearly 5 additional miles of motorized trails are added to the NFTS within 400 to 800 meters of nest sites.

Alternatives 2 & 7 are similar in the amount of direct and indirect impacts to nesting eagles, where only 0.1 mile of motorized trails within 400 meter of nest sites at Prosser Reservoir would be added to the NFTS.

Alternatives 3, 4, and 6 do not propose any motorized trail additions to the NFTS within 400 meters of bald eagle nest sites, and therefore direct and indirect effects to nesting eagles would not be expected. Within 400 to 800 meters of nest sites, an additional 0.1 mile of motorized trails to the NFTS would contribute to disturbance from motorized routes for Alternatives 4 & 6, but should not cause a considerable impact to nesting eagles for this small amount of mileage at a distance beyond 400 meters. No additional motorized trails would be added to the NFTS within 400 to 800 meters of nest sites under Alternative 3.

Table 3.03-84. Miles of Motorized Trails added to the National Forest Transportation System (NFTS) within 0 to 400 meters and within 400 to 800 meters of Bald Eagle Nest Sites

Territory Name	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
New Bullards Bar							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	0	0	0	0	0	0	0
Deer Creek							
0 to 400 meters	**1.0**	0	0	0	**0.6**	0	0
400 to 800 meters	**1.0**	0	0	0	**0.8**	0	0
Spaulding Lake (pvt)							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	0	0	0	0	0	0	0
Stampede Nest #1 (Dam)							
0 to 400 meters	**0.1**	0	0	0	**0.1**	0	0
400 to 800 meters	**1.4**	**0.1**	0	**0.1**	**1.5**	**0.1**	**0.1**
Stampede Nest #2 (Sagehen Arm)							
0 to 400 meters	**0.1**	0	0	0	**0.1**	0	0
400 to 800 meters	**0.8**	0	0	0	**0.8**	0	0
Boca Reservoir							
0 to 400 meters	**0.9**	0	0	0	**0.9**	0	0
400 to 800 meters	**0.6**	0	0	0	**0.6**	0	0
Prosser Reservoir							
0 to 400 meters	**1.1**	**0.1**	0	0	**0.1**	0	**0.1**
400 to 800 meters	**1.2**	**0.7**	0	0	**2.2**	0	**0.7**
Donner Lake (pvt)							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	0	0	0	0	0	0	0
Independence Lake							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	0	0	0	0	0	0	0
Webber Lake							
0 to 400 meters	**0.4**	0	0	0	0	0	0
400 to 800 meters	**0.9**	0	0	0	0	0	0
Fordyce Lake							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	0	0	0	0	0	0	0
Milton Reservoir (pvt)							
0 to 400 meters	0	0	0	0	0	0	0
400 to 800 meters	**0.2**	0	0	0	0	0	0
Total Proposed Motorized Route Miles For All Nest Sites							
Motorized trail additions to the NFTS (negative impact)[1]	0	0.2	0.0	0.0	1.1	0.0	0.2
0 to 400 meters	**3.6**	**0.1**	**0**	**0**	**1.8**	**0**	**0.1**
400 to 800 meters	**6.1**	**0.8**	**0**	**0.1**	**5.9**	**0.1**	**0.8**
Total (0 to 800 meters)	**9.7**	**0.9**	**0**	**0.1**	**7.7**	**0.1**	**0.9**

*Alternative 1 includes existing routes unauthorized to motorized public use that would continue under cross country travel

Summary of Direct and Indirect Effects

Table 3.03-85 summarizes the overall net direct and indirect effect of the alternatives from motorized trail additions to the National Forest Transportation System (NFTS), prohibition of cross country travel, wet weather restrictions, and changes in class of vehicles.

Table 3.03-85. Bald Eagle - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized trail additions to the NFTS	Negative effects to 8 bald eagle nest territories for a total of 9.7 miles (3.7 miles within 400 meters, and 6 miles within 400 meters to 800 meters of nest site).	Negative effects to 2 bald eagle nest territories for a total of 0.8 miles (0.1 miles within 400 meters, and 0.7 miles within 400 meters to 800 meters of nest sites).	No effect to bald eagle nest territories.	Negative effects to 1 bald eagle nest territories for a total of 0.1 miles within 400 meters of nest site.	Negative effects to 5 bald eagle nest territories for a total of 7.5 miles (2.8 miles within 400 meters, and 4.7 miles within 400 meters to 800 meters of nest sites).	Negative effects to 1 bald eagle nest territories for a total of 0.1 miles within 400 meters of nest site.	Negative effects to 2 bald eagle nest territories for a total of 0.8 miles (0.1 miles within 400 meters, and 0.7 miles within 400 meters to 800 meters of nest sites).
Cross Country Travel	Continues on 814 acres within 400 meters of bald eagle nests, including on 3.6 miles of existing motorized trails un-authorized for motorized use, and prohibited on 0.6 miles.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.5 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 2.8 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.5 miles of existing motorized trails un-authorized for motorized use.
Wet Weather Restrictions	No effect	No effect	No effect	Positive Benefit - reduced disturbance during nesting season.	Positive Benefit - reduced disturbance during nesting season.	Positive Benefit - reduced disturbance during nesting season.	No effect
Change in Class of Vehicles	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Overall Net Effect of Proposed Actions	Negative impacts to bald eagle where cross country travel is not prohibited, on 814 to 3,299 acres including on 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.5 miles of existing motorized trails un-authorized for motorized use.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.6 miles of existing motorized trails un-authorized for motorized use; and reduced effects from wet weather restrictions.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 2.8 miles of existing motorized trails un-authorized for motorized use; and reduced effects from wet weather restrictions.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.6 miles of existing motorized trails un-authorized for motorized use; and reduced effects from wet weather restrictions.	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.5 miles of existing motorized trails un-authorized for motorized use.

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

Cumulative Effects to Nesting Bald Eagles

Cumulative effects to the bald eagle analyzes the cumulative effects of motorized routes occurring on NFS and private lands within the Tahoe NF.

Cumulative Effects Boundary

The cumulative effects for the bald eagle includes all the bald eagle nest territories and surrounding bald eagle habitat that occur within the boundary of the Tahoe NF including both NFS lands and private lands. This geographic boundary is sufficient large enough to analyze cumulative effects to bald eagles since their home ranges lie entirely within the boundary of the Tahoe NF. The spatial timeframe for analyzing cumulative effects goes back approximately 50-100 years into the past and approximately 20 to 50 years into the future.

Cumulative Effects Summary of Past, Present, and Reasonably Foreseeable Actions

The development of reservoirs across the Forest on both NFS and non-NFS lands have created bald eagle foraging habitat. Cumulative effects to the bald eagle habitat around these reservoirs include disturbance from a variety recreational activities including developed and dispersed camping, hiking, fishing, boating, motorized vehicle use, and others. Seasonal closures at Boca and Bullards Bar reservoirs have been instituted to mitigate potential adverse recreational disturbance to nesting bald eagles. Bald eagles appear to be able to adapt to a certain amount of human disturbance and appear to be increasing on the Forest. Historic vegetation management activities have removed a considerable amount of bald eagle nesting habitat particularly on the east side of the Forest around Boca, Stampede and Prosser Reservoirs (i.e. large diameter trees used for nesting). The loss of nesting and foraging habitat from high levels of disease and drought related bark beetle infestations has also affected the quality and quantity of bald eagle habitat. Present and future fuels and vegetation management prescriptions are designed to retain the larger tree component, so that bald eagle nest tree components should be available. In addition, large snags used for roost trees would also retained. Forest thinning and fuels treatment projects are designed to prevent loss of bald eagle habitat over the long-term.

Miles of Motorized Routes Within 0 to 400 Meters of Nest Sites

The direct and indirect effects of the project Alternatives contribute to two of the four risk factors described above - degradation of wintering or breeding habitat through human development or habitat alteration, and disturbance at nest and roost sites.

Under Alternative 1, cross-country travel would continue, including travel on approximately 4 miles of existing motorized trails un-authorized for motorized use within 400 meters of a bald eagle nest site, which would potentially result in direct disturbance to nesting bald eagles (Table 3.03-86). In addition, under Alternative 1, wet weather closures would not be proposed on native surfaced roads and motorized trail, and could result in decreases in water quality of bald eagle foraging habitat. Because Alternative 1 does not prohibit motor vehicle cross-country travel, it is highly likely that future route proliferation and associated cumulative impacts would likely increase, and therefore the effects of Alternative 1, when

combined with the effects of current and future recreation activity, may result in significant adverse cumulative effects to nesting bald eagles.

Alternative 5 would contribute to adverse cumulative impacts by allowing motorized use on approximately 2 miles within 400 meters of bald eagle nest sites. When considering the total cumulative impact of all motorized routes (NFS and non-NFS), nearly 4 miles of motorized routes would occur within 400 meters of bald eagle nest sites under Alternative 5. However, wet weather closures proposed under Alternative 5 would provide some added benefit to water quality and bald eagle foraging habitat.

Alternatives 2 and 7 adds only about 0.1 mile of motorized trails to the NFTS that would contribute additional cumulative impacts to nesting bald eagles at Prosser Reservoir. However, since bald eagles have successfully reproduced at Prosser Reservoir, this amount of existing recreational use does not appear to affect nesting success. Alternatives 3, 4, and 6 do not result in direct or indirect effects to known nest sites, and therefore they do not contribute to existing cumulative impacts. In addition, alternatives 4 and 6 provide some added benefit to bald eagle foraging habitat from wet weather seasonal closures.

For all the action alternatives, future cross-country motorized travel would be prohibited, including motorize use on 2.6 to 3.6 miles of existing motorized trails un-authorized for motorized use within 400 meters of nest sites. Cross country travel on 814 acres within 400 meters of bald eagle nest sites would benefit bald eagles by preventing direct disturbance to nesting bald eagles on the Tahoe NF. However, non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on these routes. Some impacts to bald eagles may be expected from non-motorized use in the future, but may be less or more than motorized use depending on the type and intensity of disturbance. Bald eagle response to non-motorized disturbance also depends upon any individual bald eagle's ability to become habituated to certain types of disturbance. Furthermore, as these existing motorized trails un-authorized for motorized use become re-vegetated and recover either through active or passive restoration efforts, overall bald eagle disturbance from human activity is expected to diminish in the future.

Table 3.03-86. Cumulative Effects of Motorized Route miles within 0 to 400 meters of Bald Eagle Nest Sites

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized Trail additions to NFTS (negative impact)[1]	0	0.1	0.0	0.0	1.8	0.0	0.1
Existing motorized trails un-authorized for motorized use with the continuance of cross country travel (negative impact)	3.6	0	0	0	0	0	0
Miles of motorized trails un-authorized for motorized use with the prohibition of cross country travel (positive impact)	0.6	3.5	3.6	3.6	2.6	3.6	3.5
Acres within 400 meters of bald eagle nest sites where cross country travel is prohibited (postive impact)	0	814	814	814	814	814	814
Acres within 400 meters of bald eagle nest sites where cross country travel is not prohibited (negative impac)	814	0	0	0	0	0	0

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cumulative effects of past, present, and proposed actions							
Miles of existing motorized routes - NFS lands (negative impact)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Miles of existing motorized routes on private land - non-NFS lands (negative impact)	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Miles of existing non-motorized routes (negative impact)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miles of decommissioned routes (positive impact)	0.0	4.1	4.2	4.2	1.5	4.1	4.1
Net Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**5.4**	**0.9**	**1.8**	**1.8**	**3.6**	**1.8**	**0.9**
Acres within 400 meters of bald eagle nest sites where cross country travel is prohibited	**0**	**814**	**814**	**814**	**814**	**814**	**814**

Table 3.03-87 displays the number of route miles which may contribute to disturbance to nesting eagles between 400 and 800 meters, though probably to a lesser extent than routes that are within closer proximity to nest sites (i.e. routes < 400 meters). Motorized routes beyond 400 meters of nest sites, potentially can add to existing cumulative impacts to bald eagle nesting success. As stated earlier, some studies have shown that eagles responded to disturbance at distances less than 800 meters.

Table 3.03-87. Cumulative Effects of Motorized Route miles within 400 to 800 meters of Bald Eagle Nest Sites

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Motorized trail additions to NFTS (negative impact)	0	0.7	0.0	0.1	4.7	0.7	0.7
Continued use on motorized trails un-authorized for motorized use	5.9	0	0	0	0	0	0
Miles of motorized trails prohibited to motorized use due to the prohibition of cross country travel (positive impact)	1.4	6.0	6.0	6.0	6.0	6.0	6.0
Acres where cross country travel is prohibited within 400 to 800 meters of bald eagle nest sites (positive impact)	0	3,299	3,299	3,299	3,299	3,299	3,299
Acres where cross country travel is not prohibited within 400 to 800 meters of bald eagle nest sites (negative impact)	3,299	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Miles of existing motorized routes - NFS lands (negative impact)	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Miles of existing motorized routes on private land - non-NFS lands (negative impact)	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Miles of existing non-motorized routes (negative impact)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miles of decommissioned routes (positive impact)	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Total Cumulative Effects							
Overall Cumulative Effects equals the total of all impacts, both positive and negative	**23.1**	**15.0**	**14.1**	**14.2**	**18.8**	**14.8**	**14.8**
Acres where cross country travel is prohibited within 400 to 800 meters of bald eagle nest sites	0	3,299	3,299	3,299	3,299	3,299	3,299

Sensitive Species Determination

The Biological Evaluation for the Tahoe NF Motorized Travel Management Project, which is hereby incorporated by reference, made a determination that the action alternatives may affect the bald eagle, but do lead to a trend toward federal listing or loss of viability within the Tahoe NF, since current and future cross country travel by motorized vehicles would be prohibited. The prohibition of cross country travel will reduce the potential for disturbance to nesting bald eagles that may be vulnerable to activities associated with motorized use and cross country travel. Alternative 1, no action, may affect individual bald eagles and may lead to a trend toward federal listing due to the continued route proliferation from cross country motorized travel. Alternative 1 does not prohibit cross country motorized use, and may result in increased disturbance to nesting bald eagles.

Willow Flycatcher: Affected Environment

On the Tahoe NF, the willow flycatcher (*Empidonax traillii* ssp. *trailii* and *E.t. brewsteri*) is designated by the Regional Forester as a Sensitive species. In California, the willow flycatcher is a rare to locally uncommon, summer resident in wet meadow and montane riparian habitats at 600-2500 m (2000-8000 ft) in the Sierra Nevada and Cascade Range (CWHR 2005). Willow flycatcher populations in the Sierra Nevada are considered to be at risk (USDA Forest Service 2001). Historically, willow flycatchers were once common throughout the Sierra Nevada. The current distribution of the willow flycatcher has been drastically reduced compared to historic distributions. A ten year demographic analysis indicate the Sierra Nevada willow flycatcher populations are continuing to decline. With the exception of a few sites, the majority of areas where willow flycatchers have been located support low numbers of breeding territories, and some as low as 1-2 pairs of breeding individuals.

Willow flycatcher breeding habitat is characterized as montane wetland shrub habitat where there is a prevalence of willows and montane meadows with standing or flowing water, or highly saturated soils throughout the nesting season (Green, et al. 2003). A study by Cain (2001 In Cain et al 2003) indicated that meadow wetness may assist in successful nesting by willow flycatcher by inhibiting potential forest and edge predators from accessing willow flycatcher nests. Meadow wetness may also be important for willow flycatcher insect prey species.

The Willow Flycatcher Conservation Assessment (Green et al. 2003) identified roads as one of the leading contributing factors responsible for the loss and degradation of willow flycatcher habitat. Specifically, roads (dirt-surfaced or paved), intercept surface and subsurface hydrological flow. Meadow desiccation occurs when hydrological flows are intercepted and redirected which may result in long-term habitat loss or degradation. Roads may have a negative impact on meadow hydrology, especially when roads bisect meadows and have associated drainage structures to maintain road conditions. Human disturbance associated with road and trail motorized use may also affect willow flycatcher nesting success. Roads also provide increased access to humans which may directly and indirectly affect willow flycatcher productivity. Roads provide access for livestock grazing and often meadows occupied by willow flycatchers are key forage areas for livestock. Livestock grazing has long been identified as contributing to the decline in willow flycatcher populations as it relates to grazing impacts on willow and meadow habitat, as well as potential direct impacts from cattle coming in direct contact or destroying nest

sites. Furthermore, brown-headed cowbirds are strongly associated with cattle. Cowbirds are known to parasitize willow flycatcher nests and ultimately may reduce overall willow flycatcher nesting success.

At least two willow flycatcher breeding sites have received damage from off road vehicle travel on the Tahoe NF in recent years. Wheel tracks leaving ruts within one willow flycatcher meadow was observed on more than one occasion. Several grazing allotments on the Tahoe NF overlap occupied and emphasis willow flycatcher sites.

Willow Flycatcher: Environmental Consequences

Analysis Measures

Change in Class of Vehicles: The changes in class of vehicle was analyzed for their potential to affect willow flycatcher occupied and emphasis habitat, since this action potentially changes the condition of the existing road surface from smoothed surfaced to rough surfaced; which could potentially alter meadow condition where routes intersect meadows or are within close proximity to motorized routes.

Wet weather seasonal restrictions: Wet weather seasonal restrictions on native surfaced roads and motorized trails are analyzed for their potential to benefit willow flycatcher through the reduction of erosion and sedimentation that could occur from wet season motorized use for each of the alternatives.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for their effects to willow flycatcher occupied and emphasis habitat.

Number of Occupied and Emphasis Willow Flycatcher Sites affected by Motorized Trail additions to the National Forest Transportation System (NFTS) and designation of "Open Areas": To evaluate the effects of motorized routes on willow flycatcher habitat, the number of willow flycatcher Occupied and Emphasis meadow sites containing motorized routes is determined. The Sierra Nevada Framework Plan Amendment ROD (2004) designated Occupied and Emphasis Habitats for willow flycatcher. Occupied habitat are sites where willow flycatcher(s) have been detected during the breeding season (between 15 June and August 1) (See SNFPA ROD 2004 for more detailed definition). Emphasis habitat is defined as meadows within 5 miles of Occupied willow flycatcher sites that are larger than 15 acres that have standing water on June 1 and a deciduous shrub component.

Direct and Indirect Effects

Change in Class of Vehicles. The change in class of vehicle proposed under Alternatives 2, 4, 5, 6, and 7, on some existing NFTS motorized roads may result in some smoothed surfaced roads becoming rough surfaced roads through changed road maintenance. In addition, some existing motorized NFTS roads may receive different maintenance resulting in increased vegetation density at the road margins which would provide additional cover and/or foraging habitat. The resulting roadway condition would depend upon the amount and type of vegetation present and the type of maintenance any given road receives. For the willow flycatcher existing habitat conditions will dictate whether or not the change in class of vehicle will result in reduced habitat quality. In general, it is not expected that the change in class of vehicle would result in a significant change to willow flycatcher habitat conditions, unless different road maintenance results in increased meadow habitat degradation. No changes in class of vehicle are proposed under Alternatives 1 and 3, which means that some system routes would remain under their current maintenance

management strategy. However, in some cases some existing system roads have already become rough surfaced due to changes in maintenance.

Wet Weather Seasonal Restrictions. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails where willow flycatcher occupied and emphasis meadows would be benefited that are intersected by native, surfaced motorized routes, through the reduction of erosion and sedimentation that could occur from wet season motorized use. Alternative 1, with the greatest miles of motorized routes that intersect the most number of willow flycatcher meadows, which would continue to be impacted by motorized use during the wet weather season, where habitat degradation within willow flycatcher meadows could occur. Roads have often been cited as being the source of resource damage and habitat degradation to meadows including those potentially used by willow flycatchers.

Prohibition of Cross Country Travel. Alternative 1 would pose the greatest risk to willow flycatcher on 3,075 acres (occupied meadows - 1,747 acres, emphasis meadows - 1,328 acres) where willow flycatcher meadows would be subject to continued cross country travel, including on existing motorized trails un-authorized for motorized use. Under the action alternatives, motorized cross country travel would be prohibited on 1,747 acres willow flycatcher occupied meadows, and on 1,328 acres emphasis meadows, totaling 3,075 acres willow flycatcher meadows, including on approximately 4 miles of existing motorized trails un-authorized for motorized use within 20 to 23 willow flycatcher meadows. Under Alternative 1, cross country travel would continue, including on 3.8 miles of existing motorized trails un-authorized for motorized use within 22 meadows (Table 3.03-88), potentially causing disturbance to willow flycatcher and habitat degradation.

Additions of Motorized Trails to the National Forest Transportation System (NFTS) and Designation of "Open Areas"

Direct and indirect effects of the project alternatives are evaluated by determining the number of proposed motorized trail additions to the NFTS and designation of "Open Areas" that intersect delineated willow flycatcher meadow meadows on the Tahoe NF.

Number of Occupied and Emphasis Willow Flycatcher Meadows: Table 3.03-88 displays the willow flycatcher Occupied and Emphasis meadow sites on the Tahoe NF that are potentially affected by the project alternatives. Under Alternative 1, 22 (61%) willow flycatcher meadow sites would be intersected by existing motorized trails un-authorized for motorized use (3.8 miles), which would continue to receive motorized use associated with cross-country travel, where direct and indirect disturbance could occur. Of these sites, 4 out of 13 meadows (31%) have been identified as Occupied willow flycatcher sites, where approximately 1.2 miles of existing motorized trails un-authorized for motorized use have the potential to adversely affect breeding willow flycatchers, including both direct disturbance to nesting willow flycatchers and indirect impacts to willow flycatcher habitat through alteration and/or degradation where routes potentially affect meadow vegetation and hydrology.

Implementation of Alternative 5 would have the next greatest direct and indirect impacts to breeding willow flycatchers at Occupied sites and within Emphasis meadow sites. Alternative 5 affects a total of 4 willow flycatcher emphasis sites (13%) and no Occupied willow flycatcher sites.

Alternatives 2, 3, 4, 5, 6, and 7 do not propose motorized trail additions to the NFTS within Occupied willow flycatcher habitat where willow flycatchers are known to breed. Therefore, direct impacts to breeding willow flycatchers under these alternatives are not expected to occur.

Alternatives 2 and 6 have the same indirect impacts to willow flycatchers, where a total of 4 (11%) Emphasis willow flycatcher sites are intersected by motorized trail additions to the NFTS. Alternatives 7 and 2 progressively affect fewer willow flycatcher habitat Emphasis sites.

Table 3.03-88. Number of willow flycatcher meadow sites intersected by motorized trail additions to the National Forest Transportation System (NFTS) and affected by cross country travel

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Willow Flycatcher meadow sites intersected by motorized trail additions to the NFTS							
Occupied Meadows (13) (Motorized trail miles)	4 (1.16)	0	0	0	0	0	0
Emphasis Meadows (30) (Motorized trail miles)	18 (2.68)	2 (0.13)	0	1 (0.02)	4 (0.27)	2 (0.13)	1 (0.12)
Total	**22 (3.84)**	**2 (0.13)**	**0**	**1 (0.02)**	**4 (0.27)**	**2 (0.13)**	**1 (0.12)**
Cross Country Travel							
Total Acres of Cross Country Travel Prohibited within Willow Flycatcher Meadows	**0**	**3,075**	**3,075**	**3,075**	**3,075**	**3,075**	**3,075**
Occupied Meadows	0	1,747	1,747	1,747	1,747	1,747	1,747
Emphasis Meadows	0	1,328	1,328	1,328	1,328	1,328	1,328
Total Acres Cross Country Travel Not Prohibited within Willow Flycatcher Meadows	**3,075**	**0**	**0**	**0**	**0**	**0**	**0**
Occupied Meadows	1,747	0	0	0	0	0	0
Emphasis Meadows	1,328	0	0	0	0	0	0
Total Number of Willow Flycatcher Sites Intersected by motorized trails that would be prohibited to motorized public use (positive impact)	**1**	**21**	**23**	**22**	**20**	**21**	**22**
Total Miles	**0.02**	**3.7**	**3.9**	**3.9**	**3.6**	**3.7**	**3.8**
# Occupied Sites	1	5	5	5	5	5	5
Miles within Occupied	0.02	1.18	1.18	1.18	1.18	1.18	1.18
# Emphasis Sites	0	16	18	17	15	16	17
Miles within Emphasis	0	2.55	2.68	2.67	2.42	2.55	2.57

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

Designated "Open Areas" - Eureka Diggings, Greenhorn, and Reservoir Areas: The addition of designated "Open Areas" at Eureka Diggings, Greenhorn, and Reservoir areas would have no direct or indirect effect to Occupied and Emphasis meadow habitat for the willow flycatcher. No willow flycatcher habitat occurs within the proposed open areas.

Summary of Direct and Indirect Effects

Table 3.03-89 summarizes the overall net direct and indirect effect of the alternatives from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and changes in class of vehicles.

Table 3.03-89. Willow Flycatcher - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized trail additions to the NFTS	Negative effects to 4 occupied meadows (1.2 miles). Negative effects to 18 emphasis meadows (2.7 miles).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 2 emphasis meadows negatively affected (0.13 miles).	No effect to Occupied meadows (0 meadows intersected). No effect to emphasis meadows (0 emphasis meadows intersected).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 1 emphasis meadows (0.02 mi).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 4 emphasis meadows (0.27 mi).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 2 emphasis meadows (0.13 mi).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 1 emphasis meadow (0.12 mi).
Cross Country Travel	Continues on 3,075 willow flycatcher habitat acres, including within 22 meadows on 3.8 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 21 meadows on 3.7 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 23 meadows on 3.9 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 22 meadows on approx. 3.9 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 20 meadows on approx. 3.6 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 21 meadows on approx. 3.7 miles of existing motorized trails un-authorized for motorized use.	Prohibited on 3,075 acres, including within 22 meadows on approx. 3.8 miles of existing motorized trails un-authorized for motorized use.
Wet Weather Restrictions	No effect	No effect	No effect	Positive Benefit to habitat	Positive Benefit to habitat	Positive Benefit to habitat.	No effect
Change in Class of Vehicles	No effect	Localized negative effects.	No effect	Minor negative effect.	Localized negative effects.	Localized negative effects.	Minor negative effect.

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negative effect from continued cross country travel on 22 willow flycatcher meadows on 3.8 miles of existing motorized trails un-authorized for motorized use with continued cross country travel on 3,075 acres.	Benefits willow flycatcher on 3,075 acres, Including within 21 meadows on 3.7 miles of existing motorized trails un-authorized for motorized use where cross country travel is prohibited.	Benefits willow flycatcher on 3,075 acres, including within 23 meadows on 3.9 miles of existing motorized trails un-authorized for motorized use where cross country travel is prohibited.	Benefits willow flycatcher 3,075 acres, including within 22 meadows on approx. 3.9 miles of existing motorized trails un-authorized for motorized use.	Benefits willow flycatcher on 3,075 acres, including within 20 meadows on 3.6 miles of existing motorized trails un-authorized for motorized use where cross country travel is prohibited.	Benefits willow flycatcher on 3,075 acres, including within 21 meadows on 3.7 miles of existing motorized trails un-authorized for motorized use where cross country travel is prohibited.	Benefits willow flycatcher on 3,075 acres, including within 22 meadows on 3.8 miles of existing motorized trails un-authorized for motorized use where cross country travel is prohibited.

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

Cumulative Effects

Cumulative Effects Boundary

The cumulative effects analysis geographic boundary for the willow flycatcher includes all willow flycatcher sites occurring within the Tahoe NF boundary, both within NFS lands and non-NFS lands. See Terrestrial & Aquatic Species Introduction Section for the rationale. The temporal scale for analyzing cumulative effects to willow flycatcher is approximately 20 years into the past and 20 years out into the future.

Overall Cumulative Effects to Willow Flycatcher Meadows

Cumulative impacts to the willow flycatcher include past, present, and future impacts from livestock grazing, roads, and recreational activities. The Forest Service has completed a Conservation Assessment of the Willow Flycatcher in the Sierra Nevada (Green et al. 2003), which identified meadow drying, loss of nesting and foraging substrates (riparian shrubs), increased predator access to meadow interiors, and potential cowbird parasitism as among the key factors likely responsible for the decline of the willow flycatcher. Livestock management, recreation, water developments, and roads are described as causative factors.

Historic livestock grazing has impacted montane meadows and is considered to be a primary factor that has influenced the suitability of willow flycatcher habitat and meadow habitat for birds in the Sierra Nevada (Graber 1996, Green et al. 2003, Menke et al. 1996). Many of the landbird species utilizing these meadows feed upon insects that decline in response to removal of this herbaceous growth (Graber 1996). Poorly managed grazing in riparian areas can impact nesting densities of many bird species, and particularly of habitat specialists such as the willow flycatcher, Lincoln's sparrow, and white-crowned sparrow (RHJV 2004).

Livestock grazing on active allotments currently affects willow flycatcher meadow habitat on the Forest. Trend data from Regional range meadow monitoring was available for 15 willow flycatcher meadow sites on the Tahoe NF. Of the 15 Occupied and Emphasis sites monitored, habitat trend is either up or stable on 73% of sites and trend was down on 27% of the sites.

Non-motorized trails allow for backcountry hiking and camping, which may occur in meadows not accessed by motorized routes, and can adversely affect additional meadow habitat or disturb species. These activities are generally dispersed and of low impact to habitat, particularly in sites most suitable for willow flycatcher, which are typically very wet. Foreseeable future projects listed in the Tahoe Schedule of Proposed Actions do not indicate additional effects.

Cumulative Effects from Motorized Routes to Willow Flycatcher Meadows

Factors responsible for the decline of willow flycatcher populations in the Sierra Nevada are primarily thought to be the result of habitat change, particularly the alteration of meadow hydrology, specifically caused by roads (Green et al. 2003).

Table 3.03-90 displays the cumulative impacts of motorized and non-motorized routes within meadows that are designated as either willow flycatcher Occupied or Emphasis habitat. Occupied habitat

are sites where willow flycatcher breeding is either known or suspected. Routes intersecting Occupied habitat have the highest potential to impact breeding willow flycatchers. Emphasis habitat are meadows that are currently not occupied by breeding willow flycatcher, but are considered to be suitable willow flycatcher nesting habitat that are within 5 miles of Occupied Sites where dispersing willow flycatchers may nest in the near future. Emphasis habitats are particularly important so that willow flycatchers may have future refugia where their population can be distributed and expand in the future.

Occupied Habitat

Alternatives 1 and 5 are the only alternatives that contribute to existing cumulative impacts to Occupied willow flycatcher sites. Alternative 1 cumulatively adds, approximately 1.2 miles on existing motorized trails un-authorized for motorized use, affecting 4 Occupied meadow sites (31% of meadows identified as Occupied) where direct and indirect impacts to meadow vegetation and hydrology could occur. Hydrologic condition is an important habitat component to consider for successful willow flycatcher breeding. Given the uncertainty of future route proliferation under Alternative 1, the future habitat alteration within Occupied meadow sites is potentially at risk, and may ultimately affect willow flycatcher breeding success within Occupied habitats.

The remaining action alternatives (alternatives 2, 3, 4, 5, 6, and 7) do not add to existing cumulative impacts within Occupied willow flycatcher sites, and therefore would not impact breeding willow flycatchers. In addition, all the action alternatives would prohibit the proliferation of new motorized routes through cross-country motorized travel that may adversely alter habitat within Occupied sites. Finally, all the action alternatives would benefit willow flycatcher breeding habitat by prohibiting cross country travel, including use on motorized trails un-authorized for motorized use on approximately 1.2 miles within 5 Occupied meadow sites.

Emphasis Habitat

Emphasis Habitat are sites within 5 miles of known breeding sites (Occupied habitat) that are considered to provide suitable nesting habitat for willow flycatcher. Alternative 1 poses the greatest risk to the future colonization by willow flycatcher within Emphasis habitats, since cross country travel would not be prohibited, including use on motorized trails un-authorized for motorized use that intersect 18 Emphasis sites (60% of all Emphasis sites) for a total of about 2.7 miles.

The remaining alternatives result in substantially less impacts to willow flycatcher emphasis habitats. Alternative 5 poses the next greatest risk to willow flycatcher emphasis sites where proposed motorized trail additions to the NFTS would add to cumulative impacts within 4 Emphasis sites (13% of all Emphasis sites). Alternatives 4 and 6 result in 1 and 2 Emphasis sites (3 and 7% of all Emphasis sites) intersected by motorized trail additions to the NFTS, for less than ¼ mile each. Alternative 7 adds cumulative impacts to 1 emphasis site totaling 0.1 mile. Alternative 3 does not add to existing cumulative impacts to Emphasis habitats, since no motorized trail additions to the NFTS would intersect any willow flycatcher Emphasis sites.

Summary of Cumulative Effects to Willow Flycatcher Habitat: Occupied and Emphasis Meadows

Alternative 1 poses the greatest overall risk to known nesting sites and potentially suitable nesting sites from all routes including use on existing motorized trails un-authorized for motorized use associated with cross country travel, existing motorized routes (both NFS and non-NFS), and non-motorized routes. Alternative 1 results in willow flycatcher meadows being intersected 59 times for a total of about 12 miles by routes of any category. Over 30% of meadows identified as Occupied are impacted by existing motorized trails un-authorized for motorized use, which could substantially alter the meadow vegetation and hydrology and reduce breeding success at known nesting sites of a species that is at risk of extirpation. Therefore, Alternative 1 could contribute to the downward trend of willow flycatcher populations on the Tahoe NF.

Alternative 5 results in the next highest overall cumulative impact where Occupied and Emphasis meadows combined are intersected by a motorized or non-motorized route 41 times totaling about 8.5 miles. The remaining action alternatives do not add to existing cumulative impacts to Occupied habitat, but alternatives 2, 4, 5, 6, and 7 do contribute to cumulative impacts to 1 to 4 Emphasis meadow sites depending on the alternative where relatively short route segments would intersect a meadow (0.1 to 0.3 mile).

The action alternatives all prohibit cross-country travel, including motorized use on between 3.6 miles to 3.9 miles of motorized trails un-authorized for motorized use (Alt. 5 lowest, Alt. 3 & 4 greatest) within key willow flycatcher habitats (Occupied and Emphasis meadows). It is expected that non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on these routes in the future. In general, benefits to willow flycatcher habitat would be realized as vegetation and soil impacts from non-motorized use recover over time through active and passive restoration efforts. Under Alternative 1, these benefits would not be realized since cross country travel would not be prohibited and use on existing motorized trails un-authorized for motorized use would continue and likely proliferate.

Foreseeable future projects on the Tahoe NF include undertaking a variety of meadow restoration projects that will result in benefits to willow flycatcher (i.e. Perazzo Meadows) and its habitat.

Table 3.03-90. Willow Flycatcher Meadows - Number of Occupied and Emphasis Meadows Intersected by Routes - Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Number of Willow Flycatcher Sites Intersected by motorized trail additions to the NFTS (negative impact)[1]	**22**	**2**	**0**	**0.02**	**4**	**2**	**1**
Total Miles	**3.84**	**0.13**	**0**	**0.02**	**0.27**	**0.13**	**0.12**
# Occupied Sites	4	0	0	0	0	0	0
Miles within Occupied	1.16	0	0	0	0	0	0
# Emphasis Sites	18	2	0	1	4	2	1
Miles within Emphasis	2.68	0.13	0	0.02	0.27	0.13	0.12

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Total Number of Willow Flycatcher Sites Intersected by Motorized trails that would be prohibited to motorized use associated with the prohibition of cross country travel (positive impact)	**1**	**21**	**23**	**22**	**20**	**21**	**22**
Total Miles	**0.02**	**3.7**	**3.9**	**3.9**	**3.6**	**3.7**	**3.8**
# Occupied Sites	1	5	5	5	5	5	5
Miles within Occupied	0.02	1.18	1.18	1.18	1.18	1.18	1.18
# Emphasis Sites	0	16	18	17	15	16	17
Miles within Emphasis	0	2.55	2.68	2.67	2.42	2.55	2.57
Cumulative effects							
Total Number of Willow Flycatcher Sites Intersected by Existing NFTS motorized routes - NFS lands (negative impact)	**24**	**24**	**24**	**24**	**24**	**24**	**24**
Total Miles	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**	**3.0**
# Occupied Sites	9	9	9	9	9	9	9
Miles within Occupied	1.15	1.15	1.15	1.15	1.15	1.15	1.15
# Emphasis Sites	15	15	15	15	15	15	15
Miles within Emphasis	1.83	1.83	1.83	1.83	1.83	1.83	1.83
Total Number of Willow Flycatcher Sites Intersected by Existing motorized routes on - non-NFS lands (private) (negative impact)	**7**	**7**	**7**	**7**	**7**	**7**	**7**
Total Miles	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**	**4.2**
# Occupied Sites	2	2	2	2	2	2	2
Miles within Occupied	3.83	3.83	3.83	3.83	3.83	3.83	3.83
# Emphasis Sites	5	5	5	5	5	5	5
Miles within Emphasis	0.36	0.36	0.36	0.36	0.36	0.36	0.36
Total Number of Willow Flycatcher Sites Intersected by Existing non-motorized routes (negative impact)	**6**	**6**	**6**	**6**	**6**	**6**	**6**
Total Miles	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**
# Occupied Sites	1	1	1	1	1	1	1
Miles within Occupied	0.14	0.14	0.14	0.14	0.14	0.14	0.14
# Emphasis Sites	5	5	5	5	5	5	5
Miles within Emphasis	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Total Number of Willow Flycatcher Sites Intersected by Decommissioned routes (positive impact)	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Total Miles	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**
# Occupied Sites	1	1	1	1	1	1	1
Miles within Occupied	0.3	0.3	0.3	0.3	0.3	0.3	0.3
# Emphasis Sites	2	2	2	2	2	2	2
Miles within Emphasis	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total Cumulative Effects							
Number of Times a Meadow is Intersected by Motorized Routes	**59**	**39**	**37**	**38**	**41**	**39**	**38**
Net Cumulative Impacts = Sum Total Miles of All Routes both positive and negative that Intersect Willow Flycatcher Sites	**12.1**	**8.4**	**8.2**	**8.2**	**8.5**	**8.4**	**8.3**

[1] Alternative 1 includes the existing routes unauthorized to motorized public use continued with cross country travel, while all action alternatives include proposed unauthorized routes.

Sensitive Species Determination

The Biological Evaluation for the Tahoe NF Motorized Travel Management Project (incorporated by reference) made a determination that the proposed may affect willow flycatchers, but is not likely to lead to a trend toward federally listing or a downward trend in population viability. The action alternatives all prohibit motorized cross country travel, including use of existing motorized trails un-authorized for motorized use . Furthermore, wet weather seasonal restrictions reduces the likelihood of sedimentation and erosion that may occur from wet weather motorized use for Alternatives 4, 5, and 6.

Compliance with Forest Plan and Other Direction

The Tahoe NF LRMP, as amended by the SNFPA ROD (2004), provides management direction for managing willow flycatcher habitat, including direction for managing meadows, wetlands, and Riparian Conservation Areas that are applicable to willow flycatcher habitat as follows:

- *Locate roads away from meadow edges where alternative routes are available (Tahoe LRMP)(Management Standard & Guideline).):*
- *Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.*
- *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species (Management Standard & Guideline 92).*
- *Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity (RCO#2, Management Standard & Guideline 100).*

In the above sections, the proposed actions and alternatives for the Tahoe NF Motorized Travel Management Project were analyzed for their potential effects to willow flycatcher meadow and riparian habitats which addresses the above management standard and guidelines as they apply to willow flycatcher habitats. Mitigation measures for the action alternatives to minimize the risk of sediment and streambank alteration from proposed motorized routes and existing unauthorized routes unauthorized to public use are addressed in the RCO analysis and Appendix A (Road Cards).

Alternative 1 is least consistent with the above standards and guidelines for managing meadows in terms of maintenance and hydrologic connectivity of meadows, avoidance of roads near and within meadows, and minimizing effects to meadow condition and function. Alternative 1, continues cross country travel, including within 22 willow flycatcher meadows on approximately 4 miles of existing routes motorized trails un-authorized for motorized use.

All of the action alternatives meet these standards and guidelines by improving willow flycatcher habitat conditions. The action alternatives all prohibit cross country travel on 3,075 willow flycatcher meadow acres, and reduces the impacts of 18 to 22 willow flycatcher meadows (Alt 5 reduces the least,

Alt 3 reduces the most) from 3.6 miles to 3.8 miles of existing routes unauthorized to motorized public use. All the action alternatives considerably improve meadow function and connectivity for the willow flycatcher, since the project design standards were developed to minimize impacts to willow flycatcher meadows and riparian habitat through the implementation of wet weather seasonal restrictions, does not propose motorized route additions within any Occupied willow flycatcher meadows, and prohibits existing and future cross country travel. motorized trails un-authorized for motorized use.

Great Gray Owl: Affected Environment

The great gray owl is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). In the Sierra Nevada, great gray owls are found in mixed coniferous forest from 2,400 to 9,000 feet elevation where such forests occur in combination with meadows or other vegetated openings. Nesting usually occurs within 600 feet of the forest edge and adjacent open foraging habitat. Most nests are made in broken top snags (generally firs), but platforms such as old hawk nests, mistletoe infected limbs, etc. are also used. Nest trees or snags are generally greater than 21 inches dbh and 20 feet tall.

In the Sierra Nevada, pocket gophers and voles appear to be important prey species (Winter 1982, Reid 1989). Meadows appear to be the most important hunting habitat for great gray owls, where approximately 93% of their prey is taken (Winter 1981).

Recent great gray owl sightings in our area include an adult located three miles north of Nevada City (1/96), an adult on private land near the town of Alleghany (5/2006, 4/2007), a vocalization of an adult detected by CDFG and Sierra Pacific industries on the Sierraville RD in 2005 and 2008), and two adults found in the Feather River Ranger District of the Plumas NF (8/97). In recent years, numerous surveys for great gray owl have been conducted on the Tahoe NF, and have only resulted in a handful of single great gray owl detections, with no confirmation of nesting.

Roads and motorized trails can potentially affect great gray owl habitat by affecting the condition of suitable great gray owl habitat in similar ways that affects willow flycatcher habitat, primarily through changes in meadow hydrology or when damage to meadow vegetation occurs. Compaction and meadow drying can cause changes in vegetation composition which can lead to changes in prey species abundance and distribution. Changes in prey availability and abundance can affect reproduction success of great gray owls.

Great Gray Owl: Environmental Consequences

The Tahoe NF LRMP as amended by the SNFPA ROD (2004) provides management direction to establish and maintain Protected activity centers (PACs) to include the forested area and adjacent meadow around all known great gray owl nest stands. The desired condition for meadow vegetation in great gray owl PACs supports a sufficiently large meadow vole population to provide a food source for great gray owls through the reproductive period. Although the Tahoe NF does not currently support known great gray owl nesting pairs, potentially suitable great gray owl meadows were analyzed to determine potential impacts from the Tahoe NF Travel Management Project.

Analysis Measures

Change in Class of Vehicles: The changes in class of vehicle was analyzed for their potential to affect potential great gray owl meadow habitat (no known breeding sites, but potentially suitable breeding habitat exists), since this action potentially changes the condition of the existing road surface from smoothed surfaced to rough surfaced; which could potentially alter meadow condition where routes intersect or are within close proximity to motorized routes.

Wet Weather Seasonal Restrictions: In addition to deer seasonal restrictions specified in the current Tahoe Forest Plan, wet weather seasonal restrictions would apply to certain alternatives. The benefits to great gray owl with these additional wet weather closures are analyzed for the alternatives.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for their effects to potential great gray owl breeding habitat.

Number of Great Gray Owl Meadows Intersected by Roads and Motorized Trails: meadows identified as suitable for great gray owl foraging that are adjacent to suitable breeding habitat were assessed to determine the potential impact from proposed motorized trail additions to the NFTS. The number of great gray owl meadows intersected by proposed motorized trail additions to the NFTS were assessed for the alternatives.

Direct and Indirect Effects

Change in Class of Vehicles. The change in class of vehicle proposed under Alternatives 2, 4, 5, 6, and 7, on some existing NFTS motorized routes may result in some smoothed surfaced roads becoming rough surfaced roads through reduced road maintenance. In addition, some existing motorized NFTS roads may receive different maintenance resulting in increased vegetation density at the road margins which would provide additional cover and/or foraging habitat. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives. For the great gray owl, existing habitat conditions will dictate whether or not the change in class of vehicle will result in reduced habitat quality. In general, it is not expected that the change in class of vehicle would result in a significant change to great gray owl habitat conditions, unless different road maintenance results in increased meadow habitat degradation. No changes in class of vehicle are proposed under Alternatives 1 and 3, which means that some system routes would remain under their current maintenance management strategy. However, in some cases some existing system roads have already become rough surfaced due to different of maintenance.

Wet weather seasonal restrictions. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails. Since no suitable great gray owl meadow habitat would be affected by Alternative 3 wet weather seasonal restrictions would not affect great gray owl habitat. Under alternatives 5 and 6, great gray owl meadows that are intersected by native, surfaced motorized routes would be benefited through the reduction of erosion and sedimentation that could occur from wet season motorized use. Alternative 1 with the greatest miles through the most number of great gray owl meadows, would continue to be impacted by motorized use during the wet weather season, where habitat degradation within these meadows could occur.

Prohibition of Cross Country Travel. Under Alternative 1, cross country travel would not be prohibited on 3,165 acres of potential great gray owl meadow habitat across the Tahoe NF. All the action alternatives prohibits cross country travel on 3,165 acres of potential great gray owl meadow habitat, including on 5-6 miles of motorized trails un-authorized for motorized use.

Number of Great Gray Owl Meadows Intersected by Roads , Trails, and Open Areas

Currently, great gray owls are not known to breed on the Tahoe NF. Although great gray owl sightings have been reported on the Forest, no confirmation of nesting has been identified at this time. Therefore, the project alternatives would have no direct impacts to breeding great gray owls, since great gray owls are not currently known to breed on the Tahoe NF.

Potential great gray owl habitat has been identified on the Tahoe NF. A total of 41 meadow sites on the Forest are considered suitable foraging habitat areas for the great gray owl. These potential foraging sites were evaluated to determine the potential indirect effects to meadow vegetation and hydrology which may affect the suitability of potential great gray owl nesting/foraging habitat. Alternative 1 poses the greatest risk to potential great gray owl meadows where 21 meadows (51%) are intersected by existing motorized trails un-authorized for motorized use, where motorized use could continue associated with cross-country travel, totaling approximately 6 miles. This amount of motorized routes could alter meadow vegetation and hydrology that would indirectly affect great gray owl breeding habitat where great gray owls forage where the future to occupy these areas may be limited. Alternative 5 results in intersecting 5 (12%) great gray owl meadow sites, where the future establishment of great gray owls could be affected. The remaining action alternatives either do not impact potential great gray owl meadows (Alternative 3), or minimally impacts great gray owl meadows.

Table 3.03-91. Number of Great Gray Owl Meadows Intersected by Motorized Routes

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Meadows *with* Intersections	21	3	0	1	5	3	2
Motorized route miles	5.7	<0.1	0	<0.1	<0.1	<0.1	<0.1

* Alternative 1 includes the existing motorized trails un-authorized for motorized use associate with cross country travel, while all action alternatives include motorized trail additions to the NFTS.

Summary of Direct and Indirect Effects

Table 3.03-92 summarizes the overall net direct and indirect effect of the alternatives from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and changes in class of vehicles.

Table 3.03-92. Great Gray Owl - Summary of Overall Net Direct and Indirect Effects of the Alternatives

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized trail additions to the NFTS	Negative effects within 21 meadows intersected on 5.6 miles.	Negative effects within 3 meadows intersected on < 0.1 mile.	No effects - no meadows affected	Negative effects within 1 meadow intersected on <0.1 mile.	Negative effects within 5 meadows intersected on <0.1 mile.	Negative effects within 3 meadows intersected on <0.1 mile.	Negative effects within 2 meadows intersected on <0.1 mile.
Additions of Open Areas (Eureka Diggins, Greenhorn, and Reservoir Areas at Stampede, Boca, and Prosser)	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Cross Country Travel	Negative effect cross country travel not prohibited on 3,165 meadow acres, including within 21 meadows intersected on 5.6 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 21 meadow on 5.8 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 20 meadow on 5.7 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 17 meadow on 5.3 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 19 meadow on 5.7 miles.
Wet Weather Restrictions	No effect	No effect	No effect	Positive Benefit to habitat	Positive Benefit to habitat	Positive Benefit to habitat	No effect
Change in Class of Vehicles	No effect	Localized negative effects	No effect	No Effect	Localized negative effects	No Effect	Localized negative effects
Overall Net Effect of Proposed Actions	Negative effect where cross country travel not prohibited on 21 meadows 5.6 miles and within 3,165 acres of meadow habitat.	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles.	Positive Effect – Cross country travel. Prohibited on 3,165 acres, including within 21 meadow on 5.8 miles.	Positive Effect – Cross country travel. Prohibited on 3,165 acres, including within 20 meadow on 5.7 miles.	Positive Effect – Cross country travel. Prohibited on 3,165 acres, including within 17 meadow on 5.3 miles.	Positive Effect – Cross country travel. Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles.	Positive Effect – Cross country travel. Prohibited on 3,165 acres, including within 19 meadow on 5.7 miles.

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

Cumulative Effects

The geographic boundary for analyzing great gray owl cumulative effects of proposed alternatives are the suitable great gray owl meadow habitat sites within the boundary of the Tahoe NF. Approximately 30 meadow sites have been identified as being suitable foraging habitat for the great gray owl that are adjacent to suitable great gray owl nesting habitat, which would provide a sufficient area to analyze impacts to great gray owls on the Tahoe NF. These meadows encompass a wide geographic distribution from eastside to westside and encompasses a variety of vegetation diversity. The adjacent forest types surrounding these great gray owl meadow areas range from eastside pine, eastside mixed conifer, true fir types, and, westside mixed conifer forests.

Although great gray owls currently are not known to breed on the Tahoe NF, a few recent sightings on the Forest and on adjacent private lands, indicate the potential for breeding great gray owls on the Tahoe NF is a reasonable expectation. All of the action alternatives do not currently pose adverse direct or indirect effects to known breeding great gray owls, and therefore, no cumulative impacts to breeding great gray owls would occur. However, the action alternatives are analyzed for cumulative effects of motorized and non-motorized routes to suitable great gray owl foraging habitat that may affect the ability for great gray owls to occupy these sites in the future. Cumulative effects include routes that are on both public and private lands. Decommissioned routes are considered positive cumulative effects.

Alternative 1 poses the greatest cumulative risk to suitable great gray owl foraging habitat where these suitable great gray owl meadows are intersected by a motorized or non-motorized route on both NFS and non-NFS lands 53 times for a total of 15 miles. The uncertainty of future motorized route proliferation could alter meadow vegetation and hydrology that would impact habitat conditions for great gray owl prey species in the long term. It is expected that OHV use on the Tahoe NF will continue to increase, therefore, Alternative 1 could adversely affect the potential for great gray owls to occupy these sites in the near and distant future. In addition, there are no wet weather restrictions for native surfaced roads and trails that intersect suitable great gray owl meadows.

Alternative 5 also adds considerable cumulative impacts to suitable great gray owl meadow sites, where these sites would be intersected by motorized and non-motorized routes 37 times for a total of about 10 miles.

Alternatives 2, 6, and 7 add a small amount of cumulative impacts to great gray owl meadows where 2-3 meadows are impacted by proposed motorized routes for less than 0.1 mile. This amount of impact to great gray owl foraging habitat should not limit the distribution of great gray owls in the future. For all the action alternatives, cross-country motorized travel would be prohibited.

For all the action alternatives, cross country travel would be prohibited on 3,165 great gray owl meadows, including approximately 6 miles on motorized trails un-authorized for motorized use within great gray owl meadows which would benefit great gray owl habitat. However, non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on these routes. Some impacts to great gray owl foraging habitat may be expected from non-motorized use in the future. As these routes become revegetated and recover either through active or passive restoration efforts, overall impacts to great gray owl habitat is expected to recovery and diminish in the future.

Table 3.03-93. Cumulative Effects (Great Gray Owl Suitable Sites)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Direct and Indirect effects of proposed alternatives							
Proposed route additions (negative impact)[1]							
Number of Potential GGO Meadow Sites Intersected by motorized trails added to NFTS	21	3	0	1	5	3	2
Miles	5.7	<1	0	<1	<1	<1	<1
Motorized trails prohibited to motorized public use (positive impact)[2]							
Number of Potential GGO Meadow Sites Intersected by motorized trails	1	18	21	20	17	18	19
Miles	<1	5.7	5.8	5.7	5.3	5.7	5.7
Acres of Great Gray Owl Habitat Where Cross Country Travel is Prohibited	0	3,165	3,165	3,165	3,165	3,165	3,165
Acres of Great Gray Owl Habitat Where Cross Country Travel is not prohibited	3,165	0	0	0	0	0	0
Cumulative effects of past, present, and proposed actions							
Existing motorized routes - NFS lands (negative impact)							
Number of Potential GGO Meadow Sites Intersected by motorized routes	23	23	23	23	23	23	23
Miles	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Existing routes on private land - non-NFS lands (negative impact)							
Number of Potential GGO Meadow Sites Intersected by motorized routes	3	3	3	3	3	3	3
Miles	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Existing non-motorized routes (negative impact)							
Number of Potential GGO Meadow Sites Intersected by Routes	6	6	6	6	6	6	6
Miles	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Decommissioned routes (positive impact)							
Number of Potential GGO Meadow Sites Intersected by Routes	3	3	3	3	3	3	3
Miles	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Cumulative Effects							
Number of Times GGO Meadows Intersected by Motorized Routes	**53**	**35**	**32**	**33**	**37**	**35**	**34**
Total Miles	**15.2**	**9.6**	**9.5**	**9.5**	**10**	**9.6**	**9.5**

[1] Alternative 1 includes the existing routes unauthorized to motorized public use, while all action alternatives include proposed motorized routes.

[2] Includes routes unauthorized to motorized public use (both system and unclassified).

Overall Cumulative Effects from Past, Present, and Reasonably Foreseeable Actions

Cumulative impacts to the great gray owls include past, present, and future impacts from livestock grazing, timber harvest, roads, and recreational activities. Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on the and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the great gray owl within the cumulative effects boundary.

Between 1994 and 2007, four wildfires (Cottonwood, Pendola, Star, and Bassetts) resulted in burning approximately 4,000 acres of older forest habitat. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all have resulted in impacts to great gray owl nesting habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels thinning and mastication projects were completed, which were designed to reduce the risk of additional habitat loss to wildfires. These treatments generally do not result in habitat removal, but may result in habitat quality changes. Between 1960 and present, private land harvest within the boundaries of the Tahoe NF has resulted in over 87,000 acres of vegetation treatments including clearcuts, sanitation, shelterwood, and thinning. Much of the private land harvest has resulted in the loss or reduction in spotted owl habitat.

These wildfires and vegetation treatment projects have may have resulted in a reduction in some great gray owl nesting habitat on the Tahoe NF since 1960.

Thinning projects designed to reduce hazardous fuels will continue to be the primary activity affecting forested habitat on the Tahoe (see Appendix Q, Wildlife Cumulative Effects). Although these treatments may reduce habitat quality (i.e. nesting habitat reduced to foraging habitat), it expected that suitable habitat will be maintained, and it is anticipated that these treatments will reduce the amount of forested habitat potentially lost from future stand replacing wildfires (USDA Forest Service 2004). The California Department of Forestry and Fire Protection currently lists approximately 12,000 acres of private land within the Tahoe NF administrative boundary for which timber harvest plans have been submitted. Timber harvest on private lands is generally more intensive and does not typically maintain habitat in a suitable condition for great gray owls.

Historic livestock grazing has impacted montane meadows and is considered to be a primary factor that has influenced montane meadow habitat for birds in the Sierra Nevada (Graber 1996, Green et al. 2003, Menke et al. 1996). Many of the landbird species utilizing these meadows feed upon insects that decline in response to removal of this herbaceous growth (Graber 1996). Poorly managed grazing in riparian areas can impact nesting densities of many bird species, and particularly of habitat specialists such as the great gray owl, willow flycatcher, Lincoln's sparrow, and white-crowned sparrow (RHJV 2004).

Current livestock grazing on active allotments may affect a number of suitable great gray owl meadow habitat on the Forest. However, standards and guidelines for grazing in the Sierra Nevada Forest Plan Amendment generally are designed to minimize grazing impacts and maintain montane meadow habitat in a suitable condition for great gray owls. Non-motorized trails allow for backcountry hiking, camping, and equestrian use which may occur in meadows not accessed by motorized routes, and can adversely affect additional meadow habitat or disturb species. These activities are generally dispersed and of low impact to habitat. Foreseeable future projects listed in the Tahoe Schedule of Proposed Actions do not indicate additional effects. Perazzo Meadow on the Sierraville Ranger District, where a recent great gray owl detections are documented, is currently being planned for watershed restoration efforts to improve the hydrologic and vegetation conditions that would benefit great gray owl foraging conditions.

Alternative 1 poses the greatest cumulative risk to suitable great gray owl foraging habitat where these suitable great gray owl meadows are intersected by a motorized or non-motorized route on both

NFS and non-NFS lands 53 times for a total of 15 miles. Continued motorized route proliferation in the future could alter meadow vegetation and hydrology that would impact habitat conditions for great gray owl prey species in the long term, and could adversely affect the potential for great gray owls to occupy these sites in the near and distant future. In addition, there are no wet weather restrictions for native surfaced roads and trails that intersect suitable great gray owl meadows.

Sensitive Species Determination

The Biological Evaluation for the Tahoe NF Motorized Travel Management Project EIS, which is hereby incorporated by reference, determined that the action alternatives may affect great gray owl, but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the Tahoe National Forest. In the absence of a range wide viability assessment, this viability determination is based on local knowledge of this species as discussed previously in this evaluation, and professional judgment.

Currently, great gray owls have not been known to breed on the Tahoe NF. Therefore, the addition of motorized trails to the National Forest Transportation System (NFTS) would not directly, indirectly or cumulative affect known breeding great gray owls. However, potential great gray owl nesting habitat does occur on the Forest and incidental great gray owls have been detected on the Sierraville Ranger District and incidental great gray owls have been documented on private land adjacent to National Forest system lands within the boundary of the Tahoe NF on the west side of the Forest. Alternative 6, the preferred alternative, results in less than 0.1 mile intersecting suitable great gray owl meadow sites within 7% (3 of 41) of the suitable great gray owl meadow sites across the Tahoe NF. This amount of habitat affected by motorized routes would pose a relatively low risk to great gray owl breeding habitat.

Compliance with Forest Plan and Other Direction

The Tahoe NF LRMP as amended by the SNFPA ROD (2004) provides management direction to establish and maintain Protected activity centers (PACs) to include the forested area and adjacent meadow around all known great gray owl nest stands. The desired condition for meadow vegetation in great gray owl PACs supports a sufficiently large meadow vole population to provide a food source for great gray owls through the reproductive period. Although the Tahoe NF does not currently support known great gray owl nesting pairs, potentially suitable great gray owl meadows were analyzed to determine potential impacts from the Tahoe NF Travel Management Project.

In addition the Tahoe NF LRMP provides management direction for managing meadows, wetlands, and Riparian Conservation Areas that are applicable to suitable great gray owl meadow as follows:

- *Locate roads away from meadow edges where alternative routes are available (Tahoe LRMP)(Management Standard & Guideline).):*
- *Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.*
- *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are*

enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species (Management Standard & Guideline 92).

- *Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity (RCO#2, Management Standard & Guideline 100).*

In the above sections, the proposed actions and alternatives for the Tahoe NF Motorized Travel Management Project were analyzed for their potential effects to great gray owl meadows which addresses the above management standard and guidelines as they apply to great gray owl habitat. Mitigation measures for the action alternatives to minimize the risk of sediment and streambank alteration from proposed motorized routes and existing unauthorized routes unauthorized to public use are addressed in the RCO analysis and Appendix A (Road Cards).

Alternative 1 is least consistent with the above standards and guidelines for managing meadows in terms of maintenance and hydrologic connectivity of meadows, avoidance of roads near and within meadows, and minimizing effects to meadow condition and function. Alternative 1, continues cross country travel, including within 21 great gray meadows on approximately 6 miles of existing motorized trails un-authorized for motorized use.

All of the action alternatives are consistent with the Standards and Guidelines since the reduce the potential effects to great gray owl meadows. All the action alternatives all prohibit cross country travel on 3,185 great gray owl meadow acres, and reduces the impacts of 17 to 21 great gray owl meadows (Alt 5 reduces the least, Alt 3 reduces the most) from 5.3 miles to 5.8 miles of existing routes unauthorized to motorized public use. All the action alternatives considerably improve meadow function and connectivity for the great gray owl, since the project design standards were developed to minimize impacts to meadows and riparian habitat through the implementation of wet weather seasonal restrictions, and prohibits existing and future cross country travel.

Greater Sandhill Crane: Affected Environment

Introduction: The greater sandhill crane is a California State Threatened species and is listed as Sensitive on the Region 5 Forester's Sensitive Species List (UDSA Forest Service 1998). California pairs of sandhill cranes generally nest in wet meadow, shallow lacustrine, and fresh emergent wetland habitat, with nests constructed of large mounds of water plants over shallow water (Zeiner et al. 1990, California Department of Fish and Game 1994). Studies in California during 1988 showed water depths averaging 2.3 inches (California Department of Fish and Game 1994). Open meadow habitats are also used (Littlefield 1989). On dry sites, nests are scooped-out depressions lined with grasses (Zeiner et al. 1990).

In the Tahoe National Forest, a breeding population of approximately 12 pair occur within Carman Valley, Kyburz Flats, and Perazzo Meadow on the Sierraville Ranger District (Tahoe NF Biological Evaluation). In addition, sandhill cranes are known to breed in the Sardine Valley area on private land north of Stampede Reservoir.

Disturbance and/or Mortality from vehicles: Road and trail-associated factors can disrupt sandhill breeding activities which can ultimately cause a loss in productivity. Motorized activities off of roads and trails during the breeding season can cause direct mortality of young sandhill cranes.

Habitat Degradation: routes across meadow sites can also indirectly affect sandhill cranes by damaging or degrading meadow or wetland habitat required for breeding.

Greater Sandhill Crane: Environmental Consequences

Analysis Measures

Change in Class of Vehicles: The changes in class of vehicle was analyzed for their potential to affect sandhill crane breeding habitat, since this action potentially changes the condition of the existing road surface from smoothed surfaced to rough surfaced; which could potentially alter meadow condition where routes intersect or are within close proximity to motorized routes.

Wet weather seasonal restrictions: Wet weather seasonal restrictions on native surfaced roads and motorized trails are analyzed for their potential to benefit sandhill cranes for each of the alternatives.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for their effects to sandhill crane breeding habitat.

Sandhill Crane Breeding Sites Intersected by Motorized Trail Additions to the National Forest Transportation System (NFTS) and Designation of "Open Areas": Sandhill crane breeding sites were analyzed to determine the number of miles of motorized trail additions to the NFTS that intersects sandhill crane breeding sites.

Direct and Indirect Effects

Change in Class of Vehicle. The change in class of vehicles would potentially affect sandhill crane habitat under Alternatives 2, 5, and 7 within Carman Valley (Knutsen Meadow), where different maintenance standards could result in changes to road surface type and potentially increase erosion and sedimentation risk. In general, it is not expected that the change in class of vehicle would result in a significant change to sandhill crane habitat conditions, since the road through Carman Valley is already rough surfaced. In the long term, road condition could deteriorate and cause localized effects. Since Carman Valley recently underwent major meadow restoration efforts including a culvert improvement project specifically designed to enhance meadow condition, any adverse effects of road maintenance changes would likely be minimal, especially considering that Carman Valley is a large meadow system and the road condition is currently stable.

None of the other sandhill crane breeding sites are affected by the change in class of vehicles.

Wet Weather Seasonal Restrictions. Wet weather seasonal restrictions on native surfaced roads and motorized trails would likely benefit sandhill cranes at Kyburz Flat and Carman Valley under alternatives 4, 5, and 6, since motorized use on native surfaced routes adjacent to Kyburz and Carman Valley breeding sites would be prohibited during the wet weather season. The prohibition of motorized use on these routes would prevent the potential for meadow habitat degradation through vegetation and soil loss at sandhill crane breeding sites. For the remaining alternatives, sandhill crane breeding sites at Carman Valley, Kyburz Flat, and Perazzo Meadow could be subject to an increase in the risk of meadow vegetation

degradation through the loss of riparian vegetation and soil erosion from motorized use during the wet weather season, particularly in the spring months after snowmelt (April to early June).

Prohibition of Cross Country Travel. Cross country travel is not prohibited under Alternative 1, at Kyburz Flat, Carman Valley, and Perazzo Meadow where unmanaged cross-country travel may impact breeding sandhill cranes where breeding productivity could be at risk from disturbance of motorized activity. All the action alternatives would prohibit cross-country travel, and therefore, would benefit sandhill cranes at Kyburz Flat, Carman Valley, and Perazzo Meadow.

Breeding Sites Intersected by Motorized Trail Additions to the National Forest Transportation System (NFTS) and Designation of "Open Areas"

On the Tahoe NF, three sandhill crane breeding sites are located at Kyburz Flat, Carman Valley, and Perazzo Meadow on the Sierraville Ranger District. For all the action alternatives, motorized trails added to the NFTS would not intersect known breeding sites at Kyburz Flat or Carman Valley on National Forest System lands, and therefore, no direct or indirect effects would occur from the addition of motorized trails to the NFTS.

Boca, Stampede, and Prosser Reservoir Open Areas: Alternative 2 proposes the allowance of motorized access to the shoreline below the high water mark on dry soils to allow for recreational fishing, water play, etc. Sandhill cranes have been documented to occur on the north shore of Stampede Reservoir, but nesting has not been documented in this area. However, a known breeding population of sandhill cranes occurs at Sardine Valley on private land just north of Stampede Reservoir. Motorized access to the shoreline could potentially disturb sandhill cranes using the area north of Stampede Reservoir. Under Alternative 1 cross country travel would continue, where the potential to disturb sandhill cranes may occur, including the Stampede Reservoir area. The remaining action alternatives do not allow access to these reservoirs, and therefore, sandhill cranes would not be directly disturbed by motorized use adjacent to Stampede Reservoir.

Summary of Direct and Indirect Effects

Table 3.03-94 summarizes the overall net direct and indirect effect of the proposed actions from motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-94. Sandhill Crane - Summary of Overall Net Direct and Indirect Effects of the Alternatives

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized trail additions to the NFTS	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.
Open Reservoir Areas at Stampede, Boca, and Prosser Reservoirs	Unmanaged motorized use continues, potential adverse effects to sandhill crane at Stampede Reservoir	Open motorized access to reservoirs on dry soil – potential adverse effects to sandhill crane at Stampede Reservoir	No effect	No effect	No effect	No effect	No effect
Cross Country Travel	Not prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.
Wet Weather Restrictions	No effect	No effect	No effect	Positive Benefit to habitat	Positive Benefit to habitat	Positive Benefit to habitat	No effect
Change in Class of Vehicles	No effect	Localized negative effects at Carmen Valley.	No effect	No Effect	Localized negative effects at Carmen Valley.	No Effect	Localized negative effects at Carmen Valley.
Overall Net Effect of Proposed Actions	Negative effect at Kyburz, Perazzo, and Carman Valley, and Stampede Reservoir where cross country travel continued.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited, but negative effects at Stampede Reservoir.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.

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

Cumulative Effects

Spatial and Temporal Cumulative Effects Boundary

Breeding sandhill cranes are known to breed at three sites on the Tahoe NF, at Kyburz Flat and Carman Valley - all are located on the eastside of the Forest on the Sierraville Ranger District. A fourth breeding site is located on private land in Sardine Valley just to the north of Stampede Reservoir. Therefore, the cumulative effects of the project alternatives are analyzed in the vicinity of these four sites because they represent the spatial extent of breeding sandhill cranes on the Tahoe NF. Past and reasonably foreseeable cumulative impacts are analyzed within 20 years in the past and out 20 years into the future. This represents a reasonable timeframe for analyzing cumulative impacts since any longer timeframe for analyzing cumulative project impacts may be uncertain and speculative.

Cumulative Effects of Motorized Trail Additions to the National Forest Transportation System (NFTS), Designation of "Open Areas", Prohibition of Cross Country Travel, Wet Weather Restrictions, and Change in Class of Vehicles

For Alternative 1, unmanaged cross-country travel in the future may impact breeding sandhill cranes where breeding productivity could be at risk from disturbance of motorized activity. The rate of increased OHV use on the Tahoe NF is expected to increase in the future. All the action alternatives would prohibit unmanaged cross-country travel, and therefore, would not likely contribute to existing cumulative impacts in the future and potentially benefit sandhill cranes. However, under both Alternative 1 and 2, cumulative adverse impacts could be added at Stampede Reservoir, adjacent to a known breeding population of sandhill crane on private land at Sardine Valley.

Overall Cumulative Effects to Sandhill Crane from Past, Present and Reasonably Foreseeable Actions

Past cumulative impacts for the four sandhill crane breeding sites at Carman Valley, Kyburz Flat, Perazzo Meadow, and Sardine Valley include historic grazing practices, meadow vegetation and hydrologic function impacts from roads, railroad logging, diversions, past timber harvest practices, and recreational activities. A list of recent past, present, and future projects is provided in Appendix Q (Wildlife Cumulative Effects). Some, but not all of these projects may have impacts to the sandhill crane. Current grazing standards and guidelines as directed in the Sierra Nevada Forest Plan Amendment Record of Decision (2004) are designed to minimize impacts to riparian resources from grazing. Some conifer encroachment into these sites has occurred from the lack of fires in the past 100 years. Recent and future vegetation management and fuels reduction projects are designed to prevent the loss of forested habitat from large-scale, stand replacing catastrophic fire events.

Carman Valley

The Carman Valley area is currently recovering from a recent series of large-scale watershed restoration efforts to restore a highly degraded stream and riparian system using the plug and pond method. Prior to recent restoration efforts, numerous past attempts at improving watershed conditions were made dating back to the early part of the century, but were largely ineffective. The Carman Valley area falls within the

Beckwourth Peak Allotment which is grazed by sheep. Additional and ongoing restoration efforts will continue to improve riparian resources and watershed conditions, which will enhance breeding habitat for the sandhill crane.

Kyburz Flat

Kyburz Flat located east of Highway 89 north of Truckee, CA receives high recreational use from snowmobile use and cross country travel. The Kyburz Flat area was a part of the Boca, Kyburz, Sagehen, and Summit Allotment Management Plan (BKSS) where grazing management planning would reduce grazing impacts from sheep and improve riparian resource condition, and therefore, benefit breeding sandhill crane habitat at Kyburz Flat.

Perazzo Meadow

Perazzo Meadow is located on the Sierraville RD within the Perazzo Meadows Livestock Grazing Allotment. During the last 15 to 20 years, a variety of management efforts have been undertaken to improve riparian conditions and to reduce impacts from livestock grazing at Perazzo Meadows, including reducing livestock numbers, developing interim grazing management strategies, small watershed restoration efforts (structures), and others. Watershed degradation at Perazzo Meadows can be attributed not only to livestock grazing, but also to off-highway activities, loss of a bridge during the 1997 storm event, and other factors. Efforts to improve riparian watershed condition is currently underway, including through partnerships with local watershed groups, development of a grazing allotment management plan, and large-scale, watershed restoration efforts.

Sensitive Species Determination

The Biological Evaluation for the Tahoe NF Motorized Travel Management Plan, which is hereby incorporated by reference, made a determination that the all the action alternatives may impact sandhill cranes, but are not likely to lead to a trend toward federally listing, and do not contribute to a downward trend for sandhill crane population viability.

Compliance with Forest Plan and Other Direction

The Tahoe NF LRMP, as amended by the SNFPA ROD (2004), provides management direction for managing meadows, wetlands and riparian habitats, and Riparian Conservation Areas that are applicable to sandhill crane habitat as follows:

- *Locate roads away from meadow edges where alternative routes are available (Tahoe LRMP)(Management Standard & Guideline).*
- *Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.*
- *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2)*

minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species (Management Standard & Guideline 92).

- *Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity (RCO#2, Management Standard & Guideline 100).*

In the above sections, the proposed actions and alternatives for the Tahoe NF Motorized Travel Management Project were analyzed for their potential effects to sandhill crane breeding habitat which addresses the above management standard and guidelines as they apply to sandhill crane breeding habitat. Mitigation measures for the action alternatives to minimize the risk of sediment and streambank alteration from proposed motorized routes and existing unauthorized routes unauthorized to public use are addressed in the RCO analysis and Appendix A (Road Cards).

Alternative 1 is least consistent with the above standards and guidelines for managing meadows in terms of maintenance and hydrologic connectivity of meadows, avoidance of roads near and within meadows, and minimizing effects to meadow condition and function. Alternative 1, continues cross country travel, including within Kyburz Flat, Perazzo Meadows, and Carman Valley (Knutsen Meadow) (known sandhill crane breeding sites).

All of the action alternatives are consistent with the above standards and guidelines since they reduce the impacts to sandhill cranes. The action alternatives all prohibit cross country travel on all three sandhill crane breeding sites, and reduces the impacts to these meadows. No motorized trail additions to the NFTS are proposed within any sandhill crane breeding areas. Alternative 2 proposes changes in class of vehicles to a road that is adjacent to Knudsen Meadow, where small, localized effects may result from different maintenance standards.

Yellow Warbler: Environmental Consequences

The yellow warbler was selected as the MIS for riparian habitat in the Sierra Nevada. The Sierra Nevada Forest MIS Report and the Tahoe NF Motorized Project-level MIS Report are incorporated by reference. The yellow warbler is usually found in riparian deciduous habitats in summer (cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland) (CDFG 2005). Yellow warbler is dependent on both meadow and non-meadow riparian habitat in the Sierra Nevada (Siegel and DeSante 1999). On the Tahoe NF, CWHR montane riparian habitat (MRI) provides suitable habitat for the yellow warbler.

Habitat Factor(s) for the Analysis: The habitat factor used to assess direct and indirect effects of motorized routes for the yellow warbler were montane riparian habitat acres affected by motorized trail additions to the National Forest Transportation System (NFTS). Habitat acres were determined by the length of the route multiplied by the width of the route. Route width is assumed to be a maximum of 8 feet. In some cases, route width may be less, therefore, impacts may be somewhat over-emphasized.

Current Condition of the Habitat Factor(s) in the Project Area: The Tahoe NF has approximately 5,131 acres CWHR montane riparian habitat (MRI).

Direct and Indirect Effects to Habitat

Change in Class of Vehicles. The change in class of vehicle on some existing NFTS motorized roads may result in some smoothed surfaced roads becoming rough surfaced roads through changed road maintenance. In addition, some existing motorized NFTS roads may different maintenance resulting in increased vegetation density at the road margins which would provide additional cover and/or foraging habitat. The resulting roadway condition would depend upon the amount and type of vegetation present and the type of maintenance any given road receives. For the yellow warbler, existing habitat conditions will dictate whether or not the change in class of vehicle will result in reduced habitat quality. In general, it is not expected that the change in class of vehicle would result in a significant change to yellow warbler habitat conditions, unless changed road maintenance results in increased montane riparian habitat degradation.

Wet Weather Seasonal Restrictions. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where montane riparian habitats for the yellow warbler would be benefited through the reduction of erosion and sedimentation that could occur from wet season motorized use on routes, especially motorized routes that are within close proximity to yellow warbler habitat. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, yellow warbler habitat would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of stream crossings and highest RCA route densities that could potentially delivery sediment to montane riparian habitats from motorized use on native surfaced routes during the wet weather season.

Prohibition of Cross Country Travel. Under Alternative 1, cross country travel would continue, affecting 3,525 acres of montane riparian habitat (10 acres directly affected by continued use on motorized trails un-authorized for motorized use), potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the yellow warbler. For the action alternatives, cross country travel would be prohibited on 3,525 acres, where disturbance, avoidance, abandonment would be reduced or eliminated. Of these 3,525 acres, 9 to 10 acres of yellow warbler habitat would directly benefit of the prohibition of cross country travel on motorized trails un-authorized for motorized use.

Motorized Trail additions to the National Forest Transportation System (NFTS). Table 3.03-95 displays the acres of montane riparian habitat directly and indirectly affected by the alternatives. Alternative 1 affects the greatest amount of montane riparian habitat, suitable for yellow warbler, where motorized trails un-authorized for motorized use results in a loss or reduction in montane riparian habitat within 10 out of 5,131 acres or 0.2% of Tahoe NF montane riparian habitat. Alternatives 2, 5, & 6 are similar in their effects to montane riparian habitat, where motorized trail additions to the NFTS) results in between 0.4 and 0.6 acres out of 5,131 acres or 0.01% of Tahoe NF yellow warbler habitat. Alternatives 3, 4, and 7 result in minimal to no habitat affected by the motorized trail additions to the NFTS).

Table 3.03-95 Proportion of Yellow Warbler MIS habitat affected by of Motorized Trail Additions to the National Forest Transportation System (NFTS)

Yellow Warbler MIS Habitat	Yellow Warbler Habitat Acres	Alt1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Montane Riparian Habitat		10	0.4	0	0.04	0.6	0.4	0.1
Proportion of Sierra Nevada Habitat	29,000	.03%	0%	0%	0%	0%	0%	0%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat	5,131	0.2%	0.01%	0%	0%	0.01%	0.01%	0%
Habitat Security Risk in Tahoe NF		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

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

Summary of Direct and Indirect Effects

Table 3.03-96 summarizes the overall net effect to the yellow warbler habitat from the motorized trail additions to the NFTS, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table 3.03-96. Yellow Warbler - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Trail additions to the NFTS	0	0.4 acres montane riparian habitat affected.	0	0.04 acres montane riparian habitat affected.	0.6 acres montane riparian habitat affected.	0.4 acres montane riparian habitat affected.	0.1 acres montane riparian habitat affected.
Cross Country Travel	Not prohibited on 3,525 habitat acres (10 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within 9.6 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within approx. 10 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within approx. 10 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within 9.4 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within 9.6 acres directly affected by motorized trails un-authorized for motorized use).	Prohibited on 3,525 acres (including within 10 acres directly affected by motorized trails un-authorized for motorized use).
Wet Weather Restrictions	No effect	No effect	No effect	Positive Benefit to habitat.	Positive Benefit to habitat.	Positive Benefit to habitat.	No effect
Change in Class of Vehicles	No effect	Localized negative effects	No effect	Minor negative effect	Localized negative effects	Localized negative effects	Minor negative effect
Overall Net Effect of Proposed Actions	Negative effect on 10 acres of yellow warbler habitat.	Positive effect on 9.6 acres of yellow warbler habitat.	Positive effect on 10 acres of yellow warbler habitat.	Positive effect on 10 acres of yellow warbler habitat.	Positive effect on 9.4 acres of yellow warbler habitat.	Positive effect on 9.6 acres of yellow warbler habitat.	Positive effect on approx.10 acres of yellow warbler habitat.

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

Cumulative Effects to Habitat in the Analysis Area

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities have or will contribute to impacts to the montane riparian habitat for the yellow warbler within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Generally, vegetation/fuels management projects have not affected habitat within montane riparian habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Many recent, current, and future vegetation and fuels reduction projects are designed to minimize affects to montane riparian habitats by following "riparian conservation objectives" as prescribed in the Sierra Nevada Forest Plan Amendment Record of Decision (2004). Between 1994 and 2008, approximately 94,000 acres burned on the Tahoe NF, some of which have resulted in substantial changes in montane riparian habitat. In many cases, montane riparian habitat that was severely burned during a stand-replacing wildfire resulted in changes to or loss of riparian vegetation, loss of shade, cover, and structural diversity. In some cases, some riparian areas recovered post-fire and were significantly enhanced (i.e. aspen habitats in the Cottonwood Fire of 1994).

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increased impact to montane riparian habitats because humans are attracted to these areas for their beauty and scenic quality. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased impacts to montane riparian habitat would be expected, particularly during the summer months. Table 3.03-97 lists the reasonably foreseeable future projects and the associated direct, indirect, and cumulative impacts that are planned to occur on the Tahoe NF.

Table 3.03-97. Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Yellow Warbler Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in aspen and oak habitats.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact to montane riparian habitat.

Project type	Number of Projects	Yellow Warbler Direct and Indirect Impact	Overall Cumulative Impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve montane habitat quality and quantity used for foraging and nesting.	Beneficial cumulative impact by improving long-term habitat quality.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance where trail is in close proximity to yellow warbler habitat.	No cumulative impact to montane riparian habitat..
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

Alternative 1, no action, affects the greatest amount of yellow warbler habitat (10 acres out of 5,131 acres) on the Tahoe NF. Alternatives 2, 3, and 7 do not affect yellow warbler habitat (or affects only a nominal amount) from motorized trail additions to the National Forest Transportation System (NFTS). Alternatives 2, 5, and 6 alters less than 0.02% of yellow warbler habitat (0.4 acres to 0.6 acres out of 5,131 acres Tahoe NF habitat). In general, it is not expected that the change in class of vehicle would result in a significant change to yellow warbler habitat conditions, unless changed road maintenance results in increased montane riparian habitat degradation for Alternatives 2, 4, 5, 6, and 7. Wet weather seasonal restrictions on all native surfaced roads and motorized trails under Alternatives 4, 5, and 6 would benefit montane riparian habitat for the yellow warbler through the reduction of erosion and sedimentation. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized routes and therefore, montane riparian habitat for the yellow warbler would not benefit from wet weather seasonal restrictions. Finally, Alternative 1 would pose the greatest risk on 3,525 acres of yellow warbler habitat, where cross country travel would not be prohibited causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the yellow warbler. For the action alternatives, cross country travel would be prohibited on 3,525 montane riparian acres, where disturbance, avoidance, abandonment would be reduced or eliminated. Overall, none of the alternatives will alter the existing trend in yellow warbler habitat. However, Alternative 1, which allows cross country motorized travel to continue, could alter yellow warbler population trend.

Summary of Yellow Warbler Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the yellow warbler; hence, the riparian habitat effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the yellow warbler. This information is drawn from the detailed information on habitat and population trends

in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 29,000 acres of riparian habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. The yellow warbler has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including Lassen NF (Burnett and Humple 2003, Burnett et al. 2005) and Inyo NF (Heath and Ballard 2003) point counts; on-going California Partners in Flight monitoring and studies (CPIF 2004); 1992 to 2005 – Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that yellow warblers continue to be present at these sample sites, and current data at the range wide, California, and Sierra Nevada scales indicate that the distribution of yellow warbler populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Yellow Warbler Trend. Alternative 1 results in the greatest amount of montane riparian habitat 10 acres of 29,000 acres (0.03% of Sierra Nevada-wide habitat) affected by cross country travel, including use on existing motorized trails un-authorized for motorized use. The action alternatives result in none to very few (0 acres to less than 1 acre out of 29,000 acres) acres of yellow warbler habitat compared to Sierra Nevada-wide habitat available. Based on the small percentage of habitat affected, the Tahoe NF Motorized Travel Management Project will not alter the existing habitat trend, nor will it lead to a change in the distribution of yellow warbler across the Sierra Nevada bioregion.

Compliance with Forest Plan and Other Direction

The Tahoe NF LRMP, as amended by the SNFPA ROD (2004), provides management direction for managing meadows, wetlands and riparian habitats, and Riparian Conservation Areas that are applicable to yellow warbler habitat as follows:

- *Locate roads away from meadow edges where alternative routes are available (Tahoe LRMP)(Management Standard & Guideline).*
- *Avoid wetlands or minimize effects to natural flow patterns in wetlands and avoid road construction in meadows.*
- *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species (Management Standard & Guideline 92).*
- *Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity (RCO#2, Management Standard & Guideline 100).*

In the above sections, the proposed actions and alternatives for the Tahoe NF Motorized Travel Management Project were analyzed for their potential effects to yellow warbler montane riparian habitat which addresses the above management standard and guidelines as they apply to yellow warbler habitat. Mitigation measures for the action alternatives to minimize the risk of sediment and streambank alteration from motorized trail additions to the NFTS and existing motorized trails un-authorized for motorized use are addressed in the RCO analysis and Appendix A (Road Cards).

Alternative 1 is least consistent with the above standards and guidelines for managing montane riparian habitat in terms of maintenance and hydrologic connectivity of streams, meadows, and wetlands, avoidance of roads near and within meadows, and minimizing effects to montane riparian condition and function. Alternative 1, continues cross country travel montane riparian habitats important to yellow warblers, including on 10 acres of montane riparian habitat resulting from travel on existing motorized trails un-authorized for motorized use.

All of the action alternatives are consistent with the above Standards and Guidelines. All the action alternatives reduces the impacts to these habitats by prohibiting cross country travel on within yellow warbler habitats, including on 9.6 of 10 acres of montane riparian habitat affected by existing motorized trails un-authorized for motorized use.

Aquatic Species and Habitat: Affected Environment

Introduction: The Tahoe NF aquatic species considered here in this analysis are fish and aquatic macroinvertebrates, special status species that are either on the federal threatened and endangered species list (Lahontan cutthroat trout and California red-legged frog) or on the Regional Forester's Sensitive Species list. Amphibian species and their habitats addressed in this section are foothill yellow-legged frog, mountain-yellow legged frog, and northern leopard frog. Fish species addressed include Lahontan cutthroat trout (LCT), hardhead, and Lahontan Lake tui chub. Great Basin ramshorn snail and the California floater are aquatic invertebrate species that are also included in the general discussion of potential impacts of road and trail associated factors.

Motorized road and trail associated factors will be discussed here for fisheries and macroinvertebrates across the Forest. Generally, site-specific studies on the species interaction with road and trail-associated factors is lacking in the literature. Site-specific information or literature on road and trail associated factors to aquatic species will be presented whenever available. Additional information is presented in Chapter 3.02, Soil and Watershed Resources.

Increases in stream sediments has been correlated with decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, and increased predation of fishes. The effects of roads and trails also include barriers to migration, changes in water temperature, and changes in streamflow regime. Culverts that are placed in improper locations at stream crossings can reduce or eliminate stream passage, and road crossings may be migration barriers to fish. Roads constructed adjacent to streams can also cause adverse effects to stream condition. Loss of riparian vegetation affects stream temperature and cover which can have both negative and positive impacts on fish. Irregularly or unpredictable streamflows has the potential to impact fish densities by affect reproductive success and over wintering survival. High

streamflow events following spawning can dislodge egg masses or displace young fry, and therefore lead to increased mortality to fish populations.

Road construction and use also affects adjacent vegetation. Reductions in vegetation along roads resulting from hazard tree removal and road associated recreation use may create edge effects that alter community structure due to soil compaction and increased solar radiation and wind. Increases in soil compaction combined with increases in solar radiation have the potential to increase soil temperatures and decrease soil moisture, reducing habitat suitability for aquatic, aquatic-dependent, and riparian dependent species.

Summary of potential trail and road associated impacts to aquatic and riparian associated species:

- Mortality or injury resulting from a motorized vehicle running over or colliding with an animal
- Loss or degradation resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities (Includes changes in sediment delivery, changes in water temperature, changes in channel morphology, and changes in hydrologic and vegetative condition of aquatic and riparian habitats, including streams, ponds, lakes, meadows, springs, and fens, and the associated riparian vegetation).
- Collection of live animals for use as pets (such as amphibians and reptiles) as facilitated by the physical characteristics of roads or trails or by road or trail access
- A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise
- Displacement of individual animals from a specific location that is being used for reproduction and rearing of young.

Fisheries and Aquatic Macroinvertebrates

Several studies have correlated road density or indices of roads to fish density or measures of fish diversity (Gucinski, et al. 2001). Impacts to fisheries include sedimentation of fines, changes in streamflow, changes in water temperature through loss of shade (changes in riparian vegetation) or changes in groundwater, migration barriers, introduction of exotic fishes, changes in channel geomorphology, and increased fishing pressure.

Effects of elevated sediment delivery to aquatic systems include adverse effects to water quality (e.g., increases in turbidity) and changes in substrate morphology that potentially could influence in-stream primary production and macroinvertebrate assemblages that provide forage for trout. Aquatic invertebrates species (macroinvertebrates) assemblages have been shown to be negatively impacted by stream crossings. One study found (Hawkins et al. *In*: Gucinski, et al. 2001) that aquatic insect larvae (mayflies, stoneflies, and caddisflies) assemblages were negatively related to the number of stream crossings above a site. Another study (Newbold et al. 1980 *In*: Gucinski, et al. 2001) found that macroinvertebrate assemblages differed significantly above and below stream crossings. Landscape analyses suggests that road and trail associated factors can affect the frequency, timing, and magnitude of disturbance, which may influence aquatic invertebrate community structure and species diversity.

Aquatic Species and Habitat: Environmental Consequences

Various studies have demonstrated that sediment delivery to stream channels in a forested environment is correlated to road surface type, physical characteristics of the adjacent areas (e.g., litter depth, coarse wood), soils (erodibility), the steepness of slope below the road, and vehicle usage (Chin and others 2004 In Guldin 2004, Clinton and Vose 2003). Other factors that contribute to in-channel sediment delivery include the number of stream crossings on a channel, the condition of the stream approach, and the road length draining into the stream channel crossing.

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails were analyzed for the project alternatives in terms of all aquatic species and their habitats. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to aquatic species habitats.

Change in Class of Vehicles: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02 Watershed Resources)

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to aquatic habitat factors from motorized cross country travel.

Motorized Route and Area Additions: Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized trail additions to the NFTS, and the miles motorized trail additions within Riparian Conservation Areas (RCAs) for perennial and intermittent streams, and lakes, ponds, and reservoirs.

Direct and Indirect Effects to Fisheries (trout) and Macroinvertebrates

Aquatic or Benthic Macroinvertebrates (BMI) were selected as the MIS for riverine and lacustrine habitat in the Sierra Nevada. They have been demonstrated to be very useful as indicators of water quality and aquatic habitat condition (Resh and Price 1984; Karr et al. 1986; Hughes and Larsen 1987; Resh and Rosenberg 1989). They are sensitive to changes in water chemistry, temperature, and physical habitat; aquatic factors of particular importance are: flow, sedimentation, and water surface shade.

Habitat Factor(s) for the Analysis: Flow; Sedimentation; and Water surface shade

Flow: this habitat factor will be evaluated by assessing changes in the miles of perennial stream flow and intermittent stream flow, and changes in acres of lakes and ponds.

Sedimentation: this habitat factor will be evaluated by assessing miles of stream and acres of lake affected by sediment discharge as a result of native surfaced route crossings on streams and proximity of routes to streams, lakes and ponds. Sedimentation will be measured by route density within RCAs and Stream crossing density within RCAs.

Water surface shade: this habitat factor will be evaluated by assessing changes in water surface shade as a result of route locations that cross streams or are adjacent to streams, lakes and ponds. This

change will serve to indicate changes in water surface shade to perennial and intermittent streams, and lakes and ponds.

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

Flow: There are currently 1,398 miles of perennial stream, 941 miles of intermittent stream, and approximately 11,599 acres of lakes, ponds, and reservoirs on Tahoe NF including on National Forest System lands. These miles of perennial and intermittent streams, and acres of lakes, ponds, and reservoirs comprise the habitat for aquatic macroinvertebrates across the Forest.

Sedimentation: Native surfaced, motorized stream crossings and motorized routes within close proximity to riverine and lacustrine habitats can be a considerable source of sediment delivery to aquatic habitats important to macroinvertebrates (See Chapter 3.02 Water Resources). There are currently 2,099 native surfaced, stream crossings, and 1719 miles of roads and trails within RCAs on the Tahoe NF. There are 3 water bodies on the Tahoe NF that are listed as impaired for sediment on the EPA's 303(d) List. These are Truckee River, Humbug Creek, and Squaw Creek.

Water surface shade: Water surface shade varies tremendously on the Tahoe NF depending on the type and amount of vegetation, topographic features, floodplain type, etc. that the watercourse falls within.

Wet Weather Seasonal Closures

Proposed wet weather seasonal restrictions on native surfaced roads and trails were analyzed for the project alternatives in terms of all aquatic species and their habitats. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to aquatic species habitats.

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where fish and other aquatic species would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially motorized roads and trails that are within close proximity to or cross streams or other riparian aquatic habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather seasonal restrictions on native surfaced motorized routes and therefore, aquatic riparian dependent species would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of motorized stream crossings and highest RCA route densities that could potentially delivery sediment to aquatic and riparian habitats from wheeled motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicle. The change in class of vehicle may change the impacts to soil and water resources due to the potential change from smoothed surfaced route to native (rough) surfaced route (See Chapter 3.02 Watershed Resources). If the route changes from smoothed surfaced to native surfaced, the change in class of vehicle may result in increased sediment and erosion risk. The analysis of the change in class of vehicles indicates Alternatives 2, 5, and 6 will result in an increase in high risk routes (native surfaced) by a change of 0.2 miles per square mile of RCA (13.9 miles) and by 0.3 crossings per square mile (102 crossings) across the entire Tahoe NF, where increases in sedimentation to riverine and

lacustrine habitats may occur over time (Table 3.03-98). No change in class of vehicles would occur in Alternatives 1 and 3, only minor changes (3.4 miles) would occur in Alternatives 4 and 7.

Table 3.03-98. Change in Class of Vehicle Impacts to Riverine and Lacustrine Habitats

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced Crossings	0	102	0	0	102	102	0
RCA Miles of Native Surfaced Routes	0	13.9	0	0	13.9	13.9	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will continue on approximately 149,277 acres within Riparian Conservation Areas (RCAs), where the potential for adversely affecting aquatic macroinvertebrate habitat factors through increases in sedimentation and alteration of water surface shade. Under the action alternatives, prohibitions on cross country travel on 149,277 acres within RCA's will likely reduce the potential for sedimentation and alteration of water surface shade, and therefore benefit aquatic riverine and lacustrine habitat quality.

Motorized Route Additions

Number of Native Surfaced, Stream Crossings. The number of native surfaced, stream crossings is assessed for the alternatives, and provides a way to compare changes in sediment into riverine and lacustrine habitats for aquatic macroinvertebrates (Table 3.03-99). Alternative 1 poses the greatest risk of increased sedimentation where 785 stream crossings are affected by the continuance of cross country travel on motorized trails unauthorized to motorized public use. Of the action alternatives, Alternative 5 results in the greatest number of native surfaced, stream crossings (461 crossings) associated with proposed motorized trail additions to National Forest Transportation System (NFTS), followed by Alternatives 2, 6, 7, and 4, in descending order. Alternative 3 does not add motorized trails to the NFTS, and therefore macroinvertebrate habitat factors of sedimentation or water surface shade would not be affected.

Table 3.03-99. Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions (negative impact)	0	357	0	19	461	164	20
Stream Crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized public use (negative impact)	785	0	0	0	0	0	0
Crossings that would be unauthorized to motorized public use with the prohibition of cross country travel (positive impact)	0	428	785	766	324	621	765

Miles of Proposed Route Additions within RCAs. The miles of proposed motorized trail additions to the National Forest Transportation System (NFTS) within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into riverine and lacustrine habitats for aquatic macroinvertebrates (Table 3.03-100). Alternative 1 poses the greatest risk to

increased sedimentation potential from 201.5 miles of motorized trails un-authorized for motorized use within RCAs that would remain due to not prohibiting cross country travel. Similar to stream crossing numbers, Alternative 5 also results in the greatest number of motorized route trails within RCAs that would be added to the NFTS, followed by Alternatives 2, 6, 7, and 4, in descending order. As stated above, Alternative 3 does not add motorized trails to the NFTS, and therefore changes to macroinvertebrate habitat factors of sedimentation or water surface shade would not occur.

Table 3.03-100. Miles of Proposed Route Additions within Riparian Conservation Areas (RCAs)

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized trail additions within RCAs (negative impact)	201.5	64.5	0	5.7	97.0	35.2	8.2
Miles of motorized routes within RCAs that would be prohibited to motorized public use with the prohibition of cross country travel (positive impact)	0	136.5	201.5	195.8	104.5	166.3	193.3

*Alternative 1 includes existing native surfaced routes, unauthorized to motorized use, while all the other Alternatives include motorized route additions to NFTS.

Summary of Direct and Indirect Effects to Macroinvertebrate Habitat Factors

Table 3.03-101 summarizes the direct and indirect effects of macroinvertebrate habitat factors for the alternatives from proposed motorized trail additions to the National Forest Transportation System and cross country travel, including motorized trails un-authorized for motorized use. None of the action alternatives are expected to measurably change the amount of habitat within intermittent, perennial streams, lakes, ponds, and reservoirs. Flows within intermittent and perennial streams are expected to remain in existing conditions. Habitat quality will be affected from changes to sedimentation and to water surface shade. The following actions are assessed for their potential to affect sedimentation, and to a lesser degree to water surface shade. Native surface road and motorized trail crossings and within close proximity to watercourses have the potential to alter riparian habitat and therefore change the amount of water surface shade. These factors are measured by assessing the density of native surface road and motorized trails within the Riparian Conservation Areas (RCAs) and the density of stream crossings within RCAs. RCAs are defined as the area within 100 feet on each side of intermittent streams and 300 feet of perennial streams. Lakes, ponds, and reservoirs are considered perennial and have a 300 foot RCA. Water surface shade will be reduced by a very limited amount where shade has been removed by the proposed route crossings. Water surface shade alteration will depend upon the width of the crossing and the type of vegetation present at the crossing. Within some watercourses, water surface shade will either not be altered or only minimally reduced, such as, crossings within forested habitats. Crossings through riparian vegetation (herbaceous meadow plants and woody riparian shrubs) have resulted in a reduction of some water surface shade. The amount of water surface shade will depend on the width of the crossings and the number of crossings (crossing density).

Table 3.03-101. Summary of Effects of Motorized Route Additions and Changes in Class of Vehicles to Aquatic Macroinvertebrate Habitat Factors for the Alternatives

Alternatives	Changes in habitat quality in miles of Stream and Acres of Lakes/Ponds/Reservoirs	Changes in Sediment Levels	Changes in Water Surface Shade
Alt 1*	Low	Increases the greatest (201 RCA route miles, 785 crossings)	Decreases the most
Alt 2	Low	Increase (79 RCA route miles, 459 crossings)	Decrease
Alt 3	Low	No Change	No Change
Alt 4	Low	Increases the least (6 RCA miles, 19 crossings)	Decreases the least
Alt 5	Low	Increase (111 RCA miles, 563 crossings)	Decrease
Alt 6	Low	Increase (49 RCA miles, 266 crossings)	Decrease
Alt 7	Low	Increase (8 miles, 20 crossings)	Decrease

*Alternative 1 includes existing native surfaced, stream crossings and routes unauthorized to motorized use, while all the other Alternatives include motorized crossing and route additions.

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to aquatic macroinvertebrates include all perennial, intermittent streams, lakes, ponds, and reservoirs located within the boundary of the Tahoe NF.

Past and current cumulative effects to aquatic macroinvertebrate habitat that have affected the habitat factors of flow, sedimentation, and surface shade include current and historic grazing along watercourses; loss of habitat (shade) and increased sedimentation through catastrophic wildfires; timber and fuels management where sedimentation has increased and cover has been reduced or removed; mining and dredging, urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the aquatic macroinvertebrates within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to aquatic macroinvertebrate habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Many recent, current, and future vegetation and fuels reduction projects are designed to minimize affects to stream and riparian habitats by following “riparian

conservation objectives" as prescribed in the Sierra Nevada Forest Plan Amendment. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which may have resulted in changes in flow, increased sedimentation, and loss in surface cover.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increased impact to aquatic macroinvertebrate habitats because humans are attracted to streams, lakes, ponds, and reservoirs. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased impacts to aquatic macroinvertebrate habitat would be expected, particularly during the summer months.

Cumulative Effects Conclusion

For the action alternatives, generally, changes in flow and water surface shade will be too small to be measured. When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from grazing, vegetation/fuels projects, wildfires, mining, and recreation, Alternative 1 poses the greatest risk to the riverine and lacustrine habitats on the Tahoe NF, where cross country travel will continue on 149,277 acres within Riparian Conservation Areas where the highest potential to reduce habitat quality by increasing sediment delivery and alter water surface shade to aquatic macroinvertebrate habitats.

Changes in class of vehicles on native surfaced routes may potentially increase sedimentation to macroinvertebrate habitats under Alternatives 2, 5, and 6 by 13.9 RCA miles per square mile and by 102 crossings per mile across the Tahoe NF. Changes in class of vehicles on native surfaced routes will not measurably increase sedimentation to macroinvertebrate habitats under Alternatives 4 and 7.

Wet weather seasonal restrictions under Alternatives 4, 5, and 6 on all native surfaced roads and trails would benefit macroinvertebrate habitat through the reduction of erosion and sedimentation that could result from wet season wheeled motorized use on routes, especially wheeled motorized routes that are within close proximity to macroinvertebrate habitats.

Sedimentation of macroinvertebrate habitats the greatest under Alternative 1, where 785 stream crossings and 201 RCA miles of motorized trails would continue to have un-authorized motorized use since cross country is not prohibited. For the action alternatives, Alternative 5 results in the greatest number of native surfaced, stream crossings, followed by Alternatives 2, 6, 7, and 4, in descending order from the addition of motorized trails to the National Forest Transportation System (NFTS). Alternative 3 does not add any stream crossings because no route additions are proposed to the NFTS.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Tables 3.03-102 and 3.03-103 summarizes the direct , indirect, and cumulative effects of existing native surfaced motorized routes, native surfaced, motorized route additions, and native surfaced routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table 3.03-102. Net Direct, Indirect, and Cumulative Effects to Number of Native Surfaced, Stream Crossings from Motorized Trail Crossing Additions, Prohibition of Cross Country Travel, and Change in Class of Vehicles

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Motorized Crossings	2,099	2,099	2,099	2,099	2,099	2,099	2,099
Motorized Crossing Additions	785	357	0	19	461	164	20
Prohibition of Cross Country Travel	0	428	785	766	324	621	765
Change in Class of Vehicles	0	102	0	0	102	102	0
Net Direct, Indirect, and Cumulative Effect = Total Motorized Crossings	**2,884**	**2,558**	**2099**	**2,118**	**2,662**	**2,365**	**2,119**

*Alternative 1 includes existing native surfaced, stream crossings unauthorized to motorized use, while all the other Alternatives include motorized crossing additions.

Table 3.03-103. Net Direct, Indirect, and Cumulative Effects to Native Surfaced, RCA Miles from Motorized Trail Additions, Prohibition of Cross Country Travel, and Change in Class of Vehicles

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Motorized	472.7	472.7	472.7	472.7	472.7	472.7	472.7
Miles of Native Surfaced Motorized RCA Trail Additions	201.5	64.5	0	5.7	97.0	35.2	8.2
Prohibition of Cross Country Travel	0	136.5	201.5	195.8	104.5	166.3	193.3
Change in Class of Vehicles	0	13.9	0	0	13.9	13.9	0
Net Direct, Indirect, and Cumulative Effect = Total Motorized RCA Miles	**674.2**	**551.1**	**472.7**	**478.4**	**583.6**	**521.8**	**480.9**

*Alternative 1 includes miles of existing native surfaced, routes unauthorized to motorized use, while all the other alternatives include miles of motorized route additions.

Summary of Aquatic Macroinvertebrate Status and Trend at the Bioregional Scale. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale Index of Biological Integrity and Habitat monitoring for aquatic macroinvertebrates; hence, the lacustrine and riverine effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by these monitoring data. The sections below summarize the Biological Integrity and Habitat status and trend data for aquatic macroinvertebrates. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat and Index of Biological Integrity Status and Trend. Aquatic habitat has been assessed using Stream Condition Inventory (SCI) data collected since 1994 (Frasier et al. 2005) and habitat status information from the Sierra Nevada Ecosystem Project (SNEP) (Moyle and Randall 1996). Index of

Biological Integrity is assessed using the River Invertebrate Prediction and Classification System (RIVPACS) and macroinvertebrate data collected since 2000 (see USDA Forest Service 2008). These data indicate that the status and trend in the RIVPACS scores is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Aquatic Macroinvertebrates Habitat Trend. The Tahoe NF Motorized Travel Management Project will affect the greatest amount of macroinvertebrate habitat under Alternative 1, through increased sedimentation and decreased surface shade, where approximately 201 miles of motorized trails unauthorized to motorized public use would continue to occur under the continuance of cross country travel within RCAs. These motorized trails would effectively result in 785 native surfaced, stream crossings that could adversely affect the quality of macroinvertebrate habitats through increased sediment delivery and decreased surface water shade.

The analysis of the addition of motorized trails to the National Forest Transportation System (NFTS) for the action alternatives indicates Alternative 5 results in the greatest amount impact to macroinvertebrate habitat, though the potential increase in sedimentation and decrease in surface water shade from motorized stream crossings and RCA route miles (111 RCA miles, 563 crossings), followed by Alternatives 2, 6, 7, and 4, in descending order. Alternative 3 does not add any stream crossings or motorized trails within RCAs because no motorized trail additions to the NFTS are proposed under this alternative.

The action alternatives will not alter the existing trend in macroinvertebrate habitat, nor will it lead to a change in the distribution of macroinvertebrates across the Sierra Nevada bioregion. This is based on the relatively low amount of lacustrine and riverine habitat affected, the prohibition of cross country travel within 149,277 RCA acres, the prohibition of cross country travel on between 222 and 785 motorized RCA miles, and the prohibition of cross country travel on between 90 and 201 stream crossings.

Cumulative Effects of Past, Present, and Future Actions

The cumulative effects boundary includes all Forest Service System lands and private lands within the boundary of the Tahoe NF. This includes all major 7th field watersheds, which sufficiently analyzes cumulative effects to all perennial, intermittent, and ephemeral streams within the Forest boundary. Any larger boundary would be cumbersome and potentially dilute any cumulative effects.

Past, present, and future cumulative effects to aquatic organisms on both Forest Service System lands and private lands includes a host of activities including timber management and the large network of roads associated with it; fuels projects including prescribed burning; recreation activities including camping, fishing, hiking, off-highway travel, and sight seeing; historic and present day mining activities have had significant impacts to fisheries; water diversions including dams and hydroelectric projects; livestock grazing both historic and current have greatly impacted the fisheries resource; and last, but not least urbanization on the Tahoe NF represented by the checkerboard ownership pattern has and continues to affect landscape connectivity of streams on the Tahoe NF.

Alternative 1 would add the greatest cumulative impacts to aquatic resources on the Tahoe NF from highest route densities within Riparian Conservation Areas and the highest proportion of stream crossings. All action alternatives would decrease the potential risk to fisheries and macroinvertebrate

populations by decreasing the amount of motorized used on native surface routes. Alternative 5 would decrease the potential effects the least. Alternatives 3 and 4 would decrease the risks the most. Roads on private lands add considerable cumulative effects to the aquatic resources. Unmanaged cross country travel would continue to occur and increase at an unknown rate under Alternative 1 where impacts to aquatic resources are uncertain. Under all the action alternatives, cross-country travel would be prohibited. Over time, benefits to aquatic would be realized once these routes are revegetated and rehabilitated.

Lahontan Cutthroat Trout: Affected Environment

Introduction: The Lahontan cutthroat trout (LCT) was listed by the U.S. Fish and Wildlife Service (USFWS) as an endangered species in 1970 (Federal Register Vol. 35, p. 13520). The listing was reclassified to threatened status in 1975 to facilitate recovery and management efforts and authorize regulated angling (Federal Register Vol. 40, p. 29864). Currently, no Critical Habitat has been designated for the LCT (USFWS 1995).

Historically, LCT was thought to occupy approximately 360 miles of the Truckee River, 300 miles of the Carson River, and 360 miles of the Walker River in northern California and western Nevada (Somer 1998). Lahontan cutthroat trout historically occurred in Tahoe, Cascade, Fallen Leaf, Upper Twin, Lower Twin, Pyramid, Winnemucca, Summit, Donner, Walker, and Independence Lakes (Moyle 1976, Gerstung 1988). Currently, LCT recovery populations on the Tahoe NF occupy one lake and five streams. The Tahoe National Forest has designated the lake (Independence Lake) and the stream flowing into it (Upper Independence Creek) as a Critical Aquatic Refuge (CAR).

The Truckee River Basin Recovery Implementation Team (TRRIT) has established recovery objectives for various reaches of the Truckee River and its tributaries. Important recovery areas that the TRRIT has initially identified as having immediate potential include: Independence Creek, upstream of Independence Lake; Pole Creek; Hunter Creek; Donner Creek; Perazzo Creek; Prosser Creek; and the Truckee River from its confluence with Donner Creek to the State line; Upper Truckee River; Truckee River from Tahoe Dam to Donner Creek; and, Independence Creek downstream from Independence Lake to the Little Truckee River. The TRRIT has identified Macklin and East Fork Creeks and an unnamed tributary to the East Fork Creek in the Yuba River system as necessary for recovery of LCT because they contain remnants of indigenous Truckee River Basin strains.

The LCT currently occupy four 7th field watersheds on the Tahoe NF: Middle Truckee River-Pole Creek, Independence Lake, Middle Yuba River-Milton Reservoir, and East Fork. In addition, Lahontan cutthroat trout have been re-introduced into the Truckee River for recreational sport fishing. These recreation related populations are not considered recovery populations by the USFWS and are not subject to protection under the Endangered Species Act (ESA). In 2006, Lahontan cutthroat trout were released into Sagehen Creek as part of research project. These LCT are also not subject to protection under the ESA.

Habitat attributes considered important for Lahontan cutthroat trout include:

- Cool water temperatures
- Stable stream banks
- Sufficient coarse woody debris
- Spawning gravel with low percentages of sand/silt
- Deep pools
- 1:1 pool to riffle ratio

Route Associated Risk Factors: Potential road and trail associated risk factors to the LCT include the immediate loss of individual fish and loss of specific habitat features such as undercut banks used for cover, increases in sedimentation leading to changes in spawning bed capacity, and the loss of riparian vegetation necessary to maintain adequate temperature regime (SNFPA 2001).

Lahontan Cutthroat Trout: Environmental Consequences

In 2006, the U.S. Forest Service entered into programmatic consultation with the U.S. Fish and Wildlife Service for route designation (travel management) for motor vehicles in 14 National Forests in California. The BE for the Tahoe NF Motorized Travel Management Project and this programmatic consultation is incorporated by reference. Project design criteria were developed jointly, which includes measures to avoid impacts to federally listed species, including the Lahontan cutthroat trout. The U.S. Fish and Wildlife Service has agreed that, by using the Project Design Criteria for each of the Threatened and Endangered species and Critical Habitat, route designation will meet “No Effect” or “May Affect Not Likely to Adversely Affect” determinations and that they would concur with these determinations on a programmatic basis. Forest consultation can tier to the programmatic consultation with no further consultation. However, the FSW states that these criteria are for the Inyo, Sierra, and Stanislaus Nationals Forests only. The Tahoe and Humboldt-Toiyabe National Forests must have local project consultation for Lahontan cutthroat trout, since the Reno Office has responsibility for Section 7 Consultation on this species for these National Forests. Informal consultation for the LCT with the FWS Reno Office and the Sacramento Office occurred on August 22, 2007 regarding the Tahoe NF Motorized Travel Management Project. The FWS agreed that the Project Design Criteria which were developed through the programmatic consultation process should also be used to achieve a “No Effect” or “May Affect Not Likely to Adversely Affect” determination for the LCT for the Tahoe NF. As such, the following Project Design Standards for LCT are described and how the Tahoe NF Motorized Travel Management Project alternatives are consistent with each Project Design Criteria. More specific information on the effects of the alternatives is described in the sections that follow.

Consistency with Project Design Criteria to Achieve “No Effect” and “Not Likely to Adversely Affect” Determinations

- Routes and areas do not cross any stream within the occupied range of Lahontan cutthroat trout.
  - There are no proposed route additions that cross any stream occupied by Lahontan cutthroat trout.

  - The change in class of vehicles on the Pole Creek Road (Road #5708) proposed in alternatives 2, 5, and 6 crosses Pole Creek, which is occupied Lahontan cutthroat trout habitat.
- Routes and areas are not located on active landslides and do not re-route surface water onto active landslides within watersheds that provide habitat for Lahontan cutthroat trout.
  - There are no proposed route additions that cross any stream occupied by Lahontan cutthroat trout, and therefore, no proposed route additions are located on active landslides within watersheds that provide habitat for LCT.
- Within watersheds that provide habitat for Lahontan cutthroat trout, routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream.
  - The Travel Management action alternatives do not propose route or area additions that have the potential to capture surface run-off and then deliver sediment into any occupied LCT streams.
  - The change in class of vehicles on the Pole Creek Road has the potential to increase sediment delivery to Pole Creek which is occupied Lahontan cutthroat trout habitat. Mitigation measures would be required to maintain the Pole Creek Road that is within close proximity to the Pole Creek to a higher maintenance standard where sediment delivery to occupied habitat would be minimized to prevent adverse effects to LCT.
- **"Motorized Areas"** are located outside of Riparian Conservation Areas that are within watersheds that provide habitat for Lahontan cutthroat trout.
  - The action alternatives do not propose motorized area additions within watersheds or Riparian Conservation Areas that provide habitat for Lahontan cutthroat trout.
- Within watersheds that provide habitat for Lahontan cutthroat trout, "**motorized routes"** avoid Riparian Conservation Areas.
  - The action alternatives do not propose motorized route additions within watersheds or Riparian Conservation Areas that provide habitat for Lahontan cutthroat trout.
  - The change in class of vehicles on approximately 0.5 miles of the Pole Creek Road (Road #5708) is located within the Riparian Conservation Area of Pole Creek, which is occupied Lahontan cutthroat trout habitat, and therefore may have adverse effects from potential increased sedimentation from changed maintenance standards, where the route changes from smooth surfaced to native surfaced. Mitigation measures would be required to maintain the Pole Creek Road that is within the Pole Creek RCA to a higher maintenance standard where sediment delivery to occupied habitat would be minimized to prevent adverse effects to LCT.

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect LCT occupied habitats. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to occupied LCT streams.

Change in Class of Vehicles: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02, Soil and Watershed Resources). If the route changes from smoothed

surfaced to native surfaced, the change in class of vehicle may result in increased sediment and erosion risk to occupied LCT streams. The change in class of vehicle and associated maintenance downgrades is evaluated for their potential to affect occupied LCT streams.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to occupied LCT streams from motorized cross country travel.

Motorized Route and Area Additions (LCT 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized trail additions to the National Forest Transportation System, and the miles motorized trail additions within Riparian Conservation Areas (RCAs) for occupied LCT streams.

Site-specific Physical Impacts and Disturbance to occupied Lahontan cutthroat trout streams: Proposed motorized route additions were evaluated to determine site-specific impacts to occupied LCT streams for each of the alternatives. Native surfaced routes that cross or intersect LCT streams and lakes have the greatest potential to disturb LCT, kill and crush LCT egg masses (redds) and to alter stream banks and deliver sediment which can degrade LCT habitat condition. In addition, motorized route additions within the Riparian Conservation Areas (RCAs) of occupied LCT streams/lakes were also evaluated by the alternatives.

Route Density within Riparian Conservation Areas (RCAs): Route densities of native surfaced routes within RCAs were evaluated to compare the overall effects of all motorized routes (including existing routes and routes unauthorized to motorized public use) for the alternatives within each 7th field watershed occupied by LCT. According to Chapter 3.02 (Soil and Watershed Resources), Level 2 roads and below have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes route density of all native surfaced motorized routes (including existing NFTS and routes unauthorized to motorized use). Route density provides a relative index to measure the potential indirect effects to occupied habitat of LCT from increased sedimentation from routes. Thresholds for route density have not been established, however, route density provides a relative way to compare the effects of the alternatives.

Stream Crossing Density within RCAs: The 7th field watersheds occupied by LCT were evaluated for the crossing density of native surfaced motorized routes within RCAs to compare direct and indirect effects of motorized routes for the project alternatives. Route crossing density provides a way to measure the potential direct and indirect effects to LCT and habitat. Direct effects include potential LCT mortality as a result of use of motorized crossings of occupied LCT streams. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Thresholds for motorized crossing route density have not been established, however, route crossing density provides a relative way to compare the effects of the alternatives.

Direct and Indirect Effects

Wet Weather Seasonal Closures

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where LCT would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially motorized roads and trails that are within close proximity to or cross streams or other riparian aquatic habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather seasonal restrictions on native surfaced motorized routes and therefore, LCT would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of motorized stream crossings and highest RCA route densities that could potentially delivery sediment to aquatic and riparian habitats from wheeled motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-104 displays the effects of proposed change in class of vehicles and the associated maintenance changes that have the potential to increase the risk of delivering sediment to occupied LCT streams. Alternatives 2, 5, and 6 result in the changes to road maintenance standards resulting in changes from smooth surfaced roads to rough surfaced roads that are likely to occur (Table 3.03-104).

Under alternatives 2, 4, and 6, this change in road surface type has a higher potential to result in increased sedimentation within two HUC 7 watersheds with an occupied LCT stream. These are the East Fork Creek HUC7 watershed and the Middle Truckee River-Pole Creek HUC7 watershed. The East Fork Creek watershed is affected by the change in road maintenance standard on one motorized intermittent stream crossing on East Fork Creek, and could result in the change from smooth surfaced to native surfaced motorized crossing that may increase the risk of sedimentation. The crossing is associated with the Pinoli Ridge Road, located approximately 2/3 mile south of the occupied LCT stream (un-named tributary to East Fork Creek). The potential for delivering sediment to the occupied LCT stream within the un-named to tributary to East Fork Creek is not expected due to streamflow direction.

For alternatives 2, 5, and 6, the change in class of vehicles results in changed maintenance standards on approximately 0.5 RCA miles on the Pole Creek Road (Road 5708) within a watershed with an occupied LCT stream (Pole Creek). This changed maintenance standard has the potential to increase the risk of sediment delivery to the occupied LCT stream at Pole Creek, and therefore may reduce habitat quality for LCT in Pole Creek. However, mitigation measures would be required to maintain the Pole Creek Road at a higher maintenance standard within approximately 0.5 miles adjacent to Pole Creek so that sediment delivery to Pole Creek is minimized.

Table 3.03-104. Effects to LCT 7th Field Watersheds from Change in Class of Vehicles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced crossings resulting from changes in maintenance from smooth surfaced to native surfaced	0	1	0	0	1	1	0
Miles of route resulting from changes in maintenance from smooth surfaced to native surfaced route	0	0.5	0	0	0.5	0.5	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will continue on approximately 2,141 acres within Riparian Conservation Areas (RCAs) of occupied LCT streams, where the potential for adversely affecting occupied LCT habitat could occur by increasing sedimentation and altering water surface shade. The prohibition of cross country travel results in reducing motorized use on 5.4 RCA miles and on 10 crossings for all the action alternatives, and continues under Alternative 1. Under the action alternatives, prohibitions on cross country travel on 2,141 acres within RCA's of occupied LCT streams (5.4 miles and 10 stream crossings) will likely reduce the potential for sedimentation and alteration of water surface shade, and therefore benefit LCT habitat quality.

Motorized Trail and Area Additions – Stream Crossings and Miles of Motorized Trail Additions

Number of Native Surfaced, Stream Crossing Additions within LCT 7th Field Watersheds. At the 7th field watershed scale (HUC7), the number of native surfaced, crossing additions are assessed for the alternatives, and provides a way to compare changes in sediment into occupied LCT habitats at the HUC 7 watershed scale where LCT streams are located. Alternative 1 poses the greatest risk of increased sedimentation where 10 stream crossings are affected by the continuance of cross country travel on motorized trails unauthorized to motorized public use., Alternatives 2, 5, and 6 result in the addition of 7 native surfaced, motorized trail crossings at the HUC7 scale. Alternatives 3, and 7 do not add motorized trails to the NFTS, and therefore sedimentation or water surface shade would not be affected within and LCT HUC7 watershed.

Table 3.03-105. LCT 7th Field Watersheds - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions (negative impact)	0	0	0	0	0	0	0
Miles of existing motorized routes unauthorized to motorized public use within RCAs that would remain due to not prohibiting cross country travel (negative impact)	10	0	0	0	0	0	0
Acres of cross country travel prohibitions	0	2,141	2,141	2,141	2,141	2,141	2,141

Miles of Proposed Route Additions within RCAs of LCT 7th Field Watersheds. The miles of proposed motorized trail additions to the National Forest Transportation System (NFTS) within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into streams within LCT HUC 7 watersheds. Alternative 1 poses the greatest risk to increased sedimentation potential from 5.4 RCA miles of motorized trails un-authorized for motorized use that would remain due to not prohibiting cross country travel. Similar to stream crossing numbers, Alternatives 2, 5, and 6 proposes to add 1.9 RCA miles of motorized trails to the NFTS. As stated above, Alternatives 3, 4, and 7 do not add motorized trails to the NFTS, and therefore changes to sedimentation or water surface shade would not occur within any LCT HUC7 watershed.

Table 3.03-106. Miles of Proposed Route Additions within LCT HUC7 Riparian Conservation Areas (RCAs)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized trail additions within RCAs (negative impact)	0	0	0	0	0	0	0
Miles of existing motorized routes unauthorized to motorized public use within RCAs that would remain due to not prohibiting cross country travel (negative impact)	5.4	0	0	0	0	0	0

Addition of Areas. The addition of motorized areas will not affect any LCT watersheds, since none of the proposed motorized areas fall within any watersheds occupied by LCT, including the Greenhorn area, Eureka Diggings area, and the Reservoir areas (stampede, Boca, and Prosser).

Site-specific Physical Impacts and Disturbance to occupied Lahontan cutthroat trout streams

As mentioned above, the LCT occupies four 7th field watersheds (HUC7): Middle Truckee River-Pole Creek, Independence Lake, Middle Yuba River-Milton Reservoir, and East Fork on the Tahoe NF. Alternatives 1 and 5 pose the greatest risk to LCT where existing routes unauthorized to motorized public use have the potential to impact occupied LCT habitat. The remaining action alternatives do not directly or indirectly affect occupied LCT streams, since they do not propose motorized route additions that cross or have the potential to delivery sediment to occupied LCT streams. A brief summary of potential direct and indirect effects are described for each 7th field watershed that is occupied by LCT.

Middle Truckee River-Pole Creek 7th field watershed. Pole Creek is currently occupied by LCT and falls within the Middle Truckee River-Pole Creek watershed. No route additions are proposed under the action alternatives. Two existing routes unauthorized to motorized public travel would remain and under cross country travel in Alternative 1. However, these routes do not have the potential to deliver sediment to Pole Creek where LCT is located.

Independence Lake 7th field watershed. LCT within Independence Lake and upper Independence Creek has a high risk of being directly and indirectly affected by Alternative 1 and 5 where approximately 3 miles of routes unauthorized to motorized public use borders the north side of Independence Lake. The remaining action alternatives do not propose motorized route additions within the Independence Lake watershed. Existing routes unauthorized to motorized public use bordering the south side of Independence Lake on private land would also increase the risk of to LCT from factors associated with motorized use from potential sediment delivery into Independence Lake.

Middle Yuba River-Milton Reservoir 7th field watershed. In the Middle Yuba River-Milton Reservoir watershed, LCT occupies Macklin Creek. Under Alternative 1, a route unauthorized to motorized public use (~¼ mile) does not cross, but parallels the headwaters of Macklin Creek, potentially delivering sediment into the stream. None of the project alternatives would directly affect LCT within Macklin Creek, since they do not propose routes additions within the Middle Yuba River-Milton Reservoir.

East Fork Creek 7th field watershed. Within the East Fork Creek watershed, LCT occupies East Fork Creek. There would be no direct or indirect effects to LCT within East Fork Creek, since no route additions are proposed under any of the action alternatives. Under Alternative 1, an existing route

unauthorized to motorized public use is located outside the Riparian Conservation Area that parallels the north side of East Fork Creek connecting two smooth surfaced roads. Sediment delivery into East Fork Creek from this route is unlikely.

Cumulative Effects

Cumulative Effects Boundary in Time and Space

For this analysis, the geographic boundary used to analyze cumulative effects to LCT is the Truckee River and its tributaries. This scale is an appropriate scale to analyze cumulative effects because the Truckee River watershed including all its tributaries is the historic range of the Lahontan cutthroat trout within the Tahoe NF. Any larger scale may dilute the actual effects of motorized routes and other activities that may potential affect occupied LCT streams. Past cumulative effects currently affecting the distribution and abundance of LCT considered here include 50 to 100 years out. Future cumulative impacts timeframe for reasonably foreseeable actions is approximately 20 years out.

Cumulative Effects of Motorized Roads and Trails

Route Density within Riparian Conservation Areas (RCAs). Chapter 3.02 (Soil and Watershed Resources), analyzed Riparian Conservation Area (RCA) route density for each 7th field watershed on the Tahoe NF, and categorized motorized RCA route density (native surfaced) by four route density categories. The route density categories were highest (3.6 - 10.2 miles/square mile), moderately high (2.6 - 3.5 miles/square mile), moderately low (1.9 – 2.5 miles/square mile, and lowest (0.5 – 1.8 miles/square mile). Figure 3.03-3 shows the number of HUC7 watersheds occupied by LCT by RCA motorized route density by density category. Alternative 1 poses the greatest risk to LCT where the East Fork Creek HUC7 watershed has the highest motorized route densities (>3.6 miles/square mile) compared to all the action alternatives. Under Alternative 1, the three remaining LCT HUC7 watersheds each fall within route density categories of moderately high, moderately low, and lowest. Alternatives 2, 5, and 6 are similar in route densities where two HUC7 watersheds are within route density categories of moderately high, one within moderately low, and one within the lowest. Alternatives 3, 4, and 7 have the least potential for effects from motorized routes within HUC7 watersheds with occupied LCT streams where one watershed falls within the moderately high route density category, two within moderately low, and one within lowest.

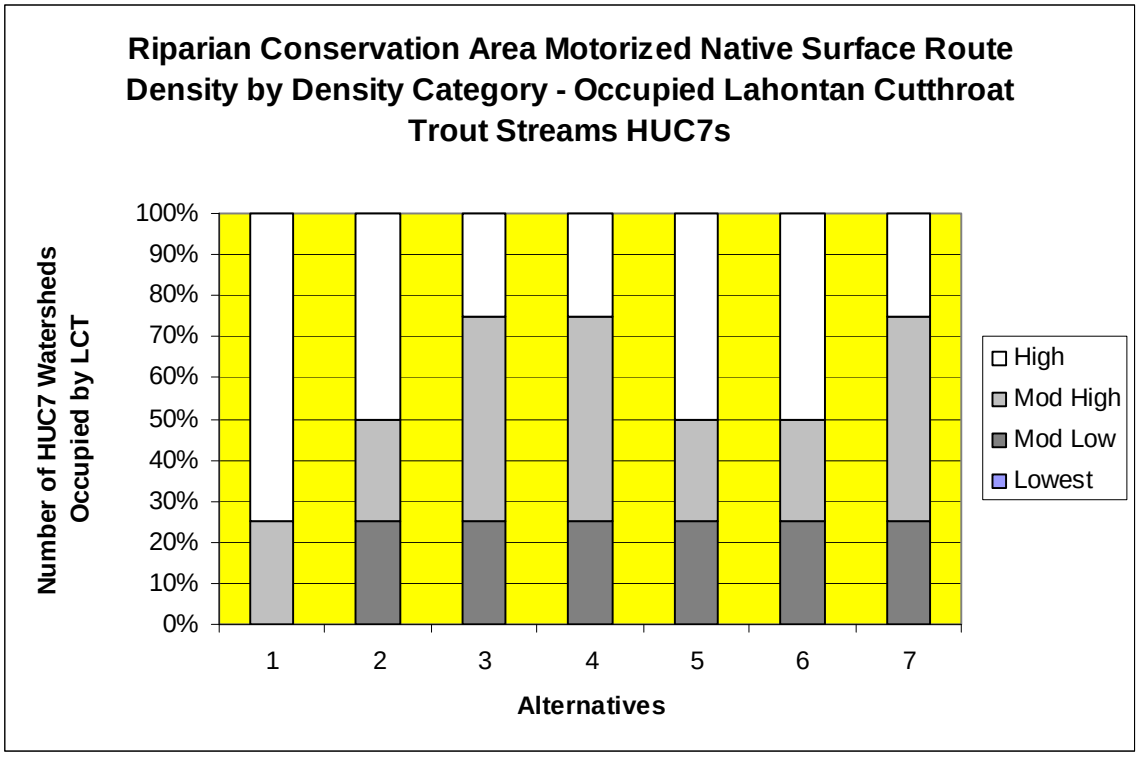

Figure 3.03-3. Number of HUC7 Watersheds with Occupied LCT streams by Route Density Categories of Lowest, Moderately Low, Highest, and Moderately High

Stream Crossing Density within RCAs

Chapter 3.02 (Soil and Watershed Resources), analyzed RCA stream crossing density for each 7th field watershed on the Tahoe NF, and categorized motorized RCA crossing density (native surfaced) by four route density categories. The route density categories were highest (29.9+crossings/sq. mile), moderately high (20.8-29.8 crossings/sq. mile), moderately low (13.9-20.7 crossings/sq. mi.), and lowest (0-13.8 crossing/sq. mi.). Figure 3.03-4 displays motorized crossing density within HUC7 watersheds with occupied LCT habitat for each of the project alternatives. Alternative 1 poses the greatest risk to LCT, since 3 of 4 HUC7 watersheds occupied by LCT falls within the highest and moderately high categories for route crossing density where potential sediment delivery to streams within HUC7 watersheds with occupied LCT streams. Alternative 5 poses the next greatest risk from stream crossings where stream crossing densities where the 4 LCT watersheds falls within highest (1), moderately high (1), and moderately low (2). Alternatives 2 and 6 are similar in their stream crossing densities where each LCT watersheds falls within stream crossing density categories of highest, moderately, high moderately low, and lowest. Alternatives 3, 4, and 7 poses the least risk to LCT watersheds where one LCT HUC7 watershed falls in the lowest route density crossing category, two in the moderately low category, and one within the highest route density crossing category, where the least amount of sediment delivery and stream habitat alteration would likely occur compared to all the other alternatives.

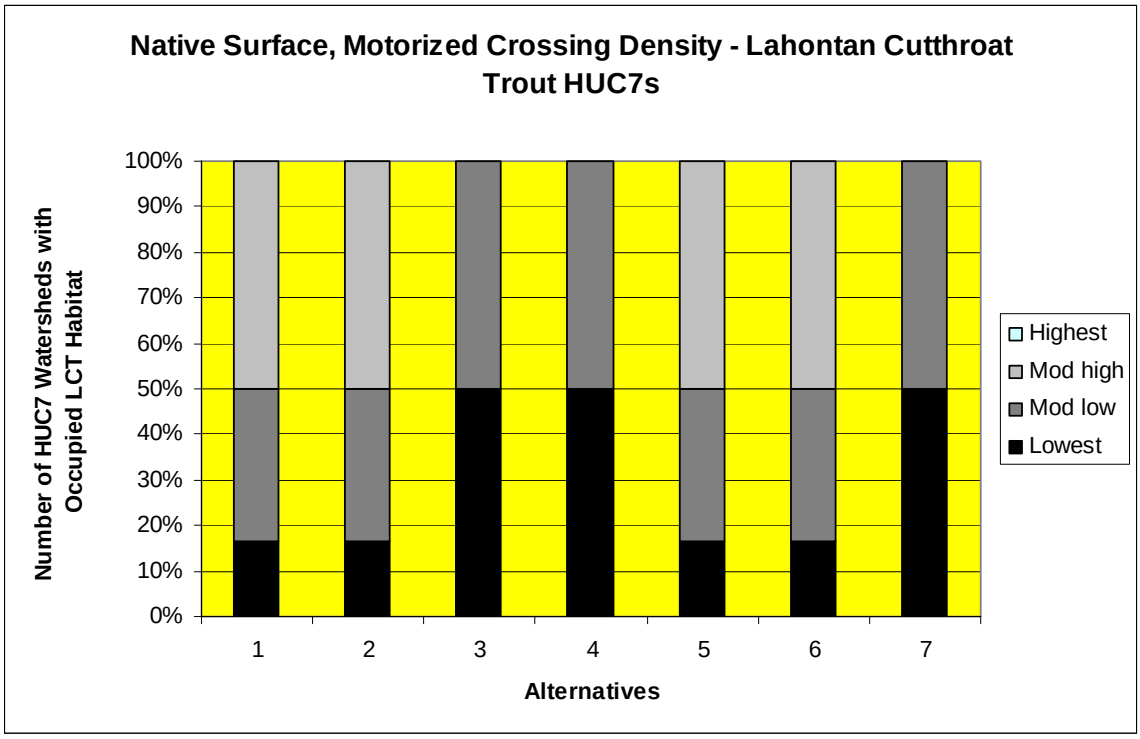

Figure 3.03-4. Number of HUC7 Watersheds with occupied LCT streams by Motorized Crossing Density Categories

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-107 summarizes the direct, indirect, and cumulative effects to native surfaced, motorized trail crossing within LCT HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 (Soil and Watershed Resources) for more detailed information and assumptions.

Table 3.03-107. LCT 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Stream Crossings

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Stream Crossings	29	29	29	29	29	29	29
Native Surfaced, Motorized Trail Crossing Additions	0	0	0	0	0	0	0
Change in Class of Vehicles resulting in changed maintenance standards resulting in smooth surfaced to native surfaced	0	1	0	0	1	1	0
Cross Country Travel Continued on Stream Crossings Unauthorized to Motorized Use	10	0	0	0	0	0	0
Cross Country Travel Prohibited on Stream Crossings Unauthorized to Motorized Use	0	9	10	10	9	9	10
Net NFTS Native Surfaced, Stream Crossings	39	30	29	29	30	30	29
Acres of Cross Country Travel	Continues on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
NET Cumulative Effect	Cross country travel continues on 2,141 LCT RCA acres, including on 10 stream crossings unauthorized to motorized use. Motorized travel on 39 native surfaced, crossings No additional protection to occupied LCT streams from wet weather restrictions.	Cross country travel prohibited on 2,141 LCT RCA acres, including on 9 stream crossing unauthorized to motorized use. 30 NFTS native surfaced, crossings available for motorized use. No additional protection to occupied LCT streams from wet weather restrictions.	Cross country travel prohibited on 2,141 LCT RCA acres, including on 10 stream crossings unauthorized to motorized use. 29 NFTS native surfaced, crossings available for motorized use. No additional protection to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 10 stream crossing unauthorized to motorized use. 29 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 9 stream crossing unauthorized to motorized use. 30 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 9 stream crossing unauthorized to motorized use. 30 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 10 stream crossing unauthorized to motorized use. 29 NFTS native surfaced, crossings available for motorized use. No additional protection to occupied LCT streams from wet weather restrictions

Table 3.03-108. LCT 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized RCA Trail Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, RCA Miles	18.9	18.9	18.9	18.9	18.9	18.9	18.9
Native Surfaced, Motorized RCA trail mile Additions to NFTS	0	0	0	0	0	0	0
Change in Class of Vehicles resulting in changed maintenance standards resulting in smooth surfaced to native surfaced motorized RCA route miles	0	0.5 miles along Pole Creek would be mitigated to minimize sedimentation risk	0	0	0.5 miles along Pole Creek would be mitigated to minimize sedimentation risk	0.5 miles along Pole Creek would be mitigated to minimize sedimentation risk	0
Cross Country Travel Continued on RCA trails Unauthorized to Motorized Use	5.4	0	0	0	0	0	0
Cross Country Travel Prohibited on RCA trails Unauthorized to Motorized Use	0	5.4	5.4	5.4	5.4	5.4	5.4
Net NFTS Native Surfaced, RCA motorized route miles	24.3	21.3	18.9	18.9	21.3	21.3	18.9
Acres of Cross Country Travel	Continues on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres	Prohibited on 2,141 acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
NET Cumulative Effect	Cross country travel continues on 2,141 LCT RCA acres, including on 5.4 miles. 24.3 RCA miles No additional protection from wet weather restrictions.	Cross country travel prohibited on 2,141 LCT RCA acres, including on 3 miles 21.3 NFTS RCA miles available. No additional protection from wet weather restrictions.	Cross country travel prohibited on 2,141 LCT RCA acres, including on 5.4 miles. 18.9 NFTS RCA miles available. No additional protection from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 5.4 miles. 18.9 NFTS RCA miles. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 3 miles. 21.3 NFTS RCA miles. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 3 miles. 21.3 NFTS RCA miles. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions	Cross country travel prohibited on 2,141 LCT RCA acres, including on 5.4 miles. 18.9 NFTS RCA miles. Reduced sedimentation risk to occupied LCT streams from wet weather restrictions

Overall Cumulative Effects of Past, Present, and Reasonably Foreseeable Future Actions

Past management activities have had severe, adverse cumulative effects on LCT distribution and population trends as a result of numerous factors including hybridization and competition with introduced trout species; alteration of stream channels and morphology; loss of spawning habitat due to pollution and sediment inputs from past logging, mining, and historic grazing, and urbanization; and loss of connectivity. LCT was particularly affected within the Truckee River watershed by loss of habitat connectivity from water diversions and dam construction (Gerstung 1986 & 1988 and Coffin 1988, In USFWS 1995). The Truckee River basin has more than 40 potential barriers to fish migration which have impeded LCT migration to historic spawning and rearing habitats. In addition, the resulting reservoirs helped to establish a number of non-native fish species known to be detrimental to LCT through predation and/or competition.

Livestock grazing has the potential affect most of the important habitat attributes listed above by reducing near-stream vegetation and de-stabilizing stream banks, which can lead to increased stream temperature, fine sediment input, and filling of pools. The current occupied LCT recovery streams on the Tahoe NF fall within two active livestock allotments - the English Allotment (cattle) and the Sierra Crest Allotment (sheep). An Allotment Management Plan for the English Allotment was completed in 1996. The Sierra Crest Allotment Management Plan was recently completed. Grazing within the Sierra Crest Allotment has not occurred since the early 1990s. Therefore, Austin Meadows and Macklin Creek are the only occupied LCT streams that are currently grazed by livestock. Streambank disturbance from livestock monitoring at both Austin and Macklin Creek indicate streambank disturbance by livestock have generally been within the maximum 10% streambank disturbance guideline for most years monitored, with a few exceptions.

The Sierra Nevada Forest Plan Amendment (2004) provides management direction and standards and guidelines for livestock utilization and streambank disturbance. Implementation and monitoring of these standards and guidelines will likely reduce the potential habitat impacts of livestock grazing. In summary, livestock grazing could cumulatively affect LCT habitat and should be limited to Macklin Creek and Austin Meadows Creek, though management requirements specific to these activities should limit these impacts.

Ongoing and planned vegetation and fuels management projects on National Forest land should not add cumulative impacts to effects due implementation of Best Management Practices and Riparian Conservation Objectives for Riparian Conservation Areas.

The continuance of cross country travel, including on existing routes unauthorized motorized public use, under Alternative 1 poses the greatest risk of adding direct and indirect impacts to existing cumulative impacts to streams occupied by LCT within the Independence Lake and the Middle Yuba River-Milton Reservoir HUC7 watersheds . Under Alternative 1, HUC7 watersheds occupied by LCT would have the highest RCA route densities and the highest route crossing densities as a result of unauthorized routes within Riparian Conservation Areas. Under Alternative 1, unauthorized route proliferation would likely continue and increase at an accelerated rate in the future, potentially increasing sediment delivery and alteration of streambank vegetation and hydrologic condition which may affect the abundance of LCT within localized areas in the future. None of the action alternatives proposes to add

motorized routes or areas to the NFTS within watersheds with occupied LCT streams. Cumulative impacts would be added to existing impacts through the change in class of vehicles under Alternatives 2, 5, and 6, where 0.5 RCA miles and 1 stream crossing could contribute to adverse effects from increased sediment delivery. For all the action alternatives, future unmanaged cross country motorized travel would be prohibited. In addition, the prohibition of cross country travel would reduce impacts on routes unauthorized for motorized public use and benefit LCT in the long-term once these routes are rehabilitated through obliteration or other means.

Federally Listed Species Determination

The Biological Assessment, which is incorporated by reference, determined that Alternatives 2, 5, and 6 may affect, but not likely to adversely affect the federally threatened Lahontan cutthroat trout within the Middle Truckee River-Pole Creek 7th field watershed. This determination is based on mitigation requirements associated with the proposed change in class of vehicles on 0.5 RCA miles along the Pole Creek Road (Road 5708) which has the potential to increase the risk of sediment delivery into Pole Creek, an occupied LCT stream. Mitigations measures require that road maintenance standards minimizes sediment delivery to Pole Creek. No motorized route or area additions are proposed within any watersheds with streams occupied by LCT.

Lahontan Lake Tui Chub: Affected Environment

The Lahontan Lake tui chub (*Gila bicolor pectinifer*) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). The Lahontan Lake tui chub are a cyprinid subspecies found in Lake Tahoe and Pyramid Lake (Nevada) which are connected to each other by the Truckee River and in nearby Walker Lake (Nevada).

The Lake Tahoe population is the only confirmed population in the Sierra Nevada, with possible populations in Stampede, Boca and Prosser Reservoirs on the Truckee Ranger District of the Tahoe National Forest. These three reservoirs are connected by the Little Truckee River which feeds into the mainstem of the Truckee River. Little study has occurred on the Lake Tahoe population since Miller (1951). Zooplankton levels have changed over this period. Daphnia, an important prey of adult chubs, have been nearly eliminated (Richards et al. 1975) by the introduced Kokanee salmon (*Oncorhynchus nerka*) and opossum shrimp (*Mysis relicta*), both of which feed on zooplankton. Marshland degradation along the lake may be taking away vital spawning and nursery areas.

Based on occurrence within such widely diverse habitats as Lake Tahoe and Pyramid Lake, it is believed this species can tolerate a wide range of physicochemical water conditions. Lahontan Lake tui chub are known as a mid-water feeder. In Lake Tahoe, larger fish (>16 cm TL) occur in deeper water (>50m) during the day, moving into shallower water areas at night (Miller 1951). Young fish generally occur in shallow water. It has also been noted that a seasonal migration occurs within the water column. Deeper water in often utilized during winter months and summer months show use of upper portions (Snyder 1917, Miller 1951). Algal beds in shallow inshore areas seem necessary for spawning, egg hatching, and larval survival.

Lahontan Lake tui chub are schooling fish reaching lengths of 35 to 41 cm FL, which inhabit large, deep lakes (Moyle 1976, In USFWS 1995). Lahontan Lake tui chub feed primarily on zooplankton, especially cladocerans and copepods, but also eat benthic insects when available (Miller 1951, Marrin and Erman 1982). Tui chub are predated upon mostly by large trout, and rarely by birds and snakes (Miller 1951).

In Lake Tahoe, nocturnal spawning occurs during May and June, possibly extending into July (Miller 1951). Tui chub may be serial spawners, reproducing several times during the spawning season (Moyle 1976). Reproductive adults spawn near-shore over beds of aquatic vegetation, to which the eggs adhere (Snyder 1917). Young remain near-shore until winter when body size is 1-2 cm, and then migrate into deeper water. Linear growth of tui chubs occurs within about 4 years, then body mass is accumulated rapidly. The largest documented length in Lake Tahoe is 13.7 cm SL, but longer chub (21 cm) have been found in Walker Lake, Nevada (Miller 1951).

Potential risk factors include but are not limited to water quality, specifically alkalinity due to diversions of inflowing water, change in prey base due to introduced species, and reservoir and wetland management.

Lahontan Lake Tui Chub: Environmental Consequences

The actual presence of the Lahontan Lake tui chub on the Tahoe NF has not been confirmed or verified. Although presence has not been confirmed, this analysis assumes the species is present within Boca, Stampede and Prosser Reservoirs. Therefore, the analysis for this species was conducted within the three 7th field watersheds within the Prosser Creek Reservoir HUC7, Stampede Reservoir HUC7, and Boca Reservoir HUC7, which includes the three reservoirs and the streams and tributaries that drain into and out of them. In addition, to assess a broader and more inclusive analysis of potential indirect effects, RCA route density and stream crossing density were analyzed within twelve 7th field watersheds which include the three reservoirs and the streams and tributaries that flow into these reservoirs.

Analysis Measures

Prosser Creek Reservoir HUC7, Stampede Reservoir HUC7, and Boca Reservoir HUC7

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect Lahontan Lake tui chub habitat. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to suitable Lahontan Lake tui chub habitat.

Change in Class of Vehicles: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02 Watershed Resources). If the route changes from smoothed surfaced to native surfaced (rough surfaced), the change in class of vehicle may result in increased sediment and erosion risk to tui chub habitat. The change in class of vehicle and associated maintenance downgrades is evaluated for their potential to affect selected 7th field watersheds that may have suitable habitat for the tui chub.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to three tui chub 7th field watersheds from motorized cross country travel.

Motorized Route and Area Additions (tui chub 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized trail additions to the National Forest Transportation System, and the miles of motorized trail additions within Riparian Conservation Areas (RCAs) for tui chub within three 7th field watersheds where the species has a potential to occur—Prosser Creek Reservoir HUC7, Stampede Reservoir HUC7, and Boca Reservoir HUC7.

Twelve HUC7 Watersheds

Route Density within Riparian Conservation Areas (RCAs): Route densities of native surfaced routes within RCAs were evaluated to compare the overall effects of all motorized routes (including existing routes and existing routes unauthorized to motorized public use) for the alternatives within twelve 7th field watersheds with suitable Lahontan Lake tui chub habitat. According to Chapter 3.02 (Soil and Watershed Resources), native surfaced roads have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes route density of all native surfaced motorized routes. Route density provides a relative index to measure the potential indirect effects to suitable tui chub habitat from increased sedimentation from motorized routes. Thresholds for route density have not been established, however, route density provides a relative way to compare the effects of the alternatives.

Stream Crossing Density: Twelve 7th field watersheds with suitable Lahontan Lake tui chub habitat were evaluated for the crossing density of native surfaced motorized routes within RCAs to compare direct and indirect effects of motorized routes for the project alternatives. Route crossing density provides a way to measure the potential direct and indirect effects to the tui chub and habitat. Direct effects include potential tui chub mortality as a result of use of motorized crossings that may affect tui chub habitat. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Thresholds for motorized crossing route density have not been established, however, route crossing density provides a relative way to compare the effects of the alternatives.

Direct and Indirect Effects

Wet Weather Seasonal Closures. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where Lahontan Lake tui chub potential habitat would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially motorized roads and trails that are within close proximity to or cross streams or other riparian aquatic habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather seasonal restrictions on native surfaced motorized routes and therefore, the Lahontan Lake tui chub would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of native surfaced, motorized stream crossings and highest RCA motorized route densities that could potentially delivery sediment to tui chub habitat from motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-109 displays the effects of proposed changes in class of vehicles and the associated maintenance downgrades that have to potential to increase the risk of delivering sedimentation and erosion to Prosser, Stampede, and Boca Reservoir HUC7 watersheds. Alternatives 2, 5, and 6 result in the downgrade of road maintenance levels resulting in changes from smooth surfaced roads to rough surfaced roads are likely to occur in the future with reduced maintenance. This change in road surface type has a higher potential to result in increased sedimentation to tui chub habitat affected by 8 crossings and 0.4 miles of motorized roads.

Table 3.03-109. Lahontan Lake Tui Chub – Effects from Change in Class of Vehicles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced Crossings as a result of changed maintenance standards from smooth surfaced to native surfaced	0	3	0	0	3	3	0
Native surfaced RCA Miles as a result of changed maintenance standards from smooth surfaced to native surfaced	0	0.4	0	0	0.4	0.4	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will continue on 9,689 acres within Riparian Conservation Areas (RCAs) of tui chub HUC7 watersheds, where the potential for adversely affecting tui chub habitat could occur by increasing sedimentation and altering streamside vegetation. The prohibition of cross country travel results in prohibiting motorized use on 9,689 RCA acres, including approximately 14 RCA miles and between 37 to 42 crossings (Alt 3- the most, Alt 5 – the least) for the action alternatives. The prohibition of motorized cross country travel will likely reduce the risk of sedimentation and alteration of streamside vegetation, and therefore benefit potential tui chub habitat.

Motorized Trail and Area Additions – Stream Crossings and Miles of Motorized Trail Additions

Number of Native Surfaced, Stream Crossing Additions within Three Tui Chub7th Field Watersheds. Within the Prosser, Stampede, and Boca Reservoir watersheds, the number of native surfaced, stream crossings is assessed for the alternatives, and provides a way to compare changes in sediment into riverine and lacustrine habitats at the HUC 7 watershed scale where potentially suitable Lahontan Lake tui chub habitat occurs. Alternative 1 poses the greatest risk of increased sedimentation where 42 stream crossings are affected by the continuance of cross country travel on trails unauthorized to motorized public use (Table 3.03-110). Alternative 5 results in the addition of 5 native surfaced crossings, while alternatives 2, 4, 6, & 7 result in the addition of 3 motorized native surfaced crossings. Alternative 3 does not add motorized trails to the NFTS, and therefore sedimentation or water surface shade would not be affected within the three tui chub HUC7 watersheds.

Table 3.03-110. Lahontan Lake tui chub 7th Field Watersheds (Prosser, Stampede, Boca Reservoirs) - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions (negative impact)	42	3	0	3	5	3	3
Cross country travel	Continues on 9,689 acres	Prohibited on 9,689 acres	Prohibited on 9,689 acres	Prohibited on 9,689 acres	Prohibited on 9,689 acres	Prohibited on 9,689 acres	Prohibited on 9,689 acres

*Alternative 1 includes existing native surfaced, stream crossings unauthorized to motorized use, while all the other Alternatives include motorized crossing additions.

Miles of Proposed Route Additions within RCAs of Prosser, Stampede, and Boca 7th Field Watersheds. The miles of proposed motorized trail additions to the National Forest Transportation System (NFTS) within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into riverine and lacustrine habitats within tui chub HUC 7 watersheds. Alternative 1 poses the greatest risk to increased sedimentation potential from approximately 14 RCA miles of motorized trails un-authorized for motorized use that would remain due to the continuance of cross country travel (Table 3.03-111). Similar to stream crossing numbers, Alternatives 2, 5, and 7 propose to add between 0.5 to 0.6 RCA miles of motorized trails to the NFTS. Alternatives 3, 4, and 6 do not add motorized trails to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within the three Lahontan Lake tui chub HUC7 watersheds under these alternatives.

Table 3.03-111. Tui Chub - Miles of Proposed Route Additions within Prosser, Stampede, and Boca HUC7 Riparian Conservation Areas (RCAs)

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized trail additions within RCAs (negative impact)	14.4	0.5	0	0	0.6	0	0.5

*Alternative 1 includes existing native surfaced, routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

Motorized Areas Additions

Stampede, Boca and Prosser Reservoirs. Under Alternative 2, Boca, Prosser and Stampede reservoirs would be managed to allow motorized access to the shoreline below the high water line by motor vehicles when the soils are dry. Shoreline access at these reservoirs by motorized vehicles is prohibited for all the other project alternatives including the no action alternative. Alternative 2 has the potential to increase soil erosion and sediment delivery to the reservoirs which may affect water quality for the Lahontan Lake tui chub. Therefore, except for Alternative 2, all the remaining project alternatives will not affect Lahontan Lake tui chub habitat within Boca, Stampede, and Prosser Reservoirs.

Greenhorn and Eureka Diggings Areas. Proposed motorized use at Greenhorn and Eureka Diggings areas, under Alternative 2, would not affect Lahontan Lake tui chub, since suitable habitat for

the species does not occur within these proposed areas. Therefore, no direct or indirect effects to the species would result from the addition of the Greenhorn or Eureka Diggings areas.

Twelve HUC7 Tui Chub Watersheds

In addition to the motorized routes that can contribute to direct impacts within the three reservoirs, the indirect effects of motorized routes to tui chub habitat are analyzed within twelve HUC7 watersheds that may contribute to water quality within the reservoirs at a broader landscape scale.

Route Density within Riparian Conservation Areas (RCAs): Chapter 3.02 (Soil and Watershed Resources), analyzed Riparian Conservation Area (RCA) route density for twelve 7th field watershed on the Tahoe NF, and categorized motorized RCA route density (native surfaced) by four route density categories. Suitable Lahontan Lake tui chub habitat was identified to occur within twelve 7th field watersheds on the Tahoe National Forest. For each of the alternatives, Table 3.03-112 and Figure 3.03-5 displays the number and percent of 7th field watersheds (HUC7s) with suitable tui chub habitat by RCA route density category of highest (3.6-8.2 miles/square mile), moderately high (2.6-3.5 miles/square mile), moderately low (1.9-2.5 miles/square mile), and lowest (0-1.8 miles/square mile). Alternative 1 poses the greatest direct and indirect effects to suitable tui chub habitat where 75% (9 of 12 tui chub HUC7 watersheds have route densities within the highest, 17% (2 of 12) within moderately high, 8% (2 of 12) within moderately low, and none within the lowest route density categories. All the action alternatives reduce RCA route densities compared to Alternative 1. Alternative 5 only slightly improves route densities compared to Alternative 1, where one HUC7 watershed moves from the moderately low to the lowest route density category. Alternatives 3, 4, and 5 have the lowest route densities of all the action alternatives. Alternatives 2 and 6 have similar route densities.

Table 3.03-112. Number and percent of HUC7 Watersheds with Suitable Lahontan Lake Tui Chub Habitat by RCA Route Density Category

Alternatives	Highest (3.6 to 8.2 mi/mi^2)	Moderately High (2.6 to 3.5 mi/mi^2)	Moderately Low (1.9 to 2.5 mi/mi^2)	Lowest (0 to 1.8 mi/mi^2)
Alt 1	10 (83%)	1 (8%)	1 (8%)	0
Alt 2	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 3	6 (50%)	3 (25%)	1 (8%)	2 (17%)
Alt 4	6 (50%)	3 (25%)	1 (8%)	2 (17%)
Alt 5	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 6	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 7	6 (50%)	3 (25%)	1 (8%)	2(17%)

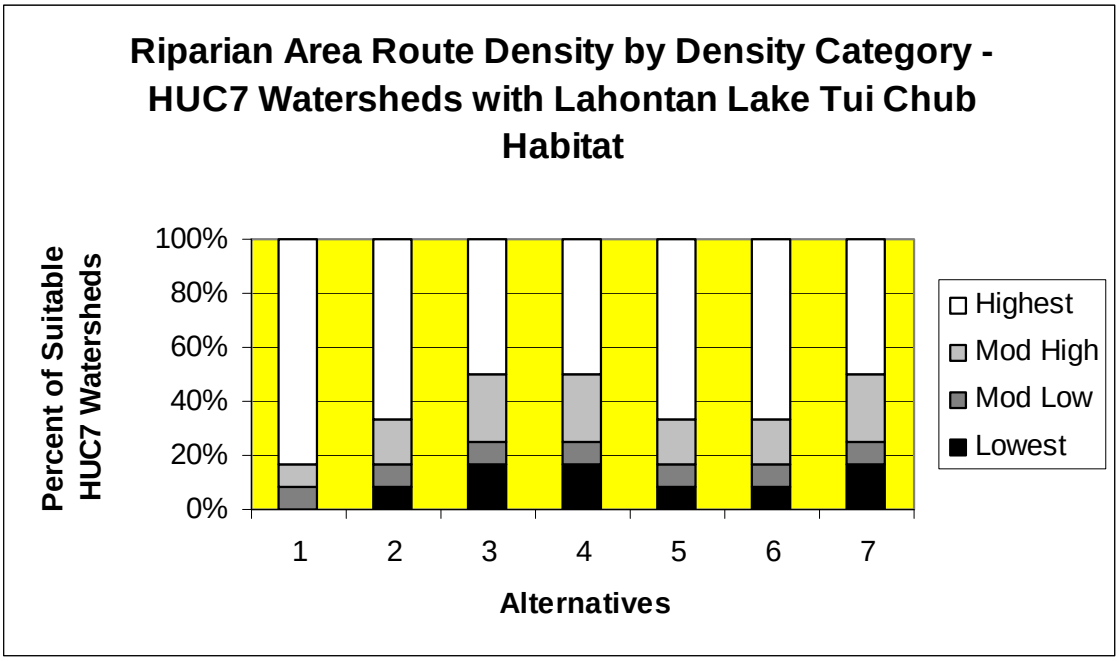

Figure 3.03-5. Proportion of HUC7 Watersheds with Suitable Lahontan Lake Tui Chub Habitat by Motorized RCA Route Density Categories

Stream Crossing Density: Twelve 7th field watersheds (HUC7s) identified as potentially affecting habitat for the Lahontan Lake tui chub within the three reservoirs were evaluated by alternative for the number and percentage of HUC7s that are within stream crossing density categories of highest (29.9+crossings/sq. mile), moderately high (20.8-29.8 crossings/sq. mile), moderately low (13.9-20.7 crossings/sq. mi.), and lowest (0-13.8 crossing/sq. mi.) (Table 3.03-113 and Figure 3.03-6). Alternative 1 poses the greatest risk of indirect effects to Lahontan Lake tui chub habitat through potential sediment delivery from native surfaced, motorized routes. Under Alternative 1, 91% HUC7 watersheds potentially affecting tui chub habitat would have stream crossing densities within the highest and the moderately high route density categories combined. Although Alternative 5 has a higher proportion of tui chub HUC7 watersheds in the highest stream crossing density category, under Alternative 5, stream crossing densities would be lower overall where a greater number of HUC7 watersheds are within the moderately low and the lowest crossing density categories.

The remaining alternatives further reduce the number of stream crossings within the highest crossing density category. Alternative 3 has the lowest stream crossing densities with the highest number of HUC7 watersheds within the moderately low and the lowest crossing density categories compared across all the alternatives. Alternatives 2 and 6 have the same proportion of HUC7 watersheds within stream crossing density categories.

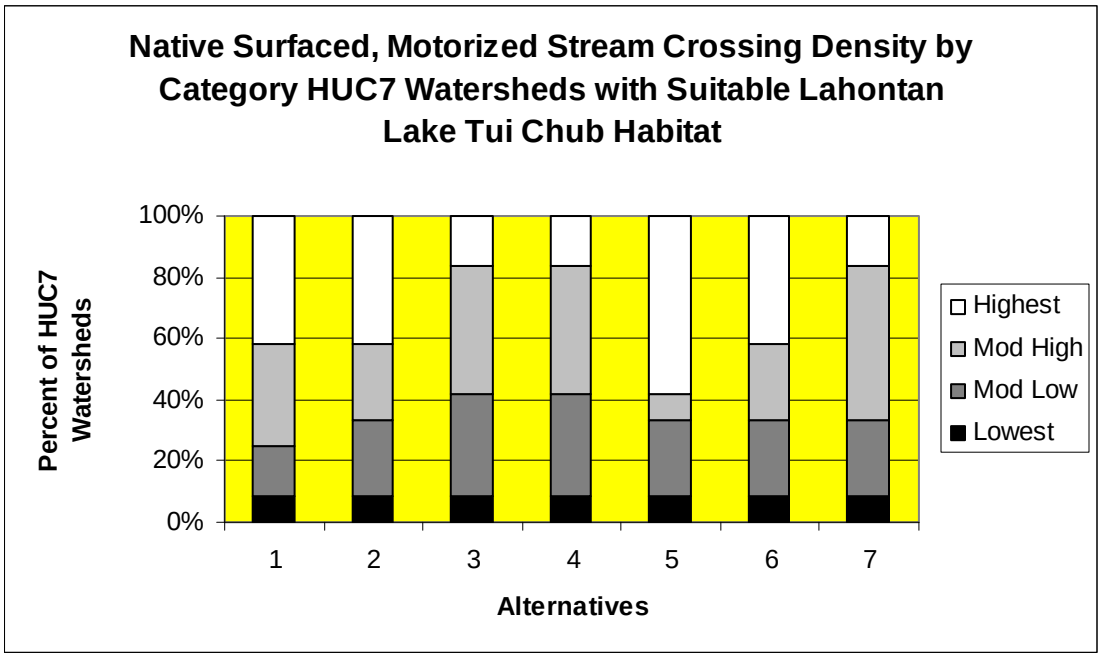

Figure 3.03-6. Number of HUC7 Watersheds with suitable Lahontan Lake Tui Chub Habitat by Motorized Stream Crossing Density Categories

Table 3.03-113. Number and percent of HUC7 Watersheds with Suitable Lahontan Lake Tui Chub Habitat by Native Surfaced, Motorized Stream Crossing Density Category

Alternatives	Highest (>29.9 crossings/mi^2)	Moderately High (20.8 to 29.8 crossings/mi^2)	Moderately Low (13.9 to 20.7 crossings/mi^2)	Lowest (0 to13.8 crossing/mi^2)
Alt 1	5 (42%)	4 (33%)	2 (17%)	1 (8%)
Alt 2	5 (42%)	3 (25%)	3 (25%)	1 (8%)
Alt 3	2 (17%)	5 (42%)	4 (33%)	1 (8%)
Alt 4	2 (17%)	5 (42%)	4 (33%)	1 (8%)
Alt 5	7 (58%)	1 (8%)	3 (25%)	1 (8%)
Alt 6	5 (42%)	3 (25%)	3 (25%)	1 (8%)
Alt 7	2 (17%)	6 (50%)	3 (25%)	1 (8%)

Cumulative Effects

Cumulative Effects Boundary in Space and Time

The geographic boundary for assessing cumulative effects to the Lahontan Lake tui chub on the Tahoe NF is within the twelve 7th field watersheds that may potentially indirectly impact suitable habitat for the species. Suitable habitat for this species occurs within Stampede, Boca, and Prosser reservoirs and streams that feed or connect to these reservoirs. This cumulative effects boundary is sufficiently large to assess all past, present, and future cumulative impacts to suitable habitat for the Lahontan Lake tui chub. Any larger boundary could dilute the effects of past, present, and future cumulative impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred

within the last 50 to 100 years. Reasonably foreseeable future impacts expand out to approximately 25 years into the future.

Cumulative Effects of Past, Present, and Reasonably Foreseeable Actions

The current knowledge of the species distribution on the Tahoe NF is unknown. Suitable habitat for the Lahontan Lake tui chub on the Tahoe NF is considered to be Stampede, Boca, and Prosser Reservoirs and the streams connecting them (Little Truckee River and tributaries). Potential past cumulative effects to this species includes habitat degradations from water diversions, reduced water quality, urbanization, livestock grazing, recreational activities, and others. The fact that the occurrence of the species on the Tahoe NF is unknown makes assessing cumulative effects extremely difficult. Therefore, there is a great deal of uncertainty surrounding the past cumulative effects to this species from past, present, and reasonably foreseeable future activities. Any attempt to actually describe cumulative impacts would be speculative at best, since it is unknown whether or not this species has a historical distribution on the Tahoe NF.

Under Alternative 1, cumulative effects from continued cross country travel, including on 42 native surfaced crossings and approximately 14 miles of routes unauthorized to motorized use would be greatest where HUC7 watersheds with suitable tui chub habitat would have the highest RCA route densities and the highest route crossing densities. The indirect impacts of potential sediment delivery from existing motorized routes unauthorized to motorized use in Alternative 1 would add measurable cumulative impacts to suitable Lake Lahontan tui chub habitat where 92% of HUC7 watersheds route densities are within the highest and moderately high route density categories combined. Native surfaced, motorized stream crossing densities would be greatest under Alternative 1 where 91% of the HUC7 watersheds are within the high and moderately highest stream crossing categories combined. The remaining alternatives improve both route density within Riparian Conservation Areas and stream crossing densities with Alternative 5 reducing the least and alternatives 3, 4, and 7 reducing the most.

For all the action alternatives, future unmanaged cross country motorized travel would be prohibited on 9,689 acres, including on approximately ½ mile of trail unauthorized to motorized use and on 34 to 42 native surfaced, stream crossings (Alt 5 prohibits the least, Alt 3 prohibits the most). These cross country prohibitions would likely benefit suitable tui chub habitat in the long-term once these routes are rehabilitated through active or passive restoration efforts.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-114 summarizes the direct, indirect, and cumulative effects to native surfaced, motorized trail crossings within Lahontan Lake tui chub HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 (Soil and Watershed Resources) for more detailed information and assumptions.

Table 3.03-114. Lahontan Lake Tui Chub 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Stream Crossing Numbers

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Motorized Stream Crossings	75	75	75	75	75	75	75
Native Surfaced, Motorized Trail Crossing Additions	42	3	0	3	5	3	3
Change in Class of Vehicles Resulting in Changed Maintenance Standards Resulting in Smooth Surfaced to Native Surfaced Crossings	0	3	0	0	3	3	0
Cross Country Travel Prohibited on Motorized Crossings Unauthorized to Motorized Use	0	36	42	39	34	36	39

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Native Surfaced, Motorized Stream Crossings	117	81	75	78	83	81	78
Prosser, Stampede, and Boca Reservoir Open Areas	No Effect	Approximately 2,000 acres surrounding three reservoirs with potential to increase sediment risk to tui chub habitat	No Effect	No Effect	No Effect	No Effect	No Effect
Acres of RCA Cross Country Travel	Continues on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
NET Cumulative Effect	Cross country travel continues on 9,689 tui chub RCA acres, including on 42 native surfaced, crossings unauthorized to motorized use. 117 native surfaced, stream crossings (75 NFTS, 42 unauthorized) No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on 36 native surfaced crossings unauthorized to motorized use. 81 NFTS stream crossings available to motorized use. Motorized impacts from Open Reservoir Areas potentially increase sedimentation risk to tui chub habitat within Prosser, Stampede, and Boca reservoirs. No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on 42 native surfaced crossings unauthorized to motorized use. 75 NFTS stream crossings available to motorized use. No additional protection to tui chub habitat from wet weather restrictions	Cross country travel prohibited on 9,689 tui chub, RCA acres including on 39 native surfaced crossings unauthorized to motorized use. 78 NFTS stream crossings available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions	Cross country travel prohibited on 9,689 tui chub, including on 34 native surfaced crossings unauthorized to motorized use. 83 NFTS stream crossings available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions	Cross country travel prohibited on 9,689 tui chub, including on 36 native surfaced crossings unauthorized to motorized use. 81 NFTS stream crossings available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions	Cross country travel prohibited on 9,689 tui chub, including on 39 native surfaced crossings unauthorized to motorized use. 78 NFTS stream crossings available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions

*Alternative 1 includes existing native surfaced, stream crossings unauthorized to motorized use, while all the other Alternatives include motorized crossing additions.

Table 3.03-115 summarizes the direct, indirect, and cumulative effects to native surfaced, motorized RCA route miles within Lahontan Lake tui chub HUC 7 watersheds, from existing motorized routes, motorized route and area additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table 3.03-115. Lahontan Lake Tui Chub 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of Existing NFTS Native Surfaced, Motorized Roads and Trails	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Miles of Native Surfaced, Motorized RCA Trail Additions*	14.4	0.5	0	0	0.6	0	0.5
Change in Class of Vehicle Where Changed Maintenance Standards Result in Smooth Surfaced to Native Surfaced RCA Route Miles	0	0.4	0	0	0.4	0.4	0
Miles of Cross Country Travel Prohibited on Motorized Routes Unauthorized to Motorized Use	0	13.5	14.4	14.4	13.4	14	13.9
Net RCA Miles of Native Surfaced, Motorized Routes	30.4	16.9	16	16	17	16.4	16.5
Acres of Open Areas at Stampede, Prosser, and Boca Reservoirs	0	2,000 acres	0	0	0	0	0
Acres of RCA Cross Country Travel	Continues on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres	Prohibited on 9,689 RCA acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
NET Cumulative Effect	Cross country travel continues on 9,689 tui chub RCA acres, including on approx. 14 miles native surfaced, RCA miles unauthorized to motorized use. Approx. 30 native surfaced, RCA miles (16 mi NFTS, 14.4 mi. unauthorized) No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 17 NFTS RCA miles available to motorized use. Increased sediment risk to tui chub habitat from 2,000 acres of Reservoir Open Areas No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 16 NFTS RCA miles available to motorized use. No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, RCA acres including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 16 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on approx. 13 native surfaced RCA miles unauthorized to motorized use. Approx. 17 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 16 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on approx. 14native surfaced RCA miles unauthorized to motorized use. Approx. 17 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.

*Alternative 1 includes existing native surfaced, routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

Frogs

Potential road and trail associated risk factors to the suitable habitat for frogs, particularly California red-legged frogs, foothill yellow-legged frogs, and mountain yellow-legged frogs, can cause the modification or loss of habitat or habitat components, primarily aquatic and adjacent riparian environments used for reproduction, cover, foraging, and aestivation. Egg survival can be impacted by roads and trails through increases in fine sediments. Stream crossings and roads and trails that are within close proximity to streams and ponds have the potential to impact riparian vegetation, emergent vegetation, nutrient loading, and channel morphology and hydrology that are important habitat components for frog species.

The degree to which trails and roads affect frogs and their habitat depends on many factors such as road density, road type, and traffic intensity. Most studies on road and trail associated factors address other amphibians (e.g., Fahrig et al. 1995, Mazerolle 2003, 2004). Several studies have shown that amphibian densities are inversely related to road density and traffic intensity (see Fahrig et al. 1995, Vos and Chardon 1998).

Direct impacts to frog populations from roads potentially include road mortality, direct loss of habitat, or creation of barriers. Mass mortalities of other species of frogs have been documented during dispersal where roads intersect natal/breeding habitat and non-breeding foraging habitat (Hine et al. 1981, Fahrig et al. 1995; see also Trombulak and Frissell 2000). Mortality from vehicles can reduce population size and reduce movement between resources and conspecific populations (Carr and Fahrig 2001). Road mortality is a considerable potential risk factor for foothill yellow-legged frogs because roads are common over the areas encompassing their historical range on the Tahoe NF, many of the roads presently have at least moderate traffic levels; and some observations suggest upslope seasonal movements by frogs likely intersect roads.

Roads can also impact populations of frogs by affecting their riparian or terrestrial habitat. Trombulak and Frissell (2000) identified eight physical characteristics of the environment may be altered by roads: soil density, temperature, soil water content, light, dust, surface-water flow, pattern of run-off, and sedimentation. The presence of roads is highly correlated with changes in the hydrologic and geomorphic processes that affect aquatic and riparian systems (Trombulak and Frissell 2000). Roads can influence both peak flows (floods) and debris flows (rapid movements of soil, sediment, and large wood stream channels) two processes which have major influences on riparian vegetation (Jones et al. 2000) as well as aquatic and riparian patch dynamics critical to stream ecosystems (Pringle et al. 1988). California red-legged frogs, foothill yellow-legged frogs, and mountain-yellow legged frogs breed in streams, which can be affected by fluctuations in the frequency or magnitude of peak and debris flows of adjacent streams. Fluctuations causing reductions or excesses in available water could severely affect recruitment. Hydrologic effects are likely to persist for as long as the road remains a physical feature altering flow routing - often long after abandonment and revegetation of the road surface (Trombulak and Frissell 2000).

Increased sedimentation from roads also impacts riparian habitat used by frogs. The knowledge of the impact of increased sediment load on amphibians is limited (Gillespie 2002). However, the negative impacts of increased sediments on aquatic species, including fish, macroinvertebrates, and periphyton, are well known (Power 1990, Newcombe and MacDonald 1991, Waters 1995). The transfer of sediment to

streams and other water bodies at road crossings is also a consequence of roads and trails (Richardson et al. 1975). The surfaces of unpaved roads can route fine sediments to streams, lakes, and wetlands, increasing turbidity of the water (Reid and Dunne 1984). This disrupts stream ecosystems by inhibiting aquatic plants, macro-invertebrates, and fish. High concentrations of suspended sediment may directly kill aquatic organisms and impair aquatic productivity (Newcombe and Jensen 1996). The effects are heightened if the sediments contain toxic materials (Maxell and Hokit 1999, In Joslin and Youmans 1999). Increased sedimentation may also reduce availability of important food resources for tadpoles such as algae (Power 1990). Fine sediment deposits also tend to fill pools and smooth gravel beds, degrading habitats (Forman and Alexander 1998) and possibly the availability of oviposition sites or larval refugia (Welsh and Ollivier 1998). In addition, the consequences of past sedimentation are long term and cumulative, and cannot be mitigated effectively (Hagans et al. 1986). The only data addressing sedimentation effects on foothill yellow-legged frogs are from Oregon, where sedimentation emerged as one of the variables affecting foothill yellow-legged frog occupancy (Borisenko and Hayes 1999).

The spread of chemicals is another way in which roads may impact frog. At least five different general classes of chemicals are transferred into the environment from maintenance and use of roads: heavy metals, salt, organic molecules, ozone, and nutrients contribute (Trombulak and Frissell 2000). The change of the chemical environment by roads may affect living organisms in several ways. For example, chemicals found in road de-icers may kill (Doughtery and Smith 2006) or displace frog life stages, or they may be accumulated in plants as toxins which, in turn, can depress larval amphibian growth. Another example is the historical use of lead as a fuel additive that may have affected foothill yellow-legged frogs because lead has been shown to have sublethal effects on growth and behavior of northern leopard frog larvae (Chen et al. 2006). No data exist that specifically addresses the effects of road associated chemicals on California red-legged frogs, foothill yellow-legged frogs, or mountain yellow-legged frogs.

California Red-legged Frog: Affected Environment

The U. S Fish and Wildlife Service listed the California red-legged frog (*Rana aurora draytonii*) (CRLF) as federally threatened in 1996. The western portion of the Tahoe National Forest falls within the Sierra Nevada recovery unit (Recovery Unit #1) (USDI Fish and Wildlife Service 2002). The Plumas and Tahoe National Forests share Core Area #2 Yuba River-South Fork Feather River located in Yuba County (USDI Fish and Wildlife Service 2002). This core area includes a portion of the North Yuba River around New Bullards Bar Reservoir. Recovery actions would be focused within core areas. No critical habitat is designated on the Tahoe National Forest (USDI Fish and Wildlife Service 2001) (Federal Register 66 (49): 14626-14758).

The California red-legged frog is a highly aquatic species typically found in cold water ponds and stream pools with depths exceeding 0.7 meters and with overhanging vegetation such as willows, as well as emergent and submergent vegetation (Hayes & Jennings 1988). It is generally found at elevations below 4,000 feet. Suitable California red-legged frog breeding habitat on the Tahoe NF includes all ponds, lakes and reservoirs on the west slope of the forest that contain water through July in years with average precipitation, and low gradient stream reaches (< 4 percent) that do not receive peak runoff flows from snowmelt during May or June. Sites need to provide: suitable water depth for breeding (most years),

presence of still or slow moving water, good water temperature for egg laying and larval development, presence of emergent aquatic vegetation or woody debris for egg deposition braces.

California red-legged frog are not currently known to occur on the Tahoe NF, though four known populations are located adjacent to the Tahoe NF administered lands. In 2000, red-legged frogs were wound in Little Oregon Creek, a tributary to New Bullards Bar Reservoir on the Plumas NF. The Little Oregon Creek population is approximately 1 mile from New Bullards Bar Reservoir. In 2001 a single female was located in Spivey Pond on the Eldorado NF on Ralston Ridge, located 1 mile from the Tahoe NF boundary. A third population was found in 2003 on private land within the Rock Creek watershed near Nevada City, within 1/5 miles of the Tahoe NF boundary. In 2006, a fourth site consisting of approximately 50 individuals was discovered on private land near Michigan Bluff in the Big Gun Diggings area. From 1996 to present, suitable California red-legged frog habitat on the Tahoe NF has been surveyed to U.S. Fish and Wildlife Service protocol at approximately 100 sites. To date, no California red-legged frog sites have been detected on lands administered by the Tahoe NF.

Roads in close proximity to streams also increase the potential for human disturbance of aquatic species and their habitats. In general, such disturbance would be correlated to the type of disturbance (e.g., roadside hazard tree removal, collection of aquatic species, behavioral changes in response to noise, etc.), the intensity of that disturbance, and the distance of the road from the stream.

Roads and trails can increase the risk of modification or loss of red-legged frog habitat or habitat components, primarily aquatic and adjacent riparian environments used for reproduction, cover, foraging, and aestivation. Egg survival can be impacted by road and trail associated factors through increases in fine sediments and changes in channel morphology and hydrology (SNFPA 2001), thus adversely affecting habitat and potentially disrupting amphibian reproduction. Effects of increased sediment delivery to aquatic systems include adverse effects to water quality (e.g., increases in turbidity) and changes in substrate composition morphology that potentially could influence in-stream primary production and macroinvertebrate assemblages. Such changes could alter the prey species presence/absence and/or promote changes in habitat that favor non-native species that have a negative effect on the red-legged frog.

California Red-legged Frog: Environmental Consequences

In 2006, the U.S. Forest Service entered into programmatic consultation with the U.S. Fish and Wildlife Service for route designation (travel management) for motor vehicles in 14 National Forests in California. The BE for the Tahoe NF Motorized Travel Management Project and this programmatic consultation is incorporated by reference. Project design criteria were developed jointly, which includes measures to avoid impacts to federally listed species, including the California red-legged frog. The U.S. Fish and Wildlife Service has agreed that, by using the Project Design Criteria for each of the Threatened and Endangered species and Critical Habitat, route designation will meet “No Effect” or “May Affect Not Likely to Adversely Affect” determinations and that they would concur with these determinations on a programmatic basis. Forest consultation can tier to the programmatic consultation with no further consultation.

The following project design criteria were developed specifically for the California red-legged frog to achieve a "No Effect" or "May Affect Not Likely to Adversely Affect" determination for routes (motorized road or trail) and area additions to the National Forest Travel System (NFTS):

Routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream associated with California red-legged frog.

- In suitable California red-legged frog habitat, routes avoid Riparian Conservation Areas except where necessary to cross streams. Crossing approaches get the riders in and out of the stream channel and riparian area in the shortest distance possible while meeting the gradient and approach length standards.
- Routes or areas that cross any stream or waterbody within 150 m (500 ft) of known occupied sites of California red-legged frog; and route or area is not within a distance of 150 m (500 ft) from wetlands (i.e. springs, wet meadows, ponds, marshes).
- In habitat occupied by California red-legged frog, routes or areas do not have the potential to capture or divert stream flow. The approaches to stream crossings are downsloped toward the stream on both sides.
- Routes or areas are located outside of Critical Aquatic Refuges, Riparian Conservation Areas, meadows, and wetlands within California red-legged frog habitat.
- No route or areas are within Critical Aquatic Refuges for California red-legged frog.

Direct and Indirect Effects

There are no known occupied California red-legged frog sites on lands administered by the Tahoe NF. Proposed motorized route and area additions to the NFTS do not directly, indirectly, or cumulatively impact the California red-legged frog. All the action alternatives would be consistent with the above Project Design Criteria, since none of the proposed route or area additions would adversely affect any occupied California red-legged frog sites adjacent to or within the boundary of the Tahoe NF.

The North Bloomfield (Rock Creek) red-legged frog site occurs several miles outside of the Forest boundary just north of Nevada City, and would not be affected by the proposed route and area additions. Two other known red-legged sites are on the Eldorado and Plumas NFs, and would not be affected by this project.

- The occupied California red-legged frog site near Michigan Bluff is immediately adjacent to the Forest boundary. Alternative 5 proposes to add two motorized routes, H3004-8 and H3004-10, to the NFTS that are within close proximity to the Michigan Bluff site. Neither proposed route addition would directly or indirectly affect this red-legged frog site. Each Project Design Standard is addressed below:
- Routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream associated with California red-legged frog.
- Routes H3004-8 and H3004-10 are located down slope of the occupied California red-legged frog site, and therefore do not have the potential to capture surface run-off and deliver sediment to the site.

- In suitable California red-legged frog habitat, routes avoid Riparian Conservation Areas except where necessary to cross streams. Crossing approaches get the riders in and out of the stream channel and riparian area in the shortest distance possible while meeting the gradient and approach length standards.
  Routes H3004-8 and H3004-10 are located outside of Riparian Conservation Areas.
- Routes or areas that cross any stream or waterbody within 150 m (500 ft) of known occupied sites of California red-legged frog; and route or area is not within a distance of 150 m (500 ft) from wetlands (i.e. springs, wet meadows, ponds, marshes).
  Routes H3004-8 and H3004-10 are located at least 580 feet away from the edge of the occupied California red-legged frog ponds. Two ponds are greater than 850 feet from the proposed route additions.
- In habitat occupied by California red-legged frog, routes or areas do not have the potential to capture or divert stream flow. The approaches to stream crossings are downsloped toward the stream on both sides.
  As indicated above, routes H3004-8 and H3004-10 are down slope of the occupied red-legged pond sites and do not have to potential to capture sediment into the ponds.
- Routes or areas are located outside of Riparian Conservation Areas, meadows, and wetlands within California red-legged frog habitat.
  As indicated above, proposed Alternative 5 routes H3004-8 and H3004-10 are located outside of the Riparian Conservation Areas for the ponds. The Riparian Conservation Area for perennial ponds is 300 feet from the edge of the pond. The distance of the proposed route additions exceed 500 feet from the edge of the nearest occupied pond.
- No route or areas are within Critical Aquatic Refuges for California red-legged frog.
  The two Critical Aquatic Refuges (CARs) on the Tahoe NF, located at Sierra Buttes and Independence Lake, are outside the range of the California red-legged frog.

Cumulative Effects

Cumulative Effects Boundary in Space and Time

The geographic boundary for assessing cumulative effects to the California red-legged frog (CRLF) is the west side of the Tahoe NF below 4,000 feet within ponds and streams with a gradient $\leq$ 4%, since this is within habitat that is considered suitable on the Tahoe NF. This geographic boundary is sufficiently large to encompass historic and potential CRLF habitat on the Tahoe NF. Any larger boundary could dilute the effects of past, present, and future cumulative impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred within the last 50 to 100 years. Reasonably foreseeable future impacts expand out to approximately 25 years into the future.

Cumulative Effects of Past, Present, and Reasonably Foreseeable Future Actions

The California red-legged frog was once numerous and widely distributed in California. Initial declines of the California red-legged frog is attributed to over-harvesting (Jennings and Hayes 1985), and then later to the introduction of the bullfrog which have out-competed and predated on the CRLF. A variety of other

past cumulative impacts to California red-legged frogs have affected the distribution and abundance of the California red-legged frog on the Tahoe NF, including historic mining and grazing; urban development and mining on private land; road building, water diversions; recreation and non-native species introduction. All these activities have the potential to alter California red-legged frog habitat through disturbance to vegetation, soils, hydrology, and the potential for introduction of exotic species. Activities on private land that comprise a significant checkerboard pattern on the Tahoe NF will continue to affect the species.

Thirty two of fifty-nine total ponds that have been identified as suitable red-legged frog habitat occur within active livestock allotments on the Tahoe NF. Since occupied CRLF habitat does not currently occur on the Tahoe NF, none of the current active grazing allotments has the potential to contribute to cumulative effects to occupied CRLF habitat. However, suitable California red-legged frog habitat overlaps with 13 active grazing allotments where habitat degradation to suitable habitat could occur.

Although mining activities have the potential to adversely affect this species, suitable habitat has been created for this species (i.e. Michigan Bluff private land historic mine tailing ponds).

The proposed project alternatives including the no action alternative would not directly or indirectly add impacts to any existing cumulative impacts to the California red-legged frog, since no California red-legged frog populations occur on National Forest System lands within the boundary of the Tahoe NF. The nearest known populations of California red-legged frog occur on private lands adjacent to Forest Service system lands in the vicinity of North Bloomfield, Nevada City, the Michigan Bluff area near the town of Foresthill, and within the Eldorado NF in Spivey Pond.

Foothill Yellow-legged Frog: Affected Environment

Introduction: The foothill yellow-legged frog (*Rana boylii*) (FYLF) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). Foothill yellow-legged frogs are associated with streams in a variety of habitats including riparian, mixed conifer, and wet meadow types (Stebbins 1985). To varying degrees depending on life stage, their habitat requirements are closely linked to seasonal variation in stream habitats and comprise 3 categories: breeding and rearing habitat, non-breeding active-season habitat; and over wintering habitat. Breeding and rearing habitat is located in gently flowing water. Foothill yellow-legged frogs breed at locations with substrates and channel shapes that provide suitable velocities and depths over a relatively broad range of discharge volumes (Kupferberg 1996a). These frogs prefer partial shade, shallow riffles, and cobble sized or greater substrate (Hayes and Jennings 1988). Occasionally, this species is also found in other riparian habitats, including moderately vegetated backwaters, isolated pools, (Hayes and Jennings 1988, pers. obs.), slow moving rivers with mud substrates (Fitch 1938). During breeding and summer, FYLF are rarely encountered far from permanent water. During the winter, frogs have been observed in abandoned rodent burrows and under logs as far as 100 meters from a stream (Zeiner et al. 1988).

Private lands comprise the largest fraction (about 50 percent) of historic foothill yellow-legged frog range in the Sierra Nevada. Only about 25 percent of historic FYLF range occurs on National Forest lands, they are not documented from Wilderness Areas or National Park lands in the Sierra Nevada, where roads are few. The remaining 25 percent of FYLF habitat lies on state lands, other federal lands (e.g.,

Bureau of Land Management [BLM], Bureau of Reclamation [BOR]), or tribal lands. On the Tahoe NF suitable habitat for FYLF is considered to be streams occurring below 6,000 feet elevation on the westside of the Tahoe NF.

Risk factors to the FYLF include disease, introduced fish and other exotic (bullfrog) and native predators, airborne contaminants (including pesticides), livestock grazing, recreational activities, water development and diversion, vegetation and fuels management projects, and habitat loss and fragmentation.

Motorized Route Associated Risk Factors: As indicated above, recreational activities associated with motorized routes has the potential to adversely affect FYLF and their habitat. Roads and trails have the potential to directly affect FYLF populations by road or trail mortality, direct habitat loss, and/or the creation of barriers. Mortality from vehicles can reduce FYLF population size and reduce movement between breeding and over wintering sites. Route associated mortality is a considerable potential risk factor for FYLF because roads are common over the areas encompassing their historical range on the Tahoe NF; and many of the roads presently have at least moderate traffic levels; and some observations suggest upslope seasonal movements by FYLF likely intersect roads.

Foothill Yellow-legged Frog: Environmental Consequences

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect FYLF habitat. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to suitable FYLF habitat.

Change in Class of Vehicles: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02 Watershed Resources). If the route changes from smoothed surfaced to native surfaced (rough surfaced), the change in class of vehicle may result in increased sediment and erosion risk to FYLF habitat. The change in class of vehicle and associated maintenance downgrades is evaluated for their potential to affect selected 7th field watersheds that may have suitable habitat for the FYLF.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to FYLF 7th field watersheds from motorized cross country travel.

Motorized Route and Area Additions (FYLF 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized trail additions to the National Forest Transportation System, and the miles of motorized trail additions within Riparian Conservation Areas (RCAs) for FYLF 7th field watersheds

Site-specific Physical Impacts and Disturbance to known foothill yellow-legged frog locations: Proposed motorized route additions were evaluated to determine site-specific impacts to known FYLF

locations for each of the alternatives. Native surfaced routes that cross or intersect FYLF streams and ponds have the greatest potential to disturb FYLF, kill and crush FYLF egg masses and to alter stream banks and deliver sediment which can degrade FYLF habitat condition. In addition, any proposed motorized route additions that are within RCAs or has the potential to delivery sediment to known FYLF locations were also evaluated by the alternatives.

Route Density within Riparian Conservation Areas (RCAs): Route densities of native surfaced routes within RCAs were evaluated to compare the overall effects of all motorized routes (including existing NFTS routes and existing routes unauthorized to motorized use) for the alternatives within each 7th field watershed occupied by foothill yellow-legged frog (FYLF). According to Chapter 3.02 (Soil and Watershed Resources), native surfaced motorized routes have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes route density of all native surfaced motorized routes maintained for high clearance vehicles. Route density provides a relative index to measure the potential indirect effects to occupied habitat of FYLF from increased sedimentation from routes. Thresholds for route density have not been established, however, route density provides a relative way to compare the effects of the alternatives.

Stream Crossing Density within Riparian Conservation Areas (RCAs): The 7th field watersheds occupied by FYLF were evaluated for the crossing density of native surfaced motorized routes within RCAs to compare direct and indirect effects of motorized routes for the project alternatives. Route crossing density provides a way to measure the potential direct and indirect effects to FYLF and habitat. Direct effects include potential FYLF mortality as a result of use of motorized crossings of occupied FYLF streams. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Thresholds for motorized crossing route density have not been established, however, route crossing density provides a relative way to compare the effects of the alternatives.

Direct and Indirect Effects

Wet Weather Seasonal Closures. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where FYLF potential habitat would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially motorized roads and trails that are within close proximity to or cross streams or other riparian aquatic habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather seasonal restrictions on native surfaced motorized routes and therefore, the FYLF would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of native surfaced, motorized stream crossings and highest RCA motorized route densities that could potentially delivery sediment to FYLF habitat from motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-115 displays the effects of proposed changes in class of vehicles and the associated maintenance downgrades that have to potential to increase the risk of delivering sedimentation and erosion to FYLF HUC7 watersheds. Alternatives 2, 5, and 6 result in the downgrade of road maintenance levels resulting in changes from smooth surfaced roads to rough surfaced roads are likely to occur in the future with reduced maintenance. This change in road

surface type has a higher potential to result in increased sedimentation to FYLF habitat affected by 1 crossing and 0.1 miles of motorized roads.

Table 3.03-116. Foothill Yellow Legged Frog – Effects from Change in Class of Vehicles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced Crossings as a result of maintenance downgrades	0	1	0	0	1	1	0
RCA Miles of road downgrades from smooth surfaced to rough or native surfaced	0	0.1	0	0	0.1	0.1	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will continue on 34,092 Riparian Conservation Areas (RCAs) acres within FYLF HUC7 watersheds, where the potential for adversely affecting FYLF habitat could occur by increasing sedimentation and altering streamside vegetation. Under the action alternatives, the prohibition of cross country travel results in prohibiting motorized use on 34,092 RCA acres, including 39 to 68 RCA miles and from 97 to 228 motorized crossings (Alt 5 prohibits the least, Alt 3 prohibits the most). Cross country travel prohibitions will likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit FYLF habitat.

Motorized Trail and Area Additions – Motorized Stream Crossings and Miles of Motorized Trail Additions

Number of Native Surfaced, Motorized Stream Crossing Additions within FYLF 7th Field Watersheds. The number of native surfaced, motorized stream crossings, proposed for addition to the NFTS, are assessed for the alternatives, and provides a useful way to compare potential changes in sediment delivery within FYLF HUC7 watersheds. Alternative 1 poses the greatest risk of increased sedimentation where 228 motorized stream crossings are associated with the continuance of cross country travel on existing motorized trails unauthorized to motorized use (Table 3.03-117**)**. In decreasing order, Alternatives 5, 2, 6, 4, and 7 result in the addition of 131 to 3 native surfaced, motorized trail crossings. Alternative 3does not add motorized trail crossings to the NFTS, and therefore sedimentation or streamside vegetation would not be affected within any FYLF HUC7 watersheds

Table 3.03-117. Foothill Yellow-legged Frog 7th Field Watersheds - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions (negative impact)	228	88	0	7	131	33	3
Cross country travel	Continues on 34,092 RCA acres	Prohibited on 34,092 RCA acres	Prohibited on 34,092 RCA acres	Prohibited on 34,092 RCA acres	Prohibited on 34,092 RCA acres	Prohibited on 34,092 RCA acres	Prohibited on 34,092 RCA acres

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

RCA Miles of Proposed Motorized Trail Additions of FYLF 7th Field Watersheds. The miles of proposed motorized trail additions to the National Forest Transportation System (NFTS) within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into FYLF habitats at the HUC7 level. Alternative 1 poses the greatest risk to increased sedimentation potential from 68.4 RCA miles of motorized trails un-authorized for motorized use that would remain due to not prohibiting cross country travel (Table 3.03-118**)**. Similar to stream crossing numbers, Alternatives 2, 4, 5, 6, and 7 propose to add between 1.3 and 29.4 RCA miles (Alt 5 adds the most , Alt 7 adds the least) of motorized trails to the NFTS. Alternative 3 does not add motorized trails to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any FYLF HUC7 watershed.

Table 3.03-118. Miles of Proposed Route Additions within FYLF HUC7 Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized trail additions within RCAs* (negative impact)	68.4	16.3	0	2.2	29.4	10.1	1.3
Miles of motorized routes within RCAs that would be prohibited to motorized public use with the prohibition of cross country travel (positive impact)	0	52.1	68.4	66.2	39.0	58.3	67.1

*Alternative 1 includes existing routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

Site-specific Physical Impacts and Disturbance to known foothill yellow-legged frog locations. On the Tahoe NF, FYLF locations occur within forty 7th field watersheds. Table 3.03-119 displays the FYLF 7th field watersheds (HUC7) where motorized route additions are located and shows the relationship to known FYLF locations. Potential site-specific adverse and beneficial impacts at the HUC7 watershed scale are described.

Table 3.03-119. Direct and indirect effects of proposed motorized route additions and prohibition of cross country travel in relation to known FYLF locations by 7th field watershed

Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts of motorized additions	Prohibition of Cross Country Travel
Bullards Bar Reservoir-Bridger Creek	No proposal	None	Proposed action alternatives prohibits cross country travel on 2 (Alts 2, 5, 6) to 3 (Alts 3,7) of 8 intermittent/perennial NFS crossings.
Cherokee Creek	YRN-008, (Alt 2, 5, 6); 0025-009, 0491-003,25-9-3_p, 35-4-1_p, 35-4_p, 491-3-1_p, 491-3-2_p, 491-3_p (Alt 5 & 6); H39-12, N25-1-1,N25-3, N25-5, N25-6-1, N25-7, N25-9-1, N25-9-2, N35-1, N35-2, N35-3-1, N35-3-2, N35-6, N35-7, N39-12-1, N39-4, N39-5. N35-5-1, N35-5-2, N39-6, N39-7, N39-8-1, N491-1, N491-3-1; (Alt 5) – 23.8 mi. (Alt 6) – 8.0 mi	YRN-008 near the FYLF site and may impact. FYLF. Alt 5 may have a cumulative effect to FYLF due to the addition of 23.8 miles of routes unauthorized to motorized use. Several Alt 5 proposed routes are above FYLF site and may impact the site. Alt 6 proposes to add motorized aroute just below the MYLF site and may have an impact to FYLF.	Proposed action alternatives prohibits cross country travel on 2 (Alt 5), 12 (Alt 6), 16 (Alt 2), to 19 (Alts 3,4,7) of 25 intermittent/perennial NFS crossings.
Fall Creek	Alt 5 proposed additions - H18-12, H18-12-2	H18-12, H18-12-2 – Alt 5 route additions may impact FYLF sites in South Yuba River below confluence of Trapp Creek and Fall Creek.	Proposed action alternatives prohibits cross country travel on 4 (Alts 3,7) or add 9 (Alts 2,5,6) to12 existing intermittent/perennial NFS crossings.
Fiddle Creek	Alt 5 proposed routes (0025-009, 25-9_p, H25-11-3, H27-19, N25-3, N25-14, N25-2, N25-2-1, N25-2-3, N25-4-10, N25-4-2, N25-4-2-2, N25-4-3, N25-4-4, N25-4-4-1, N25-4-6, N25-5, N25-8-1-1, N25-10, N25-8-2, N25-8-3, N25-8-4, N25-8-6. N25-8-8, N27, N27-1, N27-10M B27-2. N27-3, N27-4, N35-1, N55-1) – 24.8 mi Alt 6 – proposed routes - 0.8 mi	FYLF site in lower HUC7, Alt 5 proposed routes in upper HUC7. Routes in southern part of HUC7 have a small potential to indirectly and cumulatively impact FYLF site from the addition of 24.8 miles.	Proposed action alternatives prohibits cross country travel on 14 (Alts 2) to 21 (Alts 3,4,6,7) or add 9 (Alts 2,5,6) to 36 existing intermittent/perennial NFS crossings.
Fulda Creek	H19-22-14 (Alt 5), – 1.3 mi	One FYLF site. Alt 5 only - H19-22-14 is on the mainstem of Fulda Creek upstream of FYLF site and could therefore potentially impact the FYLF. The direct RCA effects are on the private land. NFS portion of route is outside of the RCA	Proposed action alternatives prohibits cross country travel on 2 (All Action Alts) of 8 existing intermittent/perennial NFS crossings.
Goodyears Creek	Alt 5 proposals H25-18, H25-18-4, H27-16, H27-17	Proposed Alt 5 proposed routes above Snow Creek have small potential to affect FYLF sites in Goodyear's Creek and North Yuba River.	Proposed action alternatives prohibits cross country travel on 8 (Alts 3,4,6,7) or add 4 (Alt 2) to 7 (Alts 5) to 20 existing intermittent/perennial NFS crossings.
Greenhorn Creek-South Fork Greenhorn Creek	Greenhorn Area (Alt1, 2, 5)	Greenhorn Area could impact FYLF site.	Proposed action alternatives prohibits cross country travel on 17 (All Action Alts) of 21 existing intermittent/perennial NFS crossings.
Grizzly Creek	Alt 5 proposed addition (H613-8)	Multiple FYLF could be affected by Alt 5 route addition.	Proposed action alternatives prohibits cross country travel on 3 of 11 existing intermittent/perennial NFS crossings.

Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts of motorized additions	Prohibition of Cross Country Travel
Headwaters Oregon Creek	No proposals	None	Proposed action alternatives prohibits cross country travel on 8 (All Action Alts) of 10 existing intermittent/perennial NFS crossings.
Humbug Canyon	ARM-7, ARM-5 (Alt 2, 4, 5, 6, 7),	ARM-5 & ARM-7 in upper HUC7 not likely to impact FYLF in lower portion of HUC7, ARM-5 up on ridge w/ no connection to frog site.	Proposed action alternatives prohibits cross country travel on 0 (All Action Alts) of 13 existing intermittent/perennial NFS crossings.
Indian Creek	No proposals	None	None
Lower Downie River	YRN-509 (Alt 2,5,6)	YRN-509 is not likely to impact FYLF.	Proposed action alternatives prohibits cross country travel 1 (All Action Alts) of 19 existing intermittent/perennial NFS crossings.
Lower Kanaka Creek	No proposals	None	Proposed action alternatives prohibits cross country travel on 9 (All Action Alts) of 24 existing intermittent/perennial NFS crossings.
Lower Middle Yuba River	Alt 5 proposed historic routes – 2.6 mi	One FYLF site.	Proposed action alternatives prohibits cross country travel on 2 (All Action Alts) of 6 existing intermittent/perennial NFS crossings.
Lower North Shirttail Canyon	ARM-3 (Alt 2, 5) , ARM-3A (Alt 4, 6, 7) Alt 5 historic proposed routes - 0.4 mi	89% FS; RCA ws-1 mi 7.3 (6.7 FS); ARM-3 & ARM-3a are above FYLF sites are not likely impact FYLF; Alt 5 historic route proposals are above sites not likely to impact; all action alternatives prohibits cross country travel on trails nearest to FYLF streams.	Proposed action alternatives prohibits cross country travel on 12 (Alts 2,4,5,6,7) to 13 (Alt 3) of 26 existing intermittent/perennial NFS crossings.
Lower Oregon Creek	Alt 5 proposed historic routes - 0.3 mi	Multiple FYLF sites. Most Proposed routes do not impact FYLF site.	Proposed action alternatives prohibits cross country travel on 1 (All Action Alts) of 15 existing intermittent/perennial NFS crossings.
Lower Poorman Creek	No proposals	None	Proposed action alternatives prohibits cross country travel on 4 of 34 existing intermittent/perennial NFS crossings.
Middle Yuba River-Indian Creek	No proposals	None	Proposed action alternatives prohibits cross country travel on 4 of 26 existing intermittent/perennial NFS crossings.
Middle Yuba River-Moores Flat Creek	YRM-M4 (Alt 2,5,6,7) Alt 5 proposed route (H833-10 - 0.6 mi)	Multiple FYLF sites. YRM-M4 is isolated and not likely to impact FYLF. Alt 5 route H833-10 - 0.6 in upper watershed could impact one of the upper FYLF sites.	Proposed action alternatives prohibits cross country travel on 8 (All Action Alts) of 26 existing intermittent/perennial NFS crossings.
Middle Yuba River-National Gulch	No proposals	None	Proposed action alternatives prohibits cross country travel on 7 of 24 existing intermittent/perennial NFS crossings.

Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts of motorized additions	Prohibition of Cross Country Travel
Middle Yuba River-Studhorse Canyon	Alt 5 proposed route- H613-8- 0.1 mi	Multiple FYLF sites. Proposed route H613-8 would not impact FYLF.	Proposed action alternatives prohibits cross country travel on 3 of 7 existing intermittent/perennial NFS crossings.
North Fork American River-Giant Gap Gulch	Alt 5 proposed routes –H26-6-10 & H26-6-12 (0 .3 mi)	Alt 5 proposed routes not connected to FYLF sites, no impacts likely.	Proposed action alternatives prohibits cross country travel on 0 (All Action Alts) of 13 existing intermittent/perennial NFS crossings.
North Fork Middle Fork American River -El Dorado Canyon	Alt 5 proposed routes H3004-10, & H3004-8 ((2.1 mi)	Multiple FYLF sites. Addition of the H3004-10 &H3004-8 could potentially impact the FYLF.	Proposed action alternatives prohibits cross country travel on 2 (Alt 5) to 3 (Alts 2,3,4,6,7) of 9 existing intermittnet/perennial NFS crossings.
North Yuba River-Humbug Creek	Alt 5 proposed route H293-19(1.6 mi)	Multiple FYLF sites. Proposed Alt 5 route H293-19 in upper parts of watershed above FYLF site, very slight potential of impact FYLF.	Proposed action alternatives prohibits cross country travel on 3 (Alts 4,6) to 4 (Alts 3,7) or add 10 (Alts 2,5) to 15 existing intermittent/perennial NFS crossings.
North Yuba River-Indian Creek	YRN-M3 (Alt 2, 5,6) Alt 5 proposed routes H293-19, H34-4,H34-8-3, N-39-5, N39-5-3, N39-5-4 (2.1 mi)	Multiple FYLF sites. YRN-M3 and several Alt 5 proposed route additions have a low potential to deliver sediment to FYLF sites.	Proposed action alternatives prohibits cross country travel on 5 (Alts 3,4,6,7) or adds 8 (Alts 2,5) to 19 existing intermittent/perennial NFS crossings.
North Yuba River-New York Ravine	No proposals	None	Proposed action alternatives prohibits cross country travel on 5 of 20 existing intermittent/perennial NFS crossings.
North Yuba River-Slug Canyon	YRN-509 (Alt 2, 5,6)	YRN-509 on ridge above not connected to FYLF site, not likely to directly or indirectly affect FYLF site	Proposed action alternatives prohibits cross country travel on 5 (All Action Alts) of 12 existing intermittent/perennial NFS crossings.
Oregon Creek-Marion Creek	Alt 5 proposed route H293-4-4 (1.8 mi)	Multiple FYLF sites. Alt 5 proposed route H293-4-4 in northeastern part of HUC has potential to deliver sediment to FYLF sites.	Proposed action alternatives prohibits cross country travel on 3 (Alt 5) to 5 (Alts 2,3,4,6,7) of 13 existing intermittent/perennial NFS crossings.
Oregon Creek-Miller Creek	Alt 5 proposed historic routes - .4 mi	Proposed historic route not connected, not likely to impact FYLF.	Proposed action alternatives prohibits cross country travel on 9 (Alts 2,4,5,6) to 10 (Alts 3,7) of 31 existing intermittent/perennial NFS crossings.
Rock Creek-North Yuba River	No proposals	None	Proposed action alternatives prohibits cross country travel on 7 (All Action Alts) of 11 existing intermittent/perennial NFS crossings.
South Yuba River-Diamond Creek	YRS-SF4 (Alt 2, 5, 6), Alt 5 proposed routes H20-16, H20-16-2-7, H29-11 s (1.5 mi)	Alt 5 proposed route additions and YRS-SF4 may affect FYLF downstream near Diamond Ck. may be affected by sediment into spring near the north end of route YRS-SF4.	Proposed action alternatives prohibits cross country travel on 0 (Alt 6) to 2 (Alts 3,4,7) or add 2 (Alt 2) to 3 Alt 5) to 15 existing intermittent/perennial NFS crossings.

Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts of motorized additions	Prohibition of Cross Country Travel
South Yuba River-Jefferson Creek	Alt 5 proposed route–H20-8-5 (0.6 mi)	Two FYLF sites. Alt 5 proposed route ties into NFTS road, and FYLF site south of proposal is not connected	Proposed action alternatives prohibits cross country travel on 3 (All Action Alts) of 13 existing intermittent/perennial NFS crossings.
South Yuba River-Logan Canyon	No proposals	No effect to multiple FYLF sites.	Proposed action alternatives prohibits cross country travel on 4 (All Action Alts) of 13 existing intermittent/perennial NFS crossings.
South Yuba River-New York Canyon	No proposals	None	Proposed action alternatives prohibits cross country travel on 0 of 4 existing intermittent/perennial NFS crossings.
South Yuba River-Scotchman Creek	YRS-066 (Alt 2, 6), YRS-SF6 (Alt 2, 4, 5, 6, 7)	Multiple FYLF sites. YRS-066, YRS-SF6 not likely to affect FYLF sites, not connected.	Proposed action alternatives prohibits cross country travel on 0 (Alts 2,5) to 5 Alt 6) to 6 (Alts 3,7) of 11 existing intermittent/perennial NFS crossings.
Upper North Shirttail Canyon	ARM-2 (Alt 2, 5, 6, 7), ARM-5 (Alt 2, 4, 5, 6, 7) Alt 5 proposed route H26-6-10 & H26-6-12 (0.3 mi)	Multiple FYLF sites. ARM-2 may impact FYLF site, ARM-5 on ridge - no connection and no impact to FYLF site, Alt 5 proposed additions H26-6-10 & H26-6-12 are short ridgetop roads and not connected to FYLF sites. ARM-5 will not impact FYLF.	Proposed action alternatives prohibits cross country travel on 9 (All Action Alts) of 30 existing intermittent/perennial NFS crossings.
Upper Poorman Creek	H21-5-3 (1.3 mi)	Multiple FYLF sites. Alt 5 proposal only (H21-5-3), separated from FYLF site, not likely to directly impact FYLF.	Proposed action alternatives prohibits cross country travel on 0 (Alt 5) to 2 (Alts 2, 6) to 4 (Alts 3,4,7) of 29 existing intermittent/perennial NFS crossings.
Upper Shirttail Canyon	ARM-3r	Multiple FYLF sites. ARM-3r is not proximal to sites and will not impact FYLF. All action alts prohibits cross country travel on trails nearest to FYLF sites	Proposed action alternatives prohibits motorized cross country travel on 2 (All Action Alts) of 25 intermittent/perennial NFS crossings.
Upper Steephollow Creek	YRS-SF5, YRS-S6 (Alt 2,4,5,6,7,) YRS-B10 (Alt 2,5)	Most of YRS-S5 and part of YRS-F6 and YRS-B10 above FYLF site - not likely to affect FYLF, YRS-S5 could put sediment into main channel where FYLF site is located.	Proposed action alternatives prohibits motorized cross country travel on 1 (Alts 2,5,6) to 2 (Alts 4,7) to 4 (Alt 3) of 16 existing intermittent/perennial NFS crossings.
Willow Creek	Alt 5 proposed route H293 (0 .9 mi)	Alt 5 proposed route H293 in southwestern portion of watershed may affect one of the FYLF sites.	Proposed action alternatives prohibits motorized cross country travel on 9 (Alts 2,5) to 13 (Alts 4,6) to 15 (Alts 3,7) of 28 existing intermittent/perennial NFS crossings.
Wolf Creek	No proposals	None	Proposed action alternatives prohibits motorized cross country travel on 6 of 26 existing intermittent/perennial NFS crossings.

Alternative 1 poses the greatest risk to FYLF habitat on the Tahoe NF from cross country travel, including on numerous existing routes unauthorized to motorized public use, where 100% of FYLF HUC7 watersheds are potentially affected. Table 3.03-120 identifies all FYLF HUC7 watersheds indicating which alternatives have the potential to impact FYLF sites either directly or indirectly. Alternative 5 poses the next greatest risk to FYLF compared to Alternative 1. Alternative 5 affects known FYLF sites within 15 HUC7 watersheds or 37% of all HUC7 watersheds (n=41) with known FYLF observations. Alternatives 2 and 6 similarly affect FYLF sites within 5 (12%) and 4 (10%) FYLF HUC7 watersheds, respectively. Alternatives 3, 4 and 7 affect the least number of FYLF sites within 0(0%), 1(2%) and 2 (5%) FYLF HUC7 watersheds respectively, where FYLF would most benefit from the prohibition of cross country travel, including on existing routes unauthorized to motorized use.

Table 3.03-120. Comparison of Alternatives for proposed route additions that have potential to adversely impact FYLF sites (X in Box = route proposed and likely to adversely impact FYLF directly or indirectly)

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Bullards Bar Reservoir-Bridger Creek	Cross country travel, including on routes unauthorized to motorized use (Alt 1 only)	X						
	Miles of Motorized Trail Additions	0.9 mi						
Cherokee Creek	YRN-008 (Alt 2, 5, 6); 0025-009, 0491-003,25-9-3_p, 35-4-1_p, 35-4_p, 491-3-1_p, 491-3-2_p, 491-3_p (Alt 5 & 6); H39-12, N25-1-1,N25-3, N25-5, N25-6-1, N25-7, N25-9-1, N25-9-2, N35-1, N35-2, N35-3-1, N35-3-2, N35-6, N35-7, N39-12-1, N39-4, N39-5. N35-5-1, N35-5-2, N39-6, N39-7, N39-8-1, N491-1, N491-3-1; Cross country travel, including on routes unauthorized to motorized use (Alt 1 only)	X	X		X	X	X	
	Miles of Motorized Trail Additions	8.3 mi	0.4 mi		0.2 mi	6.3 mi	2.8 mi	
Fall Creek	H18-12, H18-12-2; Cross country travel, including on routes unauthorized to motorized public use (Alt 1 only)	X	X			X	X	
	Miles of Motorized Trail Additions and/or Changes in Class of Vehicles	2.3 mi	3.1			3.3	3.1	
Fiddle Creek	0025-009, 25-9_p, H25-11-3, H27-19, N25-3, N25-14, N25-2, N25-2-1, N25-2-3, N25-4-10, N25-4-2, N25-4-2-2, N25-4-3, N25-4-4, N25-4-4-1, N25-4-6, N25-5, N25-8-1-1, N25-10, N25-8-2, N25-8-3, N25-8-4, N25-8-6. N25-8-8, N27, N27-1, N27-10M B27-2. N27-3, N27-4, N35-1, N55-1 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
	Miles of Motorized Trail Additions	4.9 mi				6.5 mi		
Fulda Creek	H19-22-14 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
	RCA Miles of Motorized Trail Additions	1.2 mi				0 mi NFS (1.3 mi pvt)		
Goodyears Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only); H25-18, H25-18-4, H27-16, H27-17, N25-14, N25-18-1, N25-19-1 (Alt 5)	X				X		
	RCA Miles of Motorized Trail Additions	2.5				2.3		
Greenhorn Creek-South Fork Greenhorn Creek	Greenhorn Area (Alt 1, 2) Cross country travel, including on existing routes unauthorized to motorized public use (Alt 1 only)	X	X					
	RCA Miles of Motorized Trail Additions	2.6 mi	60 acres					
Grizzly Creek	Cross country travel, including on existing routes unauthorized to motorized public use (Alt 1 only), H613-8 (Alt5)	X				X		
	RCA Miles of Motorized Trail Additions	0.8 mi				0.04 mi		
Headwaters Oregon Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	2.8 mi						
Humbug Canyon	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Motorized Trail Additions	0.7 mi						
Indian Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.1 mi						
Lower Downie River*	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.3 mi						
Lower Kanaka Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Motorized Trail Additions	1.7 mi						
Lower Middle Yuba River	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1.4 mi						
Lower North Shirttail Canyon	Cross country travel, including on routes existing unauthorized to motorized use (Alt 1 only)	X				X		
	RCA Miles of Motorized Trail Additions	2.8 mi				0.3 mi		
Lower Oregon Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.8 mi						
Lower Poorman	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use and/or change in class of vehicles	0.7 mi						
Middle Yuba River-Indian Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1.1 mi						
Middle Yuba River-Moores Flat Creek	H833-10 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only),	X				X		
	RCA Miles of Motorized Trail Additions	1.9 mi				0.22mi		
Middle Yuba River-National Gulch	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1.8 mi						
Middle Yuba River-Studhorse Canyon	H613-8 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
	RCA Miles of Motorized Trail Additions	1.3 mi				0 mi		

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
North Fork American River-El Dorado Canyon	H3004-10, H3004-8 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
	RCA Miles of Motorized Trail Additions	0.5 mi				0.3 mi		
North Fork American River-Giant Gap Gulch	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	Miles of Existing Routes Unauthorized to Motorized Use	0.5 mi						
North Yuba River-Humbug Creek	H293-19 (Alt 5); Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X	X		X	X	X	
	Miles of Motorized Trail Additions and/or Changes in Class of Vehicles	0.7 mi	1.5		0.1	1.6 mi	0.1	
North Yuba River-Indian Creek	YRM-M3 (Alts 2, 5, 6) H293-19, H34-4,H34-8-3, N-39-5, N39-5-3, N39-5-4; Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X	X			X	X	
	RCA Miles of Motorized Trail Additions	1.4 mi	1.5 mi			1.5 mi	0.03 mi	
North Yuba River-New York Ravine	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	2.2 mi						
North Yuba River-Slug Canyon	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1.7 mi						
Oregon Creek-Marion Creek	H293-4-4 (Alt 5); Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
	Miles of Existing Routes Unauthorized to Motorized Use	0.9 mi				0.2 mi		
Oregon Creek-Miller Creek	Cross country travel, including on existing routes unauthorized to motorized use Alt 1 only)	X	X		X	X	X	
	RCA Miles of Existing Routes Unauthorized to Motorized Use and/or Changes in Class of Vehicles	1.4 mi	0.1		0.1	0.1	0.1	
Rock Creek-North Yuba River	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
	Miles of Existing Routes Unauthorized to Motorized Use	2.6 mi						
South Yuba River-Diamond Creek*	YRS-SF4 (Alts 2, 5, 6), H20-16, H20-16-2-7, H29-11 (Alt 5), Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X	X			X	X	
	RCA Miles of Motorized Trail Additions	1 mi	1.9 mi			1.9 mi	1.6 mi	
South Yuba River-Jefferson Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Motorized Trail Additions	0.6 mi						
South Yuba River-Logan Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.9 mi						
South Yuba River-New York Canyon	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.1mi.						
South Yuba River-Scotchman Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1.9 mi						
Upper North Shirttail Canyon*	ARM-2 (Alts 2, 5, 6, 7); Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X	X			X	X	X
	RCA Miles of Motorized Trail Additions	3.9	0.1			0.1	0.1	0.1
Upper Poorman Creek	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	0.9						
Upper Shirttail Canyon	Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Motorized Route Additions	1.3						

HUC7 Name	Route ID	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Upper Steephollow Creek	YRS-B10 (Alt 2 & 5); YRS-SF6 (Alts 2, 4, 5, 6, & 7); Cross country travel, including on existing routes unauthorized to motorized use (Alt 1 only	X	X		X	X	X	X
	RCA Miles of Motorized Route Additions	1.7	1 mi		0.9	1 mi	1 mi	0.9 mi
Willow Creek	H293 (Alt 5 only), Cross country travel, including on routes unauthorized to motorized use (Alt 1 only)	X				X		
	RCA Miles of Motorized Route Additions	2.2 mi				1 mi		
Wolf Creek	Cross country travel, including on routes unauthorized to motorized use (Alt 1 only)	X						
	RCA Miles of Existing Routes Unauthorized to Motorized Use	1 mi						
Total Number of FYLF HUC7 watersheds with potential negative impacts to FYLF sites		**41**	**9**	**0**	**4**	**18**	**8**	**2**
Percent of All FYLF HUC7 watersheds receiving negative impacts (n=41)		**100%**	**22%**	**0%**	**10%**	**44%**	**20%**	**5%**

*HUC7 watersheds with multiple routes with potential impacts to FYLF sites

*Alternative 1 includes motorized routes unauthorized to motorized use, while all the action alternatives include motorized trail additions.

Route Density within Riparian Conservation Areas (RCAs): Route density within Riparian Conservation Areas (RCAs) for all native surfaced motorized routes within 7th field watersheds with known observations of foothill yellow-legged frogs was determined for the proposed alternatives. Alternative 1 poses the greatest risk of high route densities within Riparian Conservation Areas (RCAs) (Table 3.03-121, Figure 3.03-7). Under Alternative 1, 39% of the HUC7 watersheds with FYLF detections falls under the highest (17%) and moderately high (22%) categories for motorized route density (native surfaced routes); followed by Alternative 5. Alternative 5 poses the next highest risk of motorized RCA route density where 24% of the HUC7 watersheds with FYLF observations falls with the highest (12%) and moderately high (12%) route density categories. The remaining alternatives have slightly less RCA route densities compared to Alternative 5. Alternatives 2 and 6 are similar in RCA route densities where 19-20% of the FYLF HUC7s falls within the highest (7-10%) and moderately high (10-12%) categories. Alternatives 3, 4 and 7 each contribute 17% of FYLF HUC7 watersheds with highest and moderately high route densities.

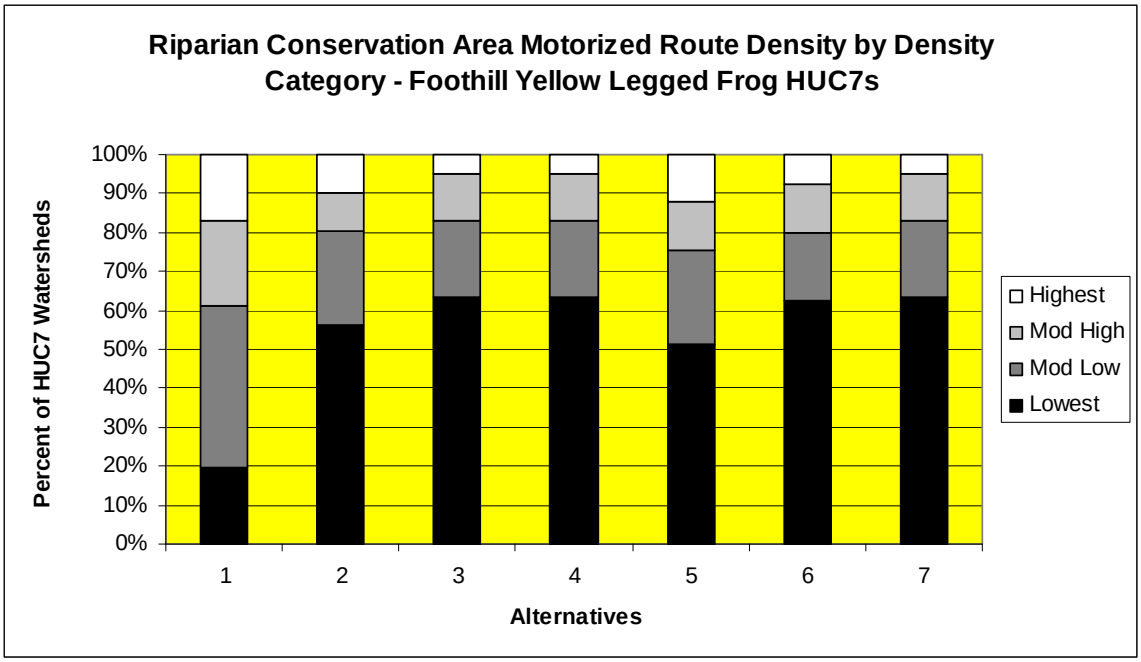

Figure 3.03-7. Number of HUC7 Watersheds with Foothill Yellow-legged Frogs by Route Density Category for Motorized Route Density (Native Surfaced) with Riparian Conservation Areas

Table 3.03-121. The Proportion of Foothill Yellow-legged Frog 7th Field Watersheds within Route Density Categories of Highest, Moderately High, Moderately Low, and Lowest or Forty one 7th Field Watersheds (HUC7s) with Foothill Yellow-legged Frog Observations

Alternatives	Highest (%)	Moderately High (%)	Moderately Low (%)	Lowest (%)
Alt 1	7 (17%)	9 (22%)	17 (41%)	8 (20%)
Alt 2	4 (10%)	4 (10%)	10 (24%)	23 (56%)
Alt 3	2 (5%)	5 (12%)	8 (20%)	26 (63%)
Alt 4	2 (5%)	5 (12%)	8 (20%)	26 (63%)
Alt 5	5 (12%)	5 (12%)	10 (24%)	21 (51%)
Alt 6	3 (7%)	5 (12%)	7 (17%)	25 51%)
Alt 7	2 (5%)	5 (12%)	8 (20%)	26 (63%)

Stream Crossing Density within Riparian Conservation Areas (RCAs): RCA stream crossing density was assessed by route density categories of highest (29.9+crossings/sq. mile), moderately high (20.8-29.8 crossings/sq. mile), moderately low (13.9-20.7 crossings/sq. mi.), and lowest (0-13.8 crossing/sq. mi.) within 7th field watersheds (HUC7s) with known foothill yellow-legged frog observations (Table 3.03-122, Figure 3.03-8). Alternative 1 poses the greatest direct impacts to foothill yellow-legged frogs (FYLF) from stream crossing densities where frogs may be disturbed and/or killed; and FYLF aquatic habitat conditions can be impacted from bank alteration and sediment input associated with motorized route crossings. Under Alternative 1, 61% of HUC7 watersheds with known FYLF detections are within the highest (28%) and moderately high (33%) route crossing density. Alternatives 2 and 5 pose the next greatest risk to FYLF from stream crossings where 46% of FYLF HUC7 watersheds are within the highest and moderately high motorized crossing density categories, followed by Alternative 6 (40%). The remaining alternatives similarly reduces the potential direct and effects of cross country travel, including on routes unauthorized to motorized public use, where 35% of HUC7 watersheds with route crossing densities within the highest and moderately high categories.

Table 3.03-122. The Proportion of Foothill Yellow-legged Frog 7th Field Watersheds within Route Crossing Density Categories of Highest, Moderately High, Moderately Low, and Lowest *or* Forty one HUC7s with Foothill Yellow-legged Frog Observations

Alternatives	Highest (%)	Moderately High (%)	Moderately Low (%)	Lowest (%)
Alt 1	11 (28%)	13 (33%)	10 (25%)	6 (15%)
Alt 2	5 (13%)	13 (33%)	10 (25%)	12 (30%)
Alt 3	3 (7%)	11 (28%)	11 (28%)	15 (37%)
Alt 4	3 (7%)	11 (28%)	11 (28%)	15 (37%)
Alt 5	7 (17%)	12 (29%)	9 (23%)	12 (29%)
Alt 6	3 (7%)	13 (33%)	10 (25%)	14 (35%)
Alt 7	3 (7%)	7 (28%)	11 (28%)	15 (37%)

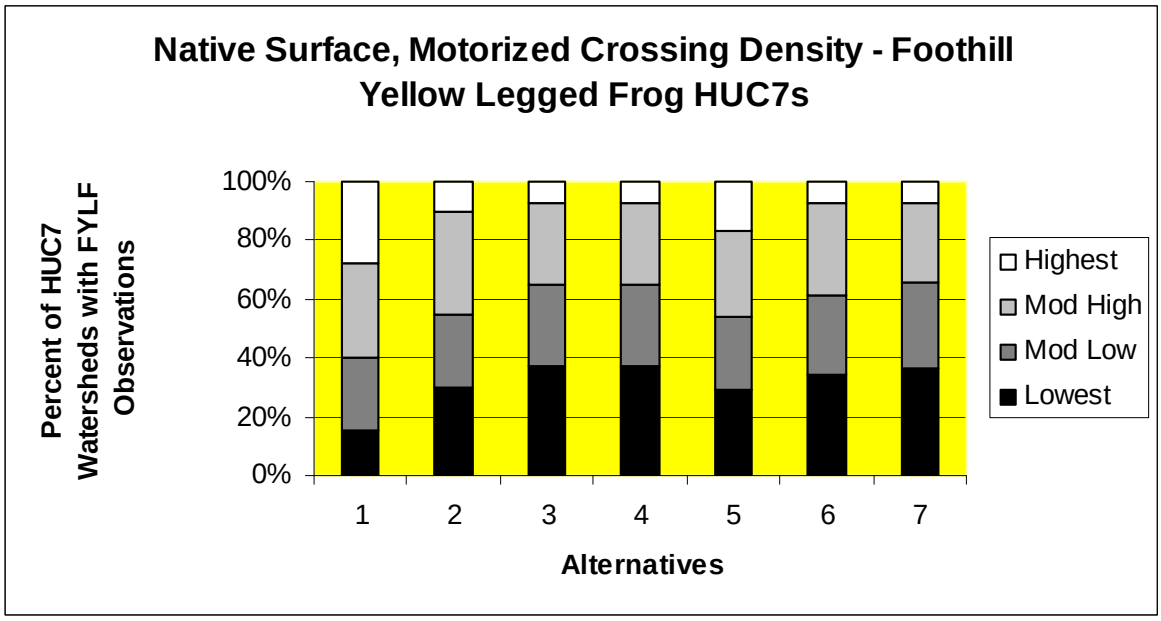

Figure 3.03-8. Number of HUC7 Watersheds with Foothill Yellow-legged Frogs by Route Density Category for Motorized Stream Crossing Density (Native Surfaced) with Riparian Conservation Areas

Cumulative Effects

Cumulative Effects Boundary in Space and Time

The geographic boundary for assessing cumulative effects to the Foothill yellow-legged frog (FYLF) is the westside of the Tahoe NF below 6,000 feet within slow-moving streams, since this is within habitat that is considered suitable on the Tahoe NF. This geographic boundary is sufficiently large to encompass historic and potential FYLF habitat on the Tahoe NF. Any larger boundary could dilute the effects of past, present, and future cumulative impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred within the last 50 to 100 years. Reasonably foreseeable future impacts expand out to approximately 25 years into the future.

Cumulative Effects of Past, Present, and Reasonably Foreseeable Actions

Foothill yellow-legged frogs were once common in streams of the Sierra Nevada, and are now increasingly rare. Foothill yellow-legged frogs have been extirpated from at least two thirds of their historic localities over their entire Sierran range (Jennings 1996, Lind 2005). Lind (2005) estimated that FYLF populations (prior to 1980) have disappeared from approximately 51% of their historic range.

Many past cumulative impacts have contributed to the decline in FYLF numbers and distribution. The reduction in foothill yellow-legged frog distribution and population numbers has largely been attributed to the stocking of non-native fish species. FYLF previously extended to Sacramento Valley floor. In addition, the introduction of bullfrogs has likely contributed to the decline in the FYLF as well from competition and predation by the bullfrog. Predation on the FYLF from other species includes birds,

mammals, and snakes, however, the population affects on the FYLF from predation of these species is unknown.

Historic livestock grazing likely had a significant cumulative impact to FYLF and their habitat. Historic livestock grazing evidence indicates that heavy livestock use in the Sierra Nevada led to riparian habitat degradation across much of the Sierra Nevada. Livestock trampling has the potential to directly kill all life stages of FYLF. The greatest potential of mortality risk from livestock trampling is expected to occur when adult FYLF aggregate and lay egg masses in the early season, and during metamorphosis, when juveniles are metamorphosing along aquatic margins. Current standards and guidelines in the Sierra Nevada Forest Plan Amendment were implemented to reduce the risk of trampling by livestock (USDA 2001). Known of FYLF habitat sites on the Forest currently overlap with 5 active livestock allotments (American Hill, Middle Yuba, Oregon Creek, Sugar Pine and Willow Creek). Suitable foothill yellow-legged frog habitat (no known detections) overlaps with an additional 6 allotments.

Urbanization within private lands makes up the largest fraction (about 50 percent) of historic FYLF range in the Sierra Nevada. Only about 25 percent of historic foothill yellow-legged frog range occurs on National Forest lands, they are not documented from Wilderness Areas or National Park lands in the Sierra Nevada, where roads are few. The remaining 25 percent of foothill yellow-legged frog habitat lies on state lands, other federal lands (e.g., Bureau of Land Management [BLM], Bureau of Reclamation [BOR]), or tribal lands.

Historic vegetation management and fuels reduction projects have likely contributed to past and present cumulative affects, especially if projects occurred adjacent to FYLF aquatic habitats. Ground disturbing activities including timber harvest and fuels treatment projects (burning and mastication projects) potentially caused direct mortality to this species which may have affected the abundance of the species on the Tahoe NF. In general, current vegetation and fuels projects are designed to reduce potential impact on FYLF habitats, and therefore, minimize disturbance to the species. However, as FYLF migrate between breeding sites, and between breeding sites and overwintering sites, there is some potential for direct impacts from being crushed or burned from vegetation and fuels projects. In general the magnitude of this happening across the range of the FYLF frog habitats on the Tahoe NF should be limited given the timing of FYLF migration which is in the spring.

Hydroelectric projects have likely contributed to the decline of FYLF across its range in the Sierra Nevada and on the Tahoe NF. FYLF egg masses are unable to service regulated pulsed flow events.

Under Alternative 1, HUC7 watersheds occupied by FYLF would have the highest RCA route densities and the highest route crossing densities as a result of continued cross country travel, including on routes unauthorized to motorized public use within Riparian Conservation Areas. Direct and indirect impacts of these motorized routes in Alternative 1 would pose considerable cumulative impacts to known FYLF sites where approximately 40% of HUC7 watersheds with FYLF observations have high to moderately high RCA route densities that may contribute to habitat degradation from off-site sedimentation. In addition, under Alternative 1, 56% of HUC7 watersheds with known FYLF detections are within the highest or moderately high route density categories which have the potential to degrade stream condition by altering streambank vegetation and stream hydrology. Under Alternative 1, motorized route proliferation would likely continue and increase at an accelerated rate in the future, potentially

increasing sediment delivery and alteration of streambank vegetation and hydrologic condition which may affect the abundance and distribution on the Tahoe NF. Declining population trends of this species could be affected by Alternative 1.

Alternative 5 also adds to existing cumulative impacts to the FYLF, though impacts are considerably less than Alternative 1 as a result of the closure of a significant number of miles of motorized routes within RCAs and reduction in the number of route crossings. Under Alternative 5, RCA route densities and route crossing densities are the second highest after Alternative 1, where 32% of the HUC7 watersheds with are within the highest and moderately high RCA route density categories; and 44% of HUC7 watersheds are within the highest to moderately high RCA route density categories. Site-specific impacts from proposed route additions in Alternative 5, directly or indirectly affects FYLF within 20 HUC7 watersheds where proposed route additions have the potential to contribute to FYLF habitat degradation.

Alternatives 2 and 6 are similar in their cumulative impacts to FYLF where known FYLF sites may be directly or indirectly affected within 15-17% FYLF HUC7 watersheds by proposed motorized route additions. The remaining action alternatives are similar in their cumulative effects to the FYLF where a slight potential for cumulative impacts from direct and indirect impacts to known FYLF sites have the potential to occur within 0% (Alt 3) to 5% (Alt 7) of FYLF HUC7 watersheds (n=41). FYLF sites are similarly affected by Alternatives 2 and 6, where 7 (17%) and 6 (15%) FYLF HUC7 watersheds are affected by motorized route additions, respectively. Alternatives 2, 4, and 7 affect the least number of FYLF sites within 0 (0%), 1(2%), and 2 (5%) HUC7 watersheds respectively, where FYLF would most benefit from the prohibition of cross country travel, including on routes unauthorized to motorized use. For all the action alternatives, future unmanaged cross country motorized travel would be prohibited, including on the majority of routes unauthorized to motorized use, which would benefit FYLF in the long-term once these routes are rehabilitated through obliteration or other means.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-123 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail crossings within FYLF HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table 3.03-123. Foothill Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Motorized Stream Crossings	411	411	411	411	411	411	411
Native Surfaced, Motorized Trail Crossing Additions	228	88	0	7	131	33	3
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	1	0	0	1	1	0
Motorized Stream Crossings unauthorized to motorized use Cross Country Travel is Prohibited	0	139	228	221	96	194	225
Net Native Surfaced, Motorized Crossings	**639**	**500**	**411**	**418**	**543**	**445**	**414**
Acres of RCA Cross Country Travel	**Continues on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 34,092 RCA acres, including on 228 native surfaced, stream crossings unauthorized for motorized use. Continued use on 639 motorized crossings (411 NFTS, 228 unauthorized). No additional protection to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 139 native surfaced, stream crossings. 500 NFTS native surfaced, crossings available for motorized use. No additional protection to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 228 native surfaced, stream crossings 411 NFTS native surfaced, crossings available for motorized use. No additional protection to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 221 native surfaced, stream crossings 418 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 96 native surfaced, stream crossings 543 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 194 native surfaced, stream crossings 445 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 225 native surfaced, stream crossings 414 NFTS motorized crossings available for motorized use. No additional protection to FYLF habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, crossings unauthorized to motorized use, while all the action alternatives include motorized route additions.

Table 3.03-124 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail miles within FYLF HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table 3.03-124. Foothill Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	122.3	122.3	122.3	122.3	122.3	122.3	122.3
RCA Miles of Native Surfaced, Motorized Trail Additions*	68.4	16.3	0	2.2	29.4	10.1	1.3
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	52.1	68.4	66.2	39.0	58.0	67.1
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	0.1	0	0	0.1	0.1	0
Net NFTS Native Surfaced, Motorized RCA Miles	**190.7**	**138.7**	**122.3**	**124.5**	**151.8**	**132.5**	**123.6**
Acres of RCA Cross Country Travel	**Continues on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 34,092 RCA acres, including on 68.4 RCA miles of routes unauthorized to motorized use. Motorized use continues on 190.7 RCA miles (122 miles NFTS, 68 miles unauthorized).	Motorized cross country travel prohibited on 34,092 RCA acres, including on 52.1 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 138.7 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 68.4 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 122.3 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 66.2 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 124.5 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 39.0 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 151.8 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 58.0 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 132.5 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 67.1 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 123.6 RCA miles.

*Alternative 1 includes existing native surfaced, routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

Mountain Yellow-Legged Frog: Affected Environment

The mountain yellow-legged frog (MYLF) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). Mountain yellow-legged frogs occur in the Sierra Nevada from 4,500 feet to over 12,000 feet elevation (Jennings and Hayes 1994). Previously the mountain yellow-legged frog in the Sierra Nevada was considered to be one species; *Rana muscosa*. Recent genetic studies indicate mountain yellow-legged frogs in the Sierra Nevada are comprised of two species: R. sierrae, with a distribution in the northern and central Sierra Nevada, and *R. muscosa*, with a distribution in the southern Sierra Nevada and southern California. The contact zone for these two newly recognized species is in the vicinity of Mather Pass and the Monarch Divide, Fresno County (Vredenburg et al. 2007).

Mountain yellow-legged frogs in the Sierra Nevada inhabit high mountain lakes, ponds, tarns, and streams, largely in areas that were glaciated (Zweifel 1955, In Lannoo 2005). Mountain yellow-legged frogs are seldom far from water, although they have been observed moving overland to disperse to other pond habitats. Typically, mountain yellow-legged frogs prefer well illuminated, sloping banks of meadow streams, riverbanks, isolated pools, and lake borders with vegetation that is continuous to the water's edge (Martin 1992, Zeiner et al. 1988). Vredenburg et al. (2004) found that *R. muscosa* (*sensu stricto*) tended to use stillwater habitats more frequently than R. sierrae, but it is unclear whether is difference is the result of stillwater habitat being more frequent within the formers geographic range or an actual phylogenetic difference in habitat selection behavior.

The Tahoe National Forest database has records for mountain yellow-legged frogs in 79 locations. Most of these observations were of individual frogs. Only 49 of these sightings are considered recent (Since 1980). Mountain yellow-legged frogs have been observed in both stream and pond habitats on the forest. The largest populations observed in recent surveys (1993-2002) were those containing 5 adults (Lyon Bog, Rattlesnake Creek, and Poorman Creek). The species appears to have disappeared from a significant number of historic locations within the Tahoe National Forest and is in very low abundance where it still persists.

Mountain Yellow-Legged Frog: Environmental Consequences

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect MYLF habitat. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to suitable MYLF habitat.

Change in Class of Vehicles: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02 Watershed Resources). If the route changes from smoothed surfaced to native surfaced (rough surfaced), the change in class of vehicle may result in increased sediment and erosion risk to MYLF habitat. The change in class of vehicle and associated maintenance downgrades is evaluated for their potential to affect selected 7th field watersheds that may have suitable habitat for the MYLF.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to MYLF 7th field watersheds from motorized cross country travel.

Motorized Route and Area Additions (MYLF 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized trail additions to the National Forest Transportation System, and the miles of motorized trail additions within Riparian Conservation Areas (RCAs) for MYLF 7th field watersheds

Site-specific Physical Impacts and Disturbance to known mountain yellow-legged frog locations: Proposed motorized route additions were evaluated to determine site-specific impacts to known mountain yellow-legged frog (MYLF) locations for each of the alternatives. Native surfaced routes that cross or intersect MYLF streams and ponds have the greatest potential to disturb MYLF, kill and crush MYLF egg masses and to alter stream banks and deliver sediment which can degrade MYLF habitat condition. In addition, proposed motorized route additions that are within RCAs or have the potential to delivery sediment to known MYLF locations were also evaluated by the alternatives.

Route Density within Riparian Conservation Areas (RCAs): route densities of native surfaced routes within RCAs were evaluated to compare the overall effects of all motorized routes (including existing routes and routes unauthorized to motorized public use) for the alternatives within each 7th field watershed occupied by mountain yellow-legged frog (MYLF). According to Chapter 3.02 (Soil and Watershed Resources), Level 2 roads and below have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes route density of all native surfaced motorized routes. Route density provides a relative index to measure the potential indirect effects to occupied habitat of MYLF from increased sedimentation from routes. Thresholds for route density have not been established, however, route density provides a relative way to compare the effects of the alternatives.

Stream Crossing Density within RCAs: The 7th field watersheds occupied by mountain yellow-legged frog were evaluated for the crossing density of native surfaced motorized routes within RCAs to compare direct and indirect effects of motorized routes for the project alternatives. Route crossing density provides a way to measure the potential direct and indirect effects to MYLF and habitat. Direct effects include potential MYLF mortality as a result of use of motorized crossings of occupied MYLF streams. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Thresholds for motorized crossing route density have not been established, however, route crossing density provides a relative way to compare the effects of the alternatives.

Direct and Indirect Effects

Wet Weather Seasonal Closures. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where MYLF potential habitat would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially motorized roads and trails that are within close proximity to or cross streams or other riparian aquatic habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather seasonal

restrictions on native surfaced motorized routes and therefore, the MYLF would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of native surfaced, motorized stream crossings and highest RCA motorized route densities that could potentially delivery sediment to MYLF habitat from motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-125 displays the effects of proposed changes in class of vehicles and the associated maintenance downgrades that have to potential to increase the risk of delivering sedimentation and erosion to MYLF HUC7 watersheds. Alternatives 2, 5, and 6 result in the downgrade of road maintenance levels resulting in changes from smooth surfaced roads to rough surfaced roads are likely to occur in the future with reduced maintenance. This change in road surface type has a higher potential to result in increased sedimentation to MYLF habitat affected by 17 native surfaced, crossings and 2.3 miles of motorized routes.

Table 3.03-125. Mountain Yellow-Legged Frog –as a Result of the Change in Class of Vehicles as Measured by Native Surfaced, Motorized Crossings and Motorized Route Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced Crossings where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	17	0	0	17	17	0
RCA Motorized Route Miles where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	2.3	0	0	2.3	2.3	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will continue on 22,717 Riparian Conservation Areas (RCAs) acres within MYLF HUC7 watersheds, where the potential for adversely affecting MYLF habitat could occur by increasing sedimentation and altering streamside vegetation. Under the action alternatives, the prohibition of cross country travel results in prohibiting motorized use on 22,717 RCA acres, including approximately 29 to 45 RCA miles and from 41 to 84 motorized crossings (Alt 5 prohibits the least, Alt 3 prohibits the most). Cross country travel prohibitions will likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit MYLF habitat.

Motorized Trail and Area Additions – Motorized Stream Crossings and Miles of Motorized Trail Additions

Number of Native Surfaced, Motorized Stream Crossing Additions within MYLF 7th Field Watersheds. The number of native surfaced, motorized stream crossings, proposed for addition to the NFTS, are assessed for the alternatives, and provides a useful way to compare potential changes in sediment delivery within MYLF HUC7 watersheds. Alternative 1 poses the greatest risk of increased sedimentation where 84 motorized stream crossings are associated with the continuance of cross country travel on existing motorized trails unauthorized to motorized use. In decreasing order, Alternatives 5, 2, 6, 4, and 7 result in the addition of 43 to 1 native surfaced, motorized trail crossings. Alternative 3does not add motorized trail crossings to the NFTS, and therefore sedimentation or streamside vegetation would not be affected within any MYLF HUC7 watershed.

Table 3.03-126. Mountain Yellow-legged Frog 7th Field Watersheds - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions to NFTS* (negative impact)	84	42	0	1	43	15	1
Motorized Stream Crossings that would be unauthorized to motorized use with the prohibition of cross country travel (positive impact)	0	42	84	83	41	69	83
Cross country travel	Continues on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

RCA Miles of Proposed Motorized Trail Additions within MYLF 7th Field Watersheds. The miles of proposed motorized trail additions to the National Forest Transportation System (NFTS) within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into MYLF habitats at the HUC7 level. Alternative 1 poses the greatest risk to increased sedimentation potential from 68.4 RCA miles of motorized trails un-authorized for motorized use that would remain due to not prohibiting cross country travel. Similar to stream crossing numbers, Alternatives 2, 4, 5, 6, and 7 propose to add between 0.6 and 16.4 RCA miles (Alts 4&7-adds the least, Alt 5-adds the most) of motorized trails to the NFTS. Alternative 3 does not add motorized trails to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any MYLF HUC7 watershed.

Table 3.03-127. Miles of Proposed Route Additions within MYLF HUC7 Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized trail additions within RCAs* (negative impact)	45.2	13.3	0	0.6	16.4	8.0	0.6
Miles of motorized routes within RCAs that would be prohibited to motorized public use with the prohibition of cross country travel (positive impact)	0	29.7	45.2	44.6	28.8	37.2	44.6

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

Site-specific Physical Impacts and Disturbance to Known Mountain Yellow-legged Frog Locations: On the Tahoe NF, MYLF has been documented from 25 7th field watersheds. Table 3.03-128 displays the MYLF 7th field watersheds (HUC7) where proposed motorized route additions are located and shows the relationship of proposed unauthorized routes with known MYLF locations. Potential site-specific adverse and beneficial impacts at the HUC7 scale are described.

Table 3.03-128. Direct and indirect impacts of proposed motorized route additions in relation to known mountain yellow-legged frog locations by 7th field watersheds

7th Field Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts	Beneficial Impacts
Alder Creek	No proposals	One MYFL site.	Proposed action alternatives prohibits cross country travel on 5 (All Action Alts) of 9 existing intermittent/perennial NFS crossings
Boca Reservoir	TKN-M1,TKN-J2, TKN-J3 (Alt 2,4,5,6,7) TKN-Q1, TKN-3n (Alt 2,5,6); H889-10, H889-30-10, H889-3-30-5, 0072-002, H894-5-1, N890-14-5 (Alt 5 2.7 mi)	MYLF sighting east of Boca ; TKN-M1 & TKN-Q1 in western part of HUC7; TKN-J2, TKN-J3, TKN-J3n east of Boca, but north and east of trib with sighting; TKN-M1, TKN-Q1, TKN-J2, TKN-J3, & TKN-J3n not likely to affect MYLF. Alt 5 routes proposed north of MYLF not likely to affect MYLF habitat	Proposed action alternatives prohibits cross country travel on 4 (Alts 2,5,6) to 7 (Alts 3,4,7) of 36 existing intermittent/perennial NFS crossings.
Canyon Creek-Sawmill Lake	YRS-003b (Alt 2,5,6)	MYLF site at bottom of HUC7, YRS-003b at top end of watershed , no connection and no impacts to frogs	Proposed action alternatives prohibits cross country travel on (Alt 4), to 1 (Alts 3,7) or add 1 (Alt 2,5,6) to 4 existing intermittent/perennial NFS crossings.
Fordyce Lake	SV-004 (Alt 2,5,6) YRS-AF (Alt 2,4,5,6,7)	Multiple MFYL sites. SV-004 not connected to sites, will not impact MYFL. YRS-AF is adjacent of MYFL site and has potential to impact MYFL.	Proposed action alternatives prohibits cross country travel on 2 (Alts 2,5) to 3 (Alts 3,4,6,7) of 25 existing intermittent/perennial NFS crossings
Headwaters North Fork American River	No proposals	None	Proposed action alternatives prohibits cross country travel on 0 of 13 existing intermittent/perennial NFS crossings.
Headwaters North Yuba River	No proposals	None	Closes 6 of 26 existing intermittent/perennial NFS crossings.
Headwaters South Yuba River	TKN-J4, TKN-J5	TKN-J4 & TKN-J5 in northern part of HUC7 above So. Yuba Rr, MYLF site in southern part of HUC7 on opposite side of So. Yuba Rr. on private land. Proposed routes are not connected.	Proposed action alternatives prohibits cross country travel on 1 (Alts 2,5,6,7) to 2 (Alts 3,4) of 22 existing intermittent/perennial NFS crossings.
Independence Creek	SV-P11	Two MFYL sites. SV-P11 in same H2shed, 1 ridge over, connection at bottom, route is in good condition, very little erosion and sediment off route, northern section has been ripped and decommissioned, south half very low use, Affects to MYLF habitat not expected.	Proposed action alternatives prohibits cross country travel on 3 (All Action Alts) of 19 existing intermittent/perennial NFS crossings.
Little Truckee River-Saddle Meadow	SV-P8 (Alt 2,5,6,7)	One MFYL site. SV-P8 is not connected to MYLF sites.	Proposed action alternatives prohibits cross country travel on 2 (Alts 3,4,7) or adds 1 (Alts 2,5,6) existing intermittent/perennial NFS crossings.
Lower Fordyce Creek	No proposals	One MYFL site. No effect	Proposed action alternatives prohibits cross country travel on 2 (Alts2,5) to 3 (Alts 3,4,6,7) of 25 existing intermittent/perennial NFS crossings.

7th Field Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts	Beneficial Impacts
Lower Sagehen Creek	No proposals	One MYLF site.	Proposed action alternatives close 1 (Alts 3,4,7) or add 2 (Alts 2,5,6) to 14 existing intermittent/perennial NFS crossings.
Lower Salmon Creek	YRN-004 (Alt 2,5,6)	MYLF site near lakes, YRN-004, not connected to MYLF site & therefore no impacts to MYLF	Proposed action alternatives prohibits cross country travel on 1 (All Action Alts) of 3 existing intermittent/perennial NFS crossings.
Middle Martis Creek	No proposals	No effect	Proposed action alternatives prohibits cross country travel on 0 of 35 existing intermittent/perennial NFS crossings.
Middle Truckee River-Lower Prosser Creek	TKN-M1	TKN-M1 not connected to MYLF site, not likely to affect MYLF.	Proposed action alternatives prohibits cross country travel on 3 (All Action Alts) of 9 existing intermittent/perennial NFS crossings.
North Creek	No proposals	2 MYLF sites not affected.	Proposed action alternatives prohibits cross country travel on 6 (All Action Alts) of 9 existing intermittent/perennial NFS crossings.
North Yuba River-Haskell Creek	No proposals.	Two MFYL sites not affected.	Proposed action alternatives prohibits cross country travel on 3 (Alt 6), to 7 (Alts 3,4,7) or add 7(Alts 2,5) to 17 existing intermittent/perennial NFS crossings.
North Yuba River-Howard Creek	H823-1-1, H54-9 (Alt 5 - 1.5 mi)	Two MFYL sites in upper watershed. H823-1-1 is the below MYFL sites, but may impact the MYLF as they move downstream. H54-9 in the sout part of the watershed is not connected to the sites and is not likely to impact MYFL..	Proposed action alternatives prohibits cross country travel on 7 (Alt 6), to 8 (Alts 3,4,7) or add 3 (Alt 2) to 4 (Alt 5) to 17 existing intermittent/perennial NFS crossings.
Perazzo Canyon	SV-005 (Alt 2, 5)	MYLF site downstream near tributary to Little Truckee Rv. MYLF not affected by SV-005 which connects to 2 NFTS roads.	Proposed action alternatives prohibits cross country travel on 0 (All Action Alts) of 14 existing intermittent/perennial NFS crossings.
Prosser Creek	N886-1-5 (Alt 5)	One MYLF site on Prosser Creek. N886-1-5 in Alt 5 is on the opposite side of Hwy 89 on private land not connected to Prosser Creek, and likely not affect MYLF site.	Proposed action alternatives prohibits cross country travel on 1 (Alts 2,5,6) to 2 (Alts 4,7) to 4 (Alt 3) of 16 existing intermittent/perennial NFS crossings.
Rattlesnake Creek	No proposals	Multiple MYLF sites not affected.	Proposed action alternatives prohibits cross country travel on 0 (Alts 2,5) to 2 (Alt 6) to 4 (Alts 3,4,7) of 9 existing intermittent/perennial NFS crossings.
South Yuba River-Lower Castle Creek	TKN-J4	TKN-J4 on watershed boundary south of MYLF site with no connection and no impacts. Route is ~1 mile from MYLF site.	Proposed action alternatives prohibits cross country travel on 3 (All Action Alts) of 8 existing intermittent/perennial NFS crossings.
Squaw Creek	No proposals	No effects	Proposed action alternatives prohibits cross country travel on 0 of 20 existing intermittent/perennial NFS crossings.

7th Field Watershed Name	Route ID/ Description for Action Alternatives	Direct and Indirect Impacts	Beneficial Impacts
Upper Cold Stream	SVP-7e (alt 2,4,5,6,7)	SVP-7e in headwaters no connection with MYLF along main channel and highway, no impacts expected.	Proposed action alternatives prohibits cross country travel on 8 (Alts 3,4,7) or add 2 (Alts 2,5,6) of 8 existing intermittent/perennial NFS crossings.
Upper Five Lakes	No proposals	No effects	Proposed action alternatives prohibits cross country travel on 1 of 10 existing intermittent/perennial NFS crossings.
Upper Sagehen Creek	TKN-001 (Alt 2,5)	Multiple MFYL sites. TKN-001 (decommissioned rd) on trib east of MYLF site, no connection & no potential effects from TKN-001.	Proposed action alternatives prohibits cross country travel on 0 (Alts 2,5,6) to 3 (Alts 3,4,7) of 8 existing intermittent/perennial NFS crossings.

Alternative 1 poses the greatest risk to MYLF habitat on the Tahoe NF from continued cross country travel, including on numerous routes unauthorized to motorized public use, within 24 of 25 (96%) MYLF HUC7 watersheds. Table 3.03-129 identifies specific MYLF HUC7 watersheds and indicates which of the alternatives have the potential to adversely impact MYLF sites either directly or indirectly. Alternative 5 poses the next greatest risk to MYLF compared to Alternative 1. Alternative 5 affects known MYLF sites within 5 of 25 (20%) HUC7 watersheds with documented MYLF observations. Alternatives 2, 4, 6, and 7 affects MYLF habitat within 1 of 25 (8%) HUC7 watersheds from a short route (0.3 mi). The potential for off-site sedimentation from this short route segment is expected to be relatively low. Beneficial effects to MYLF from the prohibition of cross country travel is displayed in Table 3.03-101 and also in the motorized route density and crossing density sections which follow.

Table 3.03-129. Mountain Yellow-legged Frog 7th Field Watersheds where Motorized Routes Additions May Impact MYLF (X denotes potential impact from proposed route) for each of the Alternatives (Total MYLF HUC7s = 25)

Watershed Name	Route ID/Description for Action Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Alder Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only – 2.6 miles)	X						
Boca Reservoir	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Canyon Creek-Sawmill Lake	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Fordyce Lake	YRS-AF (Alt 2, 4, 5, 6, 7), Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X	X		X	X	X	X
Headwaters North Fork American River	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Headwaters North Yuba River	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Headwaters South Yuba River	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Independence Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Little Truckee River-Saddle Meadow	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Lower Fordyce Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Lower Sagehen Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Lower Salmon Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Middle Martis Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Middle Truckee River-Lower Prosser Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
North Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
Perazzo Canyon	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Prosser Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		

Watershed Name	Route ID/Description for Action Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
North Yuba River-Haskell Creek	H823-1-1 (Alt 5); Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
North Yuba River-Howard Creek	H823-1-1 (Alt 5); Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X				X		
Rattlesnake Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Squaw Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
South Yuba River-Lower Castle Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Upper Cold Stream	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Upper Five Lakes	No proposals and no routes within RCAs							
Upper Sagehen Creek	Cross country travel continues, including on existing routes unauthorized to motorized use (Alt 1 only)	X						
Total Number HUC7s with Potential Adverse Impacts to MYLF (Percent) (n=25)		**24**	**1**	**0**	**1**	**5**	**1**	**1**
Percent of HUC7s		**96%**	**4%**	**0%**	**4%**	**20%**	**4%**	**4%**

Route Density within Riparian Conservation Areas (RCAs): Route density within Riparian Conservation Areas (RCAs) for all native surfaced motorized routes within 7th field watersheds with known observations of mountain yellow-legged frogs was determined for the proposed alternatives. Alternative 1 poses the greatest risk of high route densities within Riparian Conservation Areas (RCAs) (Table 3.03-130, Figure 3.03-9). Under Alternative 1, 64% of the HUC7 watersheds with MYLF detections fall under the highest (32%) and moderately high (32%) categories for motorized route density (native surfaced routes). The action alternatives have decreasing RCA route densities compared to Alternative 1, ranging between 48% (alternatives 2 and 5-) and 36% (alternatives 3, 4, and 7)) of MYLF HUC7 watersheds that fall within the highest route densities category to moderately high route density category.

Table 3.03-130. Number 7th Field Watersheds (HUC7s) with Mountain Yellow-legged Frog Sites by RCA Route Density Category or Number (Percent) of HUC7s by Route Density Category (n=25)

Alternatives	Highest (%)	Moderately High (%)	Moderately Low (%)	Lowest (%)
Alt 1	8 (32%)	8 (32%)	6 (24%)	3 (12%)
Alt 2	8 (32%)	4 (16%)	7 (28%)	6 (24%)
Alt 3	6 (24%)	4 (16%)	7 (28%)	8 (32%)
Alt 4	6 (24%)	4 (16%)	7 (28%)	8 (32%)
Alt 5	8 (32%)	4 (16%)	7 (28%)	6 (24%)
Alt 6	6 (24%)	5 (20%)	7 (28%)	7 (28%)
Alt 7	6 (24%)	4 (16%)	7 (28%)	8 (32%)

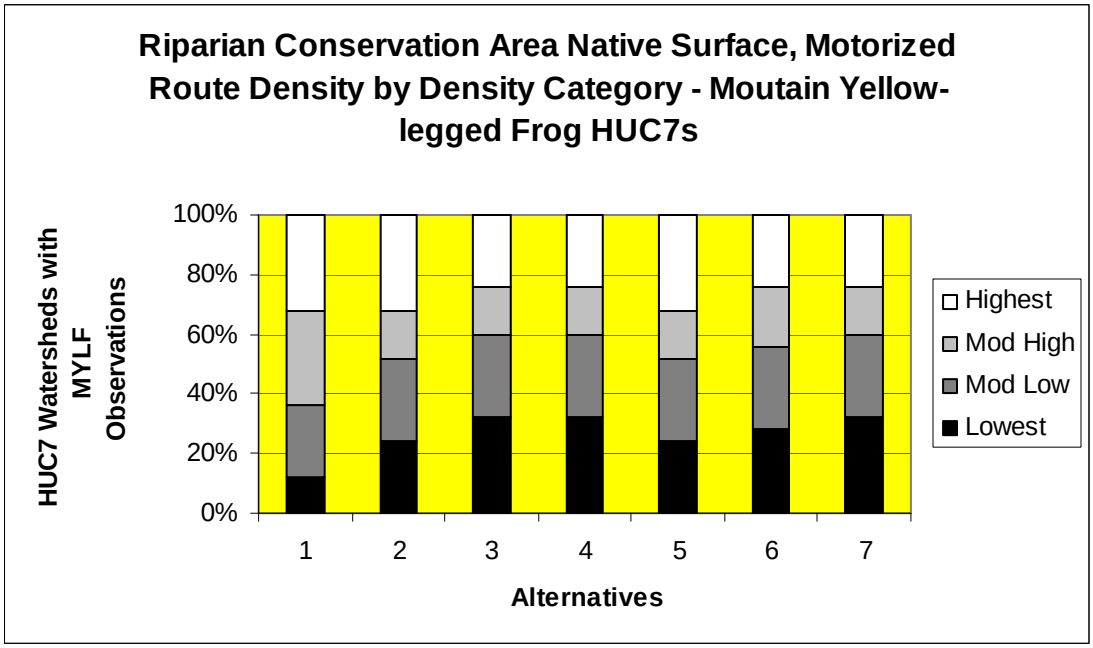

Figure 3.03-9. Number of 7th Field Watersheds within RCA Route Density Categories with Known Mountain Yellow-legged Frogs Locations

Stream Crossing Density within Riparian Conservation Areas (RCAs): RCA stream crossing density was assessed by route density categories of highest (10.4–20.4 crossings/sq. mile), moderately high (7.3-10.3 crossings/sq. mile), moderately low (4.2-7.6 crossings/sq. mi.), and lowest (0-4.1 crossing/sq. mi.) within 7th field watersheds (HUC7s) with known mountain yellow-legged frog observations (Table 3.03-131 and Figure 3.03-10). Alternative 1 poses the greatest direct impacts to mountain yellow-legged frogs (MYLF) from stream crossing densities where frogs may be disturbed and/or killed; and MYLF aquatic habitat conditions can be impacted from bank alteration and sediment input associated with motorized route crossings. Under Alternative 1, 40% of HUC7 watersheds with known MYLF detections are within the highest (24%) and moderately high (16%) route crossing density, and alternatively Alternative 1 has the least proportion of MYLF HUC7 watersheds with low crossing densities (20%). Alternatives 2 and 5 pose the next greatest risk to MYLF from stream crossings where 40% of MYLF HUC7 watersheds are within the highest (20%) and moderately high (20%) motorized crossing density categories. Alternative 6 has slightly lower route densities within both the highest and the moderately high crossing density categories compared to alternatives 1, 2, and 5.

Alternatives 3, 4, and 7 have the lowest route densities of all the alternatives, and similarly reduces the potential direct and indirect effects of unauthorized motorized routes where only 8 % of HUC7 watersheds with route crossing densities within the highest category and the most HUC7 watersheds (44%) in the lowest crossing density category. Within all the action alternatives, unmanaged cross country motorized travel would be prohibited, and over time as unauthorized routes are physically rehabilitated, MYLF and their habitat would benefit in the long term.

Table 3.03-131. Number (Percent) 7th Field Watersheds (HUC7s) with Mountain Yellow-legged Frog Sites by Native Surfaced, Motorized Crossing Density Category

Alternatives	Highest (%)	Moderately High (%)	Moderately Low (%)	Lowest (%)
Alt 1	6 (24%)	4 (16%)	10 (40%)	5 (20%)
Alt 2	5 (20%)	5 (20%)	7 (28%)	8 (32%)
Alt 3	2 (8%)	6 (24%)	6 (24%)	11 (44%)
Alt 4	2 (8%)	6 (24%)	6 (24%)	11 (44%)
Alt 5	5 (20%)	5 (20%)	7 (28%)	8 (32%)
Alt 6	4 (8%)	4 (8%)	9 (28%)	8 (32%)
Alt 7	2 (8%)	6 (24%)	6 (24%)	11 (44%)

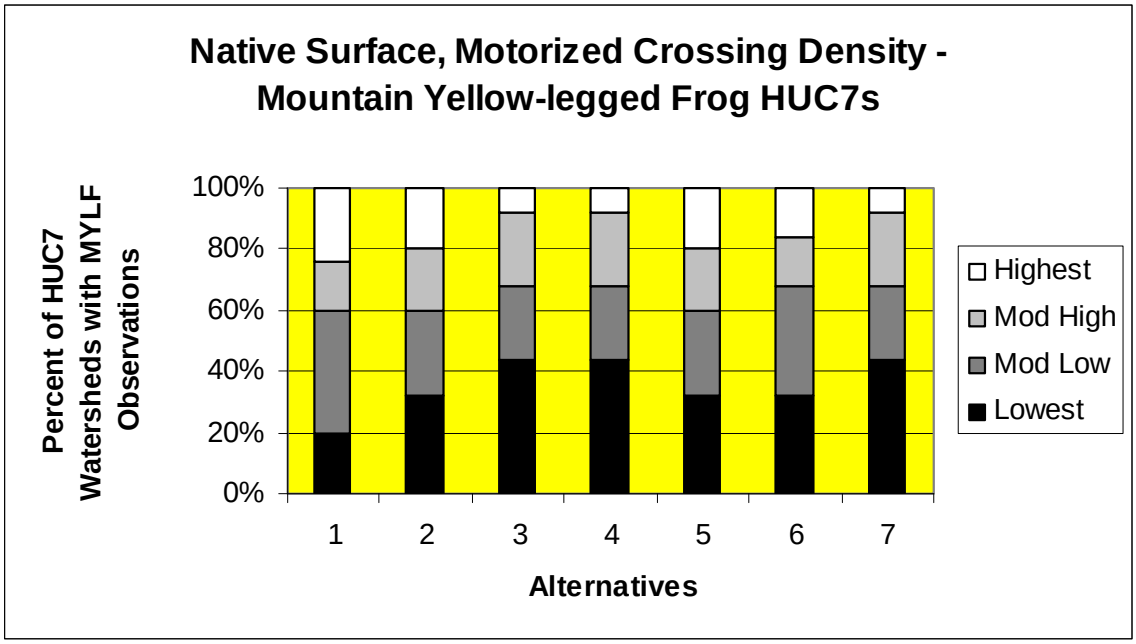

Figure 3.03-10. Number of 7th Field Watersheds by Native Surfaced, Motorized Crossing Density Category for Known Mountain Yellow-legged Frog Locations

Cumulative Effects

Cumulative Effects Boundary in Space and Time

The geographic boundary for assessing cumulative effects to the MYLF is suitable habitat on the Tahoe NF above 6,000 feet within high elevation ponds and slow moving portions of perennial and intermittent streams. This geographic boundary is sufficiently large to encompass historic and potential MYLF habitat on the Tahoe NF. Any larger boundary could dilute the effects of past, present, and future cumulative impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred within the last 50 to 100 years. Reasonably foreseeable future impacts expand out to approximately 25 years into the future.

Cumulative Effects of Past, Present, and Reasonably Foreseeable Actions

Historically the mountain yellow-legged frog was extremely abundant within high elevation aquatic ecosystems of the Sierra Nevada Mountains (Grinnell and Storer 1924, Zweifel 1955, In Lannoo 2005). Beginning around the 1970s, the mountain-yellow frog has undergone dramatic population declines throughout the Sierra Nevada (Knapp and Matthews 2000, ranging between 50-90% declines of their historic localities (USFWS 2004).

Many past and current cumulative impacts have contributed to the decline in mountain yellow-legged frog numbers and distribution. The decline of the MYLF has largely been attributed to the introduction of salmonid fishes during the last century (Bradford et al. 1993, Knapp 1996).

Other factors that have contributed to cumulative impacts to the species includes pesticides, ultraviolet radiation; bacterial, fungal, and viral pathogens; acidification from the atmospheric deposition; nitrate deposition; livestock grazing; recreational activities; and drought have all been identified as potential factors affecting the species and its habitat (USDA 2001).

Historic livestock grazing likely had a significant cumulative impact to this species and their habitat. Historic livestock grazing evidence indicates that heavy livestock use in the Sierra Nevada led to riparian habitat degradation across much of the Sierra Nevada. Livestock trampling has the potential to directly kill all life stages of MYLF. The greatest potential of mortality risk from livestock trampling is expected to occur when adult MYLF aggregate and lay egg masses in the early season, and during metamorphosis, when juveniles are metamorphosing along aquatic margins. Current standards and guidelines in the Sierra Nevada Forest Plan Amendment were implemented to reduce the risk of trampling by livestock (USDA 2004). Known MYLF habitat sites currently overlap with 5 active livestock grazing allotments (Canyon Creek, Devils Peak, Euer Valley, Independence, and Perazzo Meadows). Potential mountain yellow-legged frog habitat overlaps with an additional 29 allotments. Management direct including standards and guidelines for grazing should reduce potential grazing impacts from livestock grazing.

Introduced trout species within high mountain lakes has severely affected mountain yellow-legged frog population trends in the Sierra Nevada including the Tahoe NF. In recent years, the California Department of Fish and Game has actively addressing this issue to proactively manage for mountain yellow-legged frog restoration opportunities while still providing a recreational fisheries within high mountain lakes. Recent experimental efforts to remove introduced trout species from high mountain lakes has shown that MYLF will recover once introduced trout have been removed.

Historic vegetation management and fuels reduction projects have likely contributed to past and present cumulative affects, especially if projects occurred adjacent to MYLF aquatic habitats. Ground disturbing activities including timber harvest and fuels treatment projects (burning and mastication projects) potentially caused direct mortality to this species which may have affected the abundance of the species on the Tahoe NF. In general, current vegetation and fuels projects are designed to reduce potential impacts on MYLF habitats, and therefore, minimize disturbance to the species. However, as MYLF migrate between breeding sites, and between breeding sites and overwintering sites, there is some potential for direct impacts from being crushed or burned from vegetation and fuels projects. In general the magnitude of this happening across the range of the MYLF frog habitats on the Tahoe NF should be limited given the timing of MYLF migration which is in the spring, with the exception to spring

prescribed burning projects. In general, the adverse impacts of spring burning is expected to be low given the relatively low amount that occurs on the Forest within an average year.

Under Alternative 1, cumulative effects from unauthorized routes would be greatest within HUC7 watersheds occupied by MYLF would have the highest RCA route densities and the highest route crossing densities. In addition, 24 of 25 (96%) of MYLF HUC7 watersheds would have cross country travel and continued route proliferation. Direct and indirect impacts of unauthorized motorized routes in Alternative 1 would add considerable cumulative impacts to known MYLF sites where approximately 64% of HUC7 watersheds with MYLF observations have high to moderately high RCA route densities that may contribute to habitat degradation from off-site sedimentation. In addition, under Alternative 1, 64% of HUC7 watersheds with known MYLF detections are within the highest or moderately high route crossing density categories which have the potential to degrade stream condition by altering streambank vegetation and stream hydrology. Under Alternative 1, unauthorized route proliferation would likely continue and increase at an accelerated rate in the future, potentially increasing sediment delivery and alteration of streambank vegetation and hydrologic condition which may affect the abundance and distribution on the Tahoe NF. Already declining population trends of this species could be significantly affected by Alternative 1 in the long term.

Alternatives 2 and 5 also adds to existing cumulative impacts to the MYLF, though impacts are considerably less than Alternative 1 as a result of the closure of a significant number of miles of motorized routes within RCAs and reduction in the number of route crossings. Proposed historic routes site-specifically has the potential to directly and indirectly degrade habitat condition within known mountain yellow-legged frog sites within 28% of all MYLF HUC7s (n=25). At the 7th field watershed scale, under Alternatives 2 and 5, 40% of MYLF HUC7 watersheds have route crossing densities within the highest (20%) and moderately high (20%) motorized crossing density categories.

Alternative 2 cumulatively affects 3 of 25 (12%) MYLF HUC7 sites. Alternatives 4, 6, and 7 affect MYLF habitat within 2 of 25 (8%) HUC7 watersheds from short routes accessing dispersed recreation sites. The potential for off-site sedimentation from these short route segments is expected to be relatively low. All action alternatives have decreasing RCA route densities compared to Alternative 1, ranging between 48% (Alts 2 and 5- most) and 36% (Alt 3, 4, and 7– least) of MYLF HUC7 watersheds that fall within the highest route densities category to moderately high route density category.

For all the action alternatives, cross country motorized travel, including on routes unauthorized to motorized travel, would be prohibited. In addition, the majority these routes would benefit MYLF in the long-term once they are rehabilitated through obliteration or other means. Non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on routes that would be prohibited to cross country travel. In general, it is expected that impacts from non-motorized use would be less than motorized use. Over time, it is expected that these unauthorized motorized routes would become revegetated and recover through active or passive means, and ultimately benefit MYLF in the future.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-132 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail crossings within MYLF HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table 3.03-132. Mountain Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Motorized Stream Crossings	299	299	299	299	299	299	299
Native Surfaced, Motorized Trail Crossing Additions*	84	42	0	1	43	15	1
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	17	0	0	17	17	0
Cross Country Travel Prohibited on Motorized Stream Crossings unauthorized to motorized use	0	42	84	83	41	69	83
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
Net Native Surfaced, Motorized Crossings	383	358	299	300	359	331	300
Acres of RCA Cross Country Travel	Continues on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 22,717 RCA acres, including on 84 native surfaced, stream crossings. Motorized use continues on 383 native surfaced, crossings (299 NFTS and 84 unauthorized) No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 42 native surfaced, stream crossings. 358 NFTS crossings available for motorized use. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 84 native surfaced, stream crossings. 299 NFTS crossings available for motorized use. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 83 native surfaced, stream crossings. 300 NFTS crossings available for motorized use. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 41 native surfaced, stream crossings. 359 NFTS crossings available for motorized use. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 69 native surfaced, stream crossings. 331 NFTS crossings available for motorized use. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 10 native surfaced, stream crossings. 300 NFTS crossings available for motorized use. No additional protection to MYLF habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, crossings unauthorized to motorized use, while all the action alternatives include motorized route additions.

Table 3.03-133 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail miles within MYLF HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table 3.03-133. Mountain Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	146.2	146.2	146.2	146.2	146.2	146.2	146.2
RCA Miles of Native Surfaced, Motorized Trail Additions*	45.2	13.3	0	0.6	14.1	5.7	0.6
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	2.3	0	0	2.3	2.3	0

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	29.6	45.2	44.6	28.7	37.2	44.6
Net NFTS Native Surfaced, Motorized RCA Miles	191.4	161.8	146.2	146.9	162.7	154.2	146.8
Acres of RCA Cross Country Travel	Continues on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres	Prohibited on 22,717 RCA acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 22,717 RCA acres, including on 45.2 RCA miles of routes unauthorized to motorized use. Motorized use continues on 191.4 RCA miles (146 .2 mi. NFTS and 45.2 mi. unauthorized). No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 29.6 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 161.8 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 45.2 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 146.2 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 44.6 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 146.9 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 28.7 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 162.7 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 37.2 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 154.2 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 44.6 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 146.8 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

Northern Leopard Frog: Affected Environment

The northern leopard frog (*Rana pipiens*) (NLF) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). The NLF is widely distributed across North America from the Atlantic coast to the western edge of the Great Basin (Stebbins 1985). This species is uncommon and localized in California and many populations appear to be introduced (Morey 1988). Elevational range extends from sea level to 11,000 feet (Stebbins 1985). On the Tahoe National Forest the only drainage to potentially support endemic populations of this species is the Truckee River drainage. The Tahoe National Forest considers any northern leopard frogs to be found outside of the Truckee River drainage to be introduced and not to be included as a Region 5 Forest Service Sensitive Species unless designated through a conservation strategy.

No current records of northern leopard frogs exist from the Tahoe National Forest (Jennings and Hayes 1994, Panik and Barrett 1994, Jennings and Fuller 2004; Tahoe National Forest amphibian surveys 1993 to date). One historical record exists for northern leopard frogs in the proximity of the Tahoe National Forest in the areas of Antelope Valley near the town of Sierraville. Jennings and Fuller (2004) reported the collection of one adult frog (SSU 356) 1.6 km (1 mile) northeast of Sierraville by Robert Livezey and his herpetology class on 3 July 1958. Jennings and Fuller (2004) considered this single record as an introduction. The historic Antelope Valley location on private lands has not been resurveyed to date.

Risk factors to northern leopard frog from roads and trails are similar to other frog species described above.

Northern Leopard Frog: Environmental Consequences

No direct, indirect, or cumulative effects to the NLF would occur from the project alternatives, since no known populations of the northern leopard frog are currently known to occur on the Tahoe NF.

Northwestern Pond Turtle: Affected Environment

The northwestern pond turtle (*Clemmys marmorata marmorata*) (NWPT) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). The northwestern pond turtle ranges approximately from the American River northward to the vicinity of Puget Sound with an elevational distribution from sea level to 6,000 feet (Stebbins 1972, In Lannoo 2005). Recent genetic studies support the traditional morphological subdivision of the western pond turtle into the northern subspecies, *Clemmys marmorata marmorata* (northwestern pond turtle), and the southern subspecies, *Clemmys marmorata pallida* (Gray 1995).

Habitat for the NWPT, historically, occurs in a variety of both permanent and intermittent aquatic habitats west of the Sierra-Cascade crest. This turtle is often restricted to areas near the banks or in quiet backwaters where the current is relatively slow and basking sites and refugia are available. Currently most populations exist in smaller streams, usually in montane areas. These streams may be either permanent or intermittent, but permanent streams support larger populations. Western pond turtles occur in a variety of water courses directly or indirectly modified by man, such as reservoirs, canals, excavated farm ponds,

and mill ponds. This species is considered omnivorous. Aquatic plant material, beetles and aquatic invertebrates have been reported among their food (Stebbins 1972 and Nussbaum et al. 1983, In Lannoo 2005). Northwestern pond turtles have been observed at less than 20 locations within the Tahoe NF. Five of these locations are on National Forest system land and the remaining are on private land or on Bureau of Land Management administered lands. All the Tahoe NF reported sightings are from the Yuba River drainage associated with pond habitat.

Risk factors to northwestern pond turtle from roads and trails are similar to frog species described above.

Northwestern Pond Turtle: Environmental Consequences

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect NWPT habitat. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to suitable NWPT habitat.

Change in Class of Vehicles: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02 Watershed Resources). If the route changes from smoothed surfaced to native surfaced (rough surfaced), the change in class of vehicle may result in increased sediment and erosion risk to NWPT habitat. The change in class of vehicle and associated maintenance downgrades is evaluated for their potential to affect selected 7th field watersheds that may have suitable habitat for the NWPT.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to NWPT 7th field watersheds from motorized cross country travel.

Motorized Route and Area Additions (NWPT 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized trail additions to the National Forest Transportation System, and the miles of motorized trail additions within Riparian Conservation Areas (RCAs) for NWPT 7th field watersheds

Site-specific Physical Impacts and Disturbance to known northwestern pond turtle locations: Unauthorized motorized routes were evaluated to determine site-specific impacts to known northwestern pond turtle locations for each of the alternatives. Native surfaced routes that cross or intersect ponds occupied by NWPT have the greatest potential to disturb, crush and kill the pond turtle, and to alter stream banks and deliver sediment which can degrade pond turtle habitat condition. In addition, any unauthorized motorized routes that are within RCAs or has the potential to delivery sediment to known NWPT locations were also evaluated for their potential to contribute to indirect effects by the alternatives.

RCA Motorized Route Density within Northwestern Pond Turtle 7th Field Watersheds: Route densities of native surfaced routes within RCAs were evaluated to compare the overall effects of all

motorized routes (including existing and unauthorized) for the alternatives within each 7th field watershed occupied by the northwestern pond turtle. According to Chapter 3.02 (Soil and Watershed Resources), native surfaced roads have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes route density of all native surfaced motorized routes. Route density provides a relative index to measure the potential indirect effects to occupied habitat of the NWPT from increased sedimentation from routes. Thresholds for route density have not been established, however, route density provides a relative way to compare the effects of the alternatives.

Stream Crossing Density within RCAs: The 7th field watersheds occupied by northwestern pond turtle were evaluated for the crossing density of native surfaced motorized routes within RCAs to compare direct and indirect effects of motorized routes for the project alternatives. Route crossing density provides a way to measure the potential direct and indirect effects to the northwestern pond turtle and habitat. Direct effects include potential pond turtle mortality as a result of use of motorized crossings of occupied pond turtle. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Thresholds for motorized crossing route density have not been established, however, route crossing density provides a relative way to compare the effects of the alternatives.

Direct and Indirect Effects

Wet Weather Seasonal Closures. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where NWPT potential habitat would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially motorized roads and trails that are within close proximity to or cross streams or other riparian aquatic habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather seasonal restrictions on native surfaced motorized routes and therefore, the NWPT would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of native surfaced, motorized stream crossings and highest RCA motorized route densities that could potentially delivery sediment to NWPT habitat from motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-134 displays the effects of proposed changes in class of vehicles and the associated maintenance downgrades that have to potential to increase the risk of delivering sedimentation and erosion to NWPT HUC7 watersheds. Alternatives 2, 5, and 6 result in changed road maintenance resulting in changes from smooth surfaced roads to rough surfaced roads are likely to occur in the future with reduced maintenance. This change in road surface type has a higher potential to result in increased sedimentation to NWPT habitat 0.1 mile of motorized routes.

Table 3.03-134. Northwestern Pond Turtle – Change in Class of Vehicles as Measured by changes Native Surfaced, Motorized Crossings and Motorized Route Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced Crossings where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	0	0	0	0	0	0
RCA Motorized Route Miles where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	0.1	0	0	0.1	0.1	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will continue on 7,986 Riparian Conservation Areas (RCAs) acres within NWPT HUC7 watersheds, where the potential for adversely affecting NWPT habitat could occur by increasing sedimentation and altering streamside vegetation (Table 3.03-135). Under the action alternatives, the prohibition of cross country travel results in prohibiting motorized use on 7,986 RCA acres, including 8.7 to 16.3 RCA miles and from 20 to 44 native surfaced, motorized crossings (Alt 5 prohibits the least, Alt 3 prohibits the most). Cross country travel prohibitions will likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit NWPT habitat.

Table 3.03-135. Cross Country Travel within NWPT 7th Field Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Native Surfaced Crossings	44 Cross Country Travel Continued	34 Cross Country Travel Prohibited	44 Cross Country Travel Prohibited	42 Cross Country Travel Prohibited	20 Cross Country Travel Prohibited	34 Cross Country Travel Prohibited	44 Cross Country Travel Prohibited
Native Surfaced RCA Miles	16.3 Cross Country Travel Continued	14.6 Cross Country Travel Prohibited	16.3 Cross Country Travel Prohibited	15.9 Cross Country Travel Prohibited	8.7 Cross Country Travel Prohibited	13.0 Cross Country Travel Prohibited	16.0 Cross Country Travel Prohibited
RCA Acres	Continues on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres

Motorized Trail and Area Additions – Motorized Stream Crossings and Miles of Motorized Trail Additions

Number of Native Surfaced, Motorized Stream Crossing Additions within NWPT 7th Field Watersheds. The number of native surfaced, motorized stream crossings, proposed for addition to the NFTS, are assessed for the alternatives, and provides a useful way to compare potential changes in sediment delivery within NWPT HUC7 watersheds. Alternative 1 poses the greatest risk of increased sedimentation where 44 native surfaced, stream crossings are associated with the continuance of cross country travel on existing trails unauthorized to motorized use (Table 3.03-136). In increasing order, Alternatives 4, 6, 2, and 5 result in the addition of 2 to 24 native surfaced, motorized trail crossings.

Alternatives 3 and 7do not result in additional native surfaced, motorized stream crossings within any NWPT HUC7 watersheds, and therefore sedimentation or streamside vegetation would not be affected.

Table 3.03-136. Northwestern Pond Turtle 7th Field Watersheds - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions to NFTS (negative impact)	44	10	0	2	24	10	0

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

RCA Miles of Proposed Motorized Trail Additions within NWPT 7th Field Watersheds. The miles of proposed motorized trail additions to the National Forest Transportation System (NFTS) within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into NWPT habitats at the HUC7 level. Alternative 1 poses the greatest risk to increased sedimentation potential from 16.3 RCA miles of motorized trails un-authorized for motorized use that would remain due to not prohibiting cross country travel (Table 3.03-137). Similar to stream crossing numbers, Alternatives 2, 4, 5, 6, and 7 propose to add between 0.3 and 7.5 RCA miles (Alts 4&7-adds the least, Alt 5-adds the most) of motorized trails to the NFTS. Alternative 3 does not add motorized trails to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any NWPT HUC7 watershed.

Table 3.03-137. Northwestern Pond Turtle - Miles of Proposed Route Additions within HUC7 Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized trail additions within RCAs* (negative impact)	16.3	1.6	0	0.4	7.5	3.2	0.3
Cross country travel	Continues on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

Site-specific Physical Impacts and Disturbance to known Northwestern Pond Turtle locations: Within the boundaries of the Tahoe NF, the northwestern pond turtle is known from 5 locations on NFS lands and 13 locations on private and BLM administered lands. These pond turtle locations are known from nine 7th field watersheds within the boundary of the Tahoe NF. Table 3.03-138 describes the relationship between project alternative route proposals and pond turtle locations.

Table 3.03-138. Description of motorized route additions for the action alternatives in relation to known northwestern pond turtle locations within 7th field watersheds

Watershed Name	Route ID/Description	Direct and Indirect Impacts
Bullards Bar Reservoir-Bridger Creek	None	None
Cherokee Creek	YRN-008 (Alt 2, 5, 6) Cal Ida Network – Alt 5 & 6 (0025-009, 0491-003, 25-9-3_p, 25-9_p, 35-3_p, 35-4-1_p, 39-9_p) H39-12 (Alt 5)	YRN-008 and Cal Ida Network not likely to impact turtle site, not connected
Lower Oregon Creek	**H49-16 (Alt 5)**	**Turtle site is proximal to route H49-16 and may be impacted**
Lower Middle Yuba River	H18N49Y (Alt 5)	H18N49Y does not affect turtle sites
Middle Yuba River-Indian Creek	None	None
South Yuba River-Pierce Meadow	YRS-F1 short segments (Alts 2, 4, 5, 6, & 7) H652-5-5 (Alt 5) Alt 1 short segments (2) unauthorized routes.	YRS-F1 – short route segments do not affect turtle habitat, not connected. **H652-5-5 connects to routes within North Fork of North Fork American River-Blue Canyon watershed, and may contribute impacts to turtles.** Alt 1 short segments not connected to turtle site.
Headwaters North Fork American River	**Alt 1 existing routes unauthorized to motorized use** **H652-5-5 (Alt 5)**	**Alt 1 routes unauthorized to motorized use may impact turtles at one part of watershed,** **Alt 5 route (H652-5-5) may potentially impact turtle site.**
North Fork of North Fork American River-Blue Canyon	Alt 1 existing routes unauthorized to motorized use	Existing routes unauthorized to motorized use may impact pond turtle site
Willow Creek	H293 (Alt 5)	Alt 5 routes are located below pond turtle site, won't be impacted by Alt 5.

Northwestern pond turtles occurring within three 7th field watersheds have the potential to be impacted by Alternative 5 proposed motorized route additions within Lower Oregon Creek, South Yuba River-Pierce Meadow, and Headwaters North Fork American River (Table 3.03-138). Existing routes unauthorized to motorized use under Alternative 1 affect the pond turtles within the Headwaters North Fork American River and North Fork of North Fork American River-Blue Canyon watersheds. The remaining action alternatives either do not propose motorized route additions or proposes routes that would not affect the pond turtle. Numerous private land motorized routes may contribute to direct and indirect impacts to the pond turtle.

RCA Motorized Route Density within Northwestern Pond Turtle 7th Field Watersheds: The northwestern pond turtle was identified to occur within nine 7th field watersheds on the Tahoe National Forest (Cherokee Creek, Willow Creek, Bullards Bar Reservoir-Bridger Creek, Lower Oregon Creek, Middle Yuba River-Indian Creek, Lower Middle Yuba River, Headwaters North Fork American River and North Fork of North Fork American River-Blue Canyon). For each of the alternatives, Table 3.03-139 and

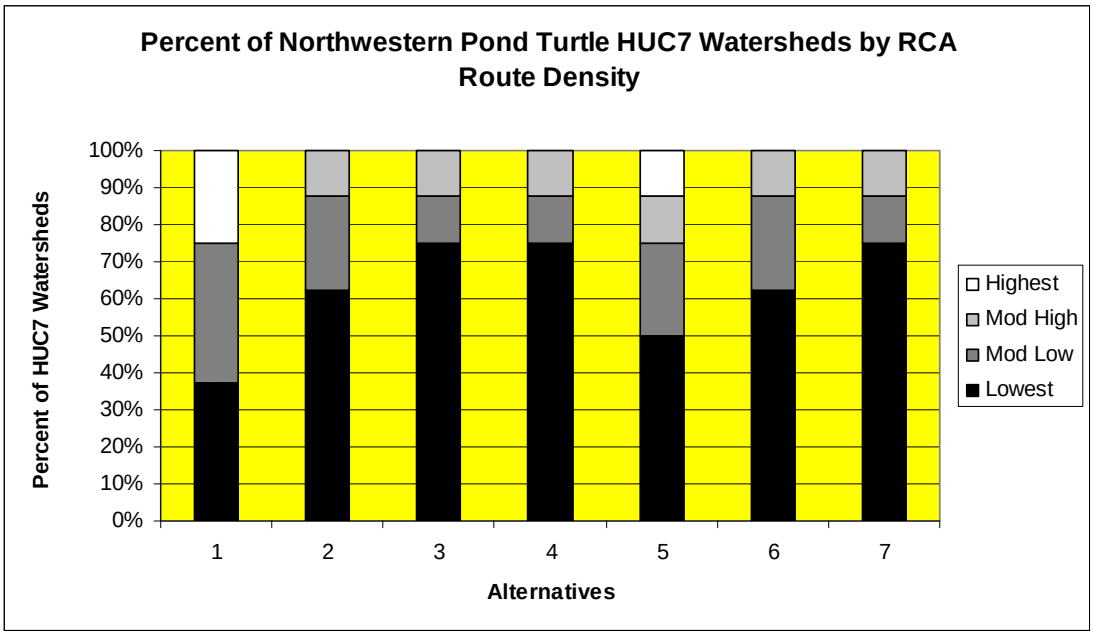

Figure 3.03-11. Number of Northwestern Pond Turtle 7th Field Watersheds by Motorized Native Surface RCA Route Density Category

Figure 3.03-11 displays the number and percent of 7th field watersheds (HUC7s) with known locations of NWPT locations by RCA route density category of highest (4.2-5.3.miles/square mile), moderately high (3.1-4.1 miles/square mile), moderately low (1.7-2.1 miles/square mile), and lowest (0-1.6 miles/square mile). Alternative 1 poses the greatest direct and indirect effects to the NWPT where 2 of 8 (25%) pond turtle HUC7 watersheds have route densities within the highest (2 of 8 HUC 7 or 25%) and moderately high (0 of 8 HUC7 or 0%) route density categories; and 76% of the pond turtle HUC7 watersheds fall within the moderately low (3 of 8 HUC7s or 38%) and lowest (3 0f 8 HUC7s or 38%). All the action alternatives reduce RCA route densities compared to Alternative 1. Under Alternative 5, 25% pond turtle HUC7 watersheds remains in the highest and moderately high route density categories, 25% (2 of 8) HUC7s within the moderately low, and 50% (4 of 8) HUC7s within the lowest RCA route density category. The remaining alternatives improves RCA route densities similarly where between 1 (13%) and 2 (25%) pond turtle HUC7 watersheds fall in the moderately low route density category, and 5-6 HUC7s (63-75%) fall within the lowest category.

Table 3.03-139. Number and Percent of 7th Field Watersheds (HUC7s) with Occupied Northwestern Pond Turtle Locations by Route Density Category

Alternatives	Highest (4.2 to 5.3 mi/mi^2)	Moderately High (3.1 to 4.1 mi/mi^2)	Moderately Low (1.7 to 2.1 mi/mi^2)	Lowest (0 to 1.6 mi/mi^2)
Alt 1	2 (25%)	0 (0%)	3 (38%)	3 (38%)
Alt 2	0 (0%)	1 (13%)	2 (25%)	5 (63%)
Alt 3	0 (0%)	1 (13%)	1 (13%)	6 (75%)
Alt 4	0 (0%)	1 (13%)	1 (13%)	6 (75%)
Alt 5	1 (13%)	1 (13%)	2 (25%)	4 (50%)
Alt 6	0 (0%)	1 (13%)	2 (25%)	5 (63%)
Alt 7	0 (0%)	1 (13%)	1 (13%)	6 (75%)

Motorized Route (native surface) Crossing Density within Northwestern Pond Turtle 7th Field Watersheds: For each of the project alternatives, RCA stream crossing density was assessed by crossing density categories of highest (12.8-15.0 crossings/sq. mile), moderately high (7.7-12.7 crossings/sq. mile), moderately low (4.4-7.6 crossings/sq. mi.), and lowest (0-4.3 crossing/sq. mi.) within 7th field watersheds (HUC7s) with known northwestern pond turtles occurrences. Table 3.03-140 and Figure 3.03-12 displays the number of HUC7 watersheds with known northwestern pond turtle observations by crossing density categories listed above. Alternative 1 poses the greatest direct impacts to northwestern pond turtle from stream crossing densities (crossings/square mile) where pond turtles may be disturbed and/or killed; and pond turtle aquatic habitat conditions can be impacted from bank alteration and sediment input associated with motorized route crossings. Under Alternative 1, 25% (2 of 8) HUC7 watersheds with known pond turtle occurrences are within the highest, 13% (1 of 8) in moderately high route crossing densities, and 25% (2 of 8) within moderately low, and 38% (3 of 8) within lowest categories. The remaining action alternatives reduce the number of stream crossings within Riparian Conservation Areas, and thus reduce the potential for direct and indirect impacts to the northwestern pond turtle. Alternative 5 reduces crossing densities the least where 2 of 8 (25%) HUC7 remains in the highest stream crossing density category, 1 of none (0%) is within the moderately high category, 2 of 8 (25%) is within moderately low, and 4 of 8 (50%) HUC7s are within the lowest category. Compared to Alternative 5, Alternative 6 moves 1 HUC7 from the highest stream crossing density category from the highest to the moderately high.

The remaining alternatives similarly reduce the potential direct and indirect effects by prohibiting cross country travel, including on routes unauthorized to motorized public use, where HUC7 crossing density categories are as follows: 13% HUC7s in the highest, no HUC7s in moderately high, 25-38% in moderately low, and 50-63% in lowest. Within all the action alternatives, unmanaged cross country motorized travel would be prohibited, and over time as routes unauthorized to motorized public use are physically revegetated and rehabilitated, the northwestern pond turtle and their habitat would benefit in the long term.

Table 3.03-140. Number of 7th Field Watersheds (HUC7s) with Occupied Northwestern Pond Turtle Locations by Stream Crossing Density Category of Native Surfaced Routes

Alternatives	Highest (12.8 to 15.0 crossings/mi^2)	Moderately High (7.7 to 12.7 crossings/mi^2)	Moderately Low (4.4 to 7.6 crossings/mi^2)	Lowest (0 to 4.3 crossings/mi^2)
Alt 1	2 (25%)	1 (13%)	2 (25%)	3 (38%)
Alt 2	1 (13%)	0 (0%)	3 (38%)	4 (50%)
Alt 3	1 (13%)	0 (0%)	2 (25%)	5 (63%)
Alt 4	1 (13%)	0 (0%)	2 (25%)	5 (63%)
Alt 5	2 (25%)	0 (0%)	2 (25%)	4 (50%)
Alt 6	1 (13%)	1 (13%)	2 (25%)	4 (50%)
Alt 7	1 (13%)	0 (0%)	2 (25%)	5 (63%)

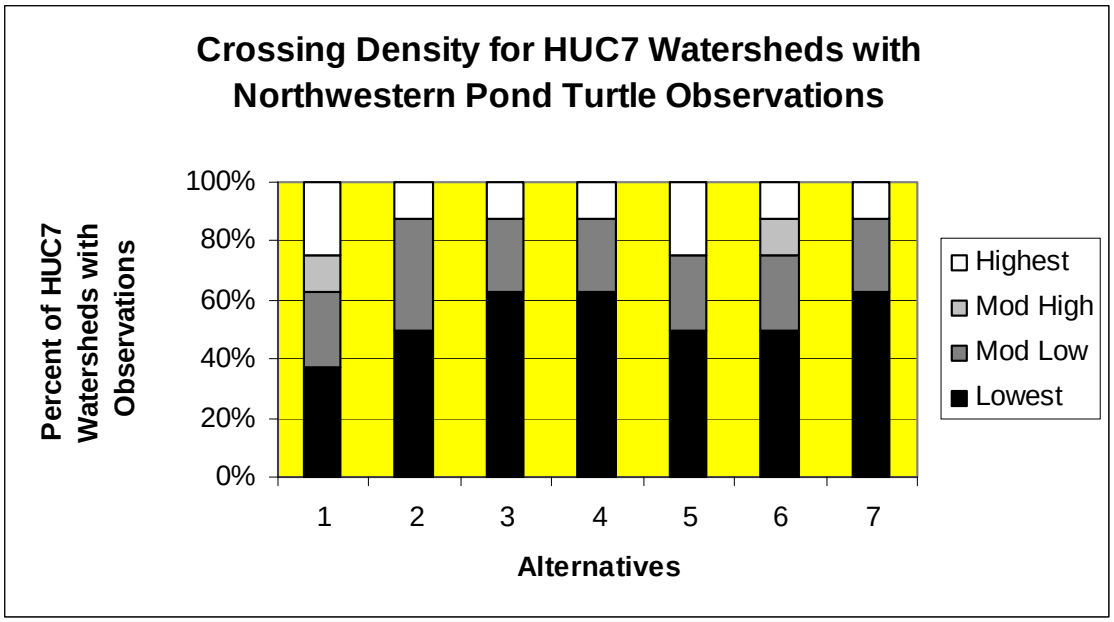

Figure 3.03-12. Northwestern Pond Turtle 7th Field Watersheds by Motorized Crossing

Cumulative Effects

The geographic boundary for assessing cumulative effects to the northwestern pond turtle is the westside of the Tahoe NF below 6,000 feet within lacustrine habitat (ponds and lakes), since this is within habitat that is considered suitable on the Tahoe NF. This geographic boundary is sufficiently large to encompass historic and potential pond turtle habitat on the Tahoe NF. Any larger boundary could dilute the effects of past, present, and future cumulative impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred within approximately the last 20 years. Reasonably foreseeable future impacts expand out to approximately 20 years into the future.

Current pond turtle habitat impacts from existing motorized routes has been documented at the Pierce wetland area within the South Yuba - Pierce 7th Field watershed on the Yuba River Ranger District where vehicles have altered and degraded pond turtle riparian vegetation, soils, and hydrology. This particular

pond turtle location could be at risk from crushing and mortality and habitat degradation from continued motorized vehicle use off of routes.

Grazing has the potential to add to cumulative effects to the northwestern pond turtle. Known pond turtle locations occur within one active grazing allotment - Willow Creek. The recently closed Our House Allotment also has pond turtle occurrences where grazing impacts would no longer occur in the future. An additional 10 allotments has potential pond turtle habitat and could receive cumulative impacts from livestock grazing were turtles to be found there.

Alternative 1 adds the greatest cumulative impacts to current existing cumulative impacts where HUC7 watersheds where pond turtles are located have the greatest route densities and stream crossing densities compared to all the action alternatives. Beneficial impacts to pond turtle habitat would occur least within Alternative 5 and greatest within all the remaining action alternatives similarly from the reduction in RCA route density and stream crossing density. Alternative 5 potentially adds cumulative impacts site-specifically within three7th field watersheds (Lower Oregon Creek, South Yuba River-Pierce Meadow, and Headwaters North Fork American River) where proposed route additions are within close proximity and may directly or indirectly affect pond turtle habitat.

Non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on routes that would be prohibited to motorized use. In general, it is expected that impacts from non-motorized use would be less than motorized use. Over time, it is expected that these the prohibition of cross country travel, including on motorized routes unauthorized to motorized public use would become revegetated and recover through active or passive means, and ultimately benefit the northwestern pond turtle in the future.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-141 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail crossings within NWPT HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table 3.03-141. Northwestern Pond Turtle 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Motorized Stream Crossings	77	77	77	77	77	77	77
Native Surfaced, Motorized Trail Crossing Additions	44	10	0	2	24	10	0
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	0	0	0	0	0	0
Cross Country Travel Prohibited on Motorized Stream Crossings unauthorized to motorized use	0	34	44	42	20	34	44
Net Native Surfaced, Motorized Crossings	121	87	77	79	101	87	77
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented.	Wet Weather Restrictions would be implemented.	Wet Weather Restrictions would be implemented.	None

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres of RCA Cross Country Travel	Continues on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 7,986 RCA acres, including on 44 native surfaced, stream crossings. Motorized use continues on 121 native surfaced, crossings (77 NFTS and 44 unauthorized) No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 34 native surfaced, stream crossings. 87 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 44 native surfaced, stream crossings 77 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 42 native surfaced, stream crossings 79 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 20 native surfaced, stream crossings 101 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 34 native surfaced, stream crossings 87 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 44 native surfaced, stream crossings 77 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.

Table 3.03-142 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail miles within NWPT HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table 3.03-142. Northwestern Pond Turtle 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	22.3	22.3	22.3	22.3	22.3	22.3	22.3
RCA Miles of Native Surfaced, Motorized Trail Additions*	16.3	1.6	0	0.4	7.5	3.2	0.3

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	0.1	0	0	0.1	0.1	0
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	14.6	16.3	15.9	8.7	13.0	16.0
Net NFTS Native Surfaced, Motorized RCA Miles	38.6	24.0	22.3	22.7	29.9	25.6	22.6
Acres of RCA Cross Country Travel	Continues on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres	Prohibited on 7,986 RCA acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 7,986 RCA acres, including on 16.3 RCA miles of routes unauthorized to motorized use. Motorized use continues on 38.6 RCA miles (22.3 mi. NFTS and 16.3 mi. unauthorized). No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 14.6 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 24 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 16.3 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 22.3 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 15.9 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 22.7 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 8.7 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 29.9 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 13 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 25.6 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 16 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 22.6 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

Sensitive Aquatic Mollusks

This section will also address two Sensitive aquatic mollusk species currently designated as Sensitive by the Regional Forester, the Great Basin ramshorn snail and the California floater.

Great Basin Ramshorn Snail: Affected Environment

The Great Basin ramshorn snail (GBRS) is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). The Great Basin ramshorn snail occurs in a highly restrictive distribution but is locally abundant. Historically, the Great Basin ramshorn snail occurred within the lakes and larger, slow streams in and around the northern Great Basin. In California the snail was known to occur in six local drainages in which the species probably survives in four of these drainages.

The Great Basin ramshorn snail occurs in larger lakes and slow rivers including larger spring sources and spring-fed creeks. These snails characteristically burrow in soft mud and may be invisible even when abundant (Taylor 1981). The Great Basin ramshorn snail can occur with *Pisidium ultramontanum*, *Lanx klamathensis*, or several other endemic mollusks (Frest and Johannes 1993). It also occurs with *Juga acutifilosa* and *Fluminicola seminalis*. Habitat requirements include cold highly oxygenated water, muddy substrate, and slow stream flow. Springs are preferred, but the snail will use river margins. Soft sediments are preferred. Threats to snails have been attributed to water diversions and water pollution. Mitigations for fish species, such as adding spawning gravels, may harm this species by smothering soft mud habitats.

Historically, the GBRS has been observed in the Truckee River directly downstream of Lake Tahoe, on the Lake Tahoe Basin Management Unit. Currently, this snail has not been sighted or surveyed for on the Tahoe National Forest. Suitable habitat occurs within slow segments of the Truckee and Little Truckee Rivers and their tributaries.

Road and trail-associated risks to this species are similar to those described for fish and frogs described above and include habitat alteration, changes in water flow regime, changes in water quality and loss of hosts for development.

Great Basin Ramshorn Snail: Environmental Consequences

Analysis Measures

Wet Weather Seasonal Closures: Proposed wet weather seasonal restrictions on native surfaced roads and trails are analyzed for their potential to affect GBRS habitat. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to suitable GBRS habitat.

Change in Class of Vehicles: Changing the class of vehicle on a particular route potentially changes the impacts to soil and water resource due to changes in the road surface (i.e. from smooth surfaced to rough surfaced) (see Chapter 3.02, Soil and Watershed Resources). If the route changes from smoothed surfaced to native surfaced (rough surfaced), the change in class of vehicle may result in increased sediment and erosion risk to GBRS habitat. The change in class of vehicle and associated maintenance downgrades is evaluated for their potential to affect selected 7th field watersheds that may have suitable habitat for the GBRS.

Prohibition of Cross Country Travel: The prohibition of cross country travel is analyzed for the alternatives to estimate the potential benefits and reduction in effects to GBRS 7th field watersheds from motorized cross country travel.

Motorized Route and Area Additions (NWPT 7th field watersheds): Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized trail additions to the National Forest Transportation System, and the miles of motorized trail additions within Riparian Conservation Areas (RCAs) for GBRS 7th field watersheds

Route Density within Riparian Conservation Areas (RCAs): Route densities of native surfaced routes within RCAs were evaluated to compare the overall effects of all motorized routes (including existing and routes unauthorized to motorized public use) for the alternatives within each 7th field watershed that may impact potential habitat for GBRS. According to Chapter 3.02 (Soil and Watershed Resources), high clearance vehicle roads have the greatest potential for off-site sediment delivery into streams and lakes. Therefore, this effects analysis includes route density of all native surfaced motorized routes. Route density provides a relative index to measure the potential indirect effects to potential habitat of the GBRS from increased sedimentation from routes. Thresholds for route density have not been established, however, route density provides a relative way to compare the effects of the alternatives.

Stream Crossing Density within RCAs: The 7th field watersheds with potential ramshorn snail habitat were evaluated for the crossing density of native surfaced motorized routes within RCAs to compare direct and indirect effects of motorized routes for the project alternatives. Route crossing density provides a way to measure the potential indirect effects to sensitive aquatic invertebrate species habitat. Indirect effects to GBRS habitat include changes to channel and streambank characteristics and changes in vegetation structure. Thresholds for motorized crossing route density have not been established, however, route crossing density provides a relative way to compare the effects of the alternatives.

Direct and Indirect Effects

The Great Basin ramshorn snail has not been sighted or surveyed for on the Tahoe National Forest. Suitable habitat occurs within slow flowing segments of the Truckee and Little Truckee Rivers and associated tributaries. Direct effects to the species from the action alternatives are not likely since confirmation of the species presence has not been confirmed. The nearest known occurrence of the GBRS is within the Truckee River downstream of Lake Tahoe on the Lake Tahoe Basin Management Unit. The project alternatives will be evaluated for their potential indirect impacts to potential habitat for this species. Potential habitat for this species occurs within twelve 7th Field watersheds on the eastside of the Tahoe NF (Alder Creek, Prosser Creek, Prosser Creek Reservoir, Middle Truckee River-Lower Prosser Creek, Little Truckee River-Saddle Meadow, Lower Sagehen Creek, Lower Davies, Hoke Valley, Stampede Reservoir, Little Truckee River Canyon, Russel Valley, and Boca Reservoir).

Wet Weather Seasonal Closures. Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where GBRS potential habitat would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially motorized roads and trails that are within close proximity to or cross

streams or other riparian aquatic habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather seasonal restrictions on native surfaced motorized routes and therefore, the GBRS would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of native surfaced, motorized stream crossings and highest RCA motorized route densities that could potentially delivery sediment to GBRS habitat from motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicles. For each of the alternatives, Table 3.03-143 displays the effects of proposed changes in class of vehicles and the associated maintenance downgrades that have to potential to increase the risk of delivering sedimentation and erosion to GBRS HUC7 watersheds. Alternatives 2, 5, and 6 result in changed road maintenance resulting in changes from smooth surfaced roads to rough surfaced roads. This change in road surface type has a higher potential to result in increased sedimentation to GBRS habitat on 11 stream crossings and 1.3 miles of native surfaced, motorized routes.

Table 3.03-143. Great Basin Ramshorn Snail (12 HUC7s) –Change in Class of Vehicles as Measured by changes Native Surfaced, Motorized Crossings and Motorized Route Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Number of Native Surfaced Crossings where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	11	0	0	11	11	0
RCA Motorized Route Miles where changed maintenance standards result in smooth surfaced to native surfaced crossings	0	1.3	0	0	1.3	1.3	0

Prohibition of Cross Country Travel. Under Alternative 1, no action, motorized cross country travel will continue on 12,359 Riparian Conservation Areas (RCAs) acres within NWPT HUC7 watersheds, where the potential for adversely affecting NWPT habitat could occur by increasing sedimentation and altering streamside vegetation. Under the action alternatives, the prohibition of cross country travel results in prohibiting motorized use on 12,359 RCA acres, including 42.5 to 51.1 RCA miles and from 40 to 74 native surfaced, motorized crossings (Alt 5 prohibits the least, Alt 3 prohibits the most). Cross country travel prohibitions will likely reduce the potential for sedimentation and alteration of streamside vegetation, and therefore benefit GBRS habitat.

Table 3.03-144. Cross Country Travel within Twelve GBRS 7th Field Watersheds

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Native Surfaced Crossings	74 Cross Country Travel Continued	44 Cross Country Travel Prohibited	74 Cross Country Travel Prohibited	69 Cross Country Travel Prohibited	40 Cross Country Travel Prohibited	45 Cross Country Travel Prohibited	67 Cross Country Travel Prohibited
Native Surfaced RCA Miles	51.1 Cross Country Travel Continued	42.5 Cross Country Travel Prohibited	51.1 Cross Country Travel Prohibited	48.8 Cross Country Travel Prohibited	37.5 Cross Country Travel Prohibited	44.4 Cross Country Travel Prohibited	47.9 Cross Country Travel Prohibited
RCA Acres	Continues on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres

Motorized Trail and Area Additions – Motorized Stream Crossings and Miles of Motorized Trail Additions

Number of Native Surfaced, Motorized Stream Crossing Additions within GBRS 7th Field Watersheds. The number of native surfaced, motorized stream crossings, proposed for addition to the NFTS, are assessed for the alternatives, and provides a useful way to compare potential changes in sediment delivery within GBRS HUC7 watersheds. Alternative 1 poses the greatest risk of increased sedimentation where 74 native surfaced, stream crossings are associated with the continuance of cross country travel on existing trails unauthorized to motorized use (Table 3.03-145). In increasing order, Alternatives 4, 7, 6, 2, and 5 result in the addition of 5 to 26 native surfaced, motorized trail crossings. Alternative 3 does not result in additional native surfaced, motorized stream crossings within the twelve GBRS HUC7 watersheds, and therefore sedimentation or streamside vegetation would not be affected.

Table 3.03-145. Northwestern Pond Turtle 7th Field Watersheds - Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions to NFTS (negative impact)	74	22	0	5	26	21	7

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

RCA Miles of Proposed Motorized Trail Additions within GBRS 7th Field Watersheds. The miles of proposed motorized trail additions to the National Forest Transportation System (NFTS) within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into GBRS habitats at the HUC7 level. Alternative 1 poses the greatest risk to increased sedimentation potential from 51.1 RCA miles of motorized trails un-authorized for motorized use that would remain due to not prohibiting cross country travel (Table 3.03-146). Similar to stream crossing numbers, Alternatives 2, 4, 5, 6, and 7 propose to add between 2.3 and 12.8 RCA miles (Alts 4 adds the least, Alt 5 adds the most) of motorized trails to the NFTS. Alternative 3 does not add motorized trails to the NFTS, and therefore changes to sedimentation or streamside vegetation would not occur within any GBRS HUC7 watershed.

Table 3.03-146. Miles of Proposed Motorized Route Additions within twelve GBRS HUC7 Watersheds

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized trail additions within RCAs (negative impact)	51.1	7.9	0	2.3	12.8	7.0	3.1

*Alternative 1 includes motorized stream crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

Riparian Conservation Area Route Density: Potential habitat for the Great Basin ramshorn snail was identified to occur within twelve 7th field watersheds on the Tahoe National Forest on the east slope of the Sierran Nevada crest. For each of the alternatives, Table 3.03-147 and Figure 3.03-13 displays the number and percent of 7th field watersheds (HUC7s) with potential GBRS habitat by RCA route density

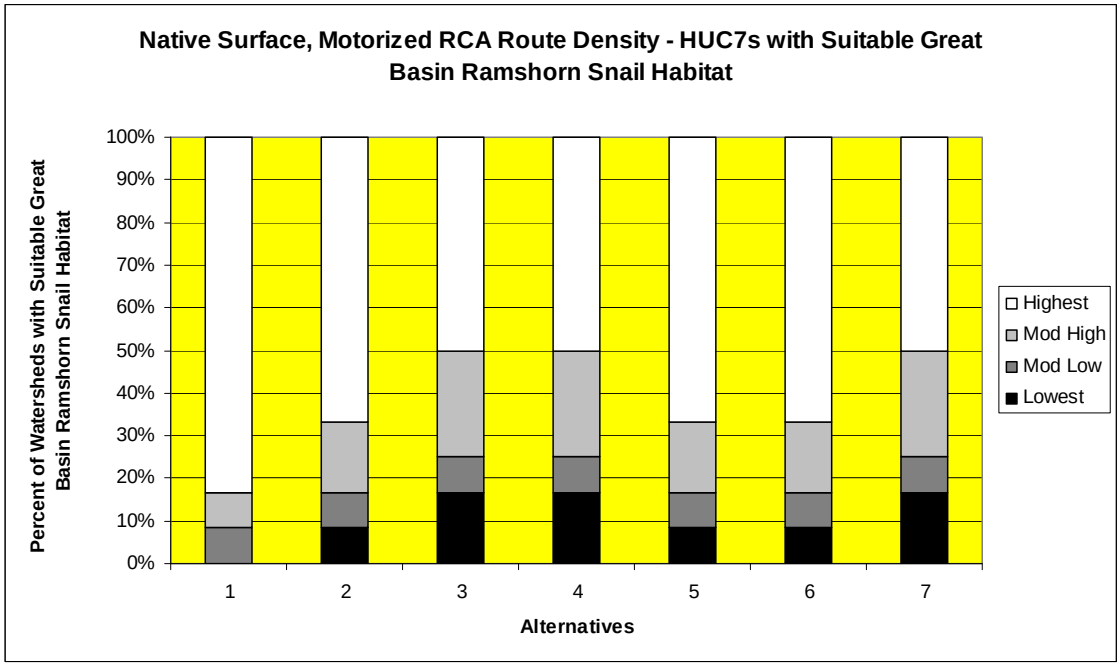

Figure 3.03-13. 7th Field Watersheds with Suitable Great Basin Ramshorn Snail Habitat by Native Surfaced, RCA Motorized Density

category of highest (3.6-8.6 miles/square mile), moderately high (2.6-3.5 miles/square mile), moderately low (1.8-2.7 miles/square mile), and lowest (0-1.8 miles/square mile). Alternative 1 poses the greatest potential for indirect effects of sediment delivery to potential GRBS habitat where 83% (10 of 12) HUC7 watersheds with suitable ramshorn snail habitat have route densities within the highest, 8% (1 of 12) are in the moderately high, 8% (1 0f 12) are in the moderately low, and 0% (0 of 15) are in the lowest route density category. All the action alternatives reduce RCA route densities within potential GBRS HUC7 watersheds compared to Alternative 1. Under alternatives 2, 5, and 6, 67% (8 of 12) of HUC 7 watersheds are in the highest, 17% (2 of 12) are in the moderately high, 8% (1 of 12) are in the moderately low, and 8% (1 of 12) are in the lowest route density category. Alternatives 3, 4, and 7 result in the lowest route densities within suitable GBRS HUC7s and reduce route densities within the highest route density category by 11-16% when compared to all the other alternatives. Alternatives 3, 4, and 7 are similar in their potential for indirect effects to ramshorn snail habitat and have the lowest route densities overall.

Table 3.03-147. Number and Percent of 7th Field Watersheds with Suitable Great Basin Ramshorn Snail Habitat by Route Density Category (n=15)

Alternatives	Highest (3.6 to 8.6 mi/mi^2)	Moderately High (2.6 to 3.5 mi/mi^2)	Moderately Low (1.8-2.7 mi/mi^2)	Lowest (0 to 1.8 7 mi/mi^2)
Alt 1	10 (83%)	1 (8%)	1 (8%)	0 (0%)
Alt 2	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 3	6 (50%)	3 (25%)	1 (8%)	2 (17%)
Alt 4	6 (50%)	3 (25%)	1 (8%)	2 (17%)
Alt 5	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 6	8 (67%)	2 (17%)	1 (8%)	1 (8%)
Alt 7	6 (50%)	3 (25%)	1 (8%)	2 (17%)

Stream Crossing Density: Twelve 7th field watersheds (HUC7s) identified as having suitable habitat for the Great Basin ramshorn snail were evaluated by alternative for the number and percentage of HUC7s that are within stream crossing density categories of highest (10.4-20.6 crossings/sq. mile), moderately high (7.4-10.3 crossings/sq. mile), moderately low (4.2-7.3 crossings/sq. mi.), and lowest (0-4.1 crossing/sq. mi.) (Table 3.03-148, Figure 3.03-14). Alternative 1 poses the greatest risk of indirect effects to Great Basin ramshorn snail habitat through potential sediment delivery from native surfaced, motorized routes. Under Alternative 1, 42% (5 of 12) HUC7 watersheds with suitable ramshorn snail habitat would have stream crossing densities within the highest route density category, 33% (4 of 12) within the moderately high category, 17% (2 of 12) in the moderately low category, and none within the lowest category. Alternative 5 has the most HUC7 watersheds within the highest stream crossing density category (7 of 12), but Alternative 1 has the most HUC7 watersheds when the highest and moderately high crossing density categories are combined.

The remaining alternatives further reduce the number of stream crossings within the highest route crossing density category. Alternatives 2 and 6 have the same number of HUC7 watersheds across all stream crossing density categories. Alternatives 3, 4, and 7 are similar in stream crossing densities within the highest and moderately high crossing density categories, and therefore have the most HUC7 watersheds within the moderately low and lowest crossing densities.

Table 3.03-148. Number and Percent of 7th Field Watersheds with Suitable Great Basin Ramshorn Snail Habitat by Stream Crossing Density Category (n=15)

Alternatives	Highest (10.4 to 20.6 crossings/mi^2)	Moderately High (7.4 to 10.3 crossings/mi^2)	Moderately Low (4.2-7.3 crossings/mi^2)	Lowest (0 to 4.1 crossings/mi^2)
Alt 1	5 (42%)	4 (33%)	2 (17%)	1 (8%)
Alt 2	5 (42%)	3 (25%)	3 (25%)	1 (8%)
Alt 3	2 (17%)	5 (42%)	4 (33%)	1 (8%)
Alt 4	2 (17%)	5 (42%)	4 (33%)	1 (8%)
Alt 5	7 (58%)	1 (8%)	3 (25%)	1 (8%)
Alt 6	5 (42%)	3 (25%)	3 (25%)	1 (8%)
Alt 7	2 (17%)	6 (50%)	3 (25%)	1 (8%)

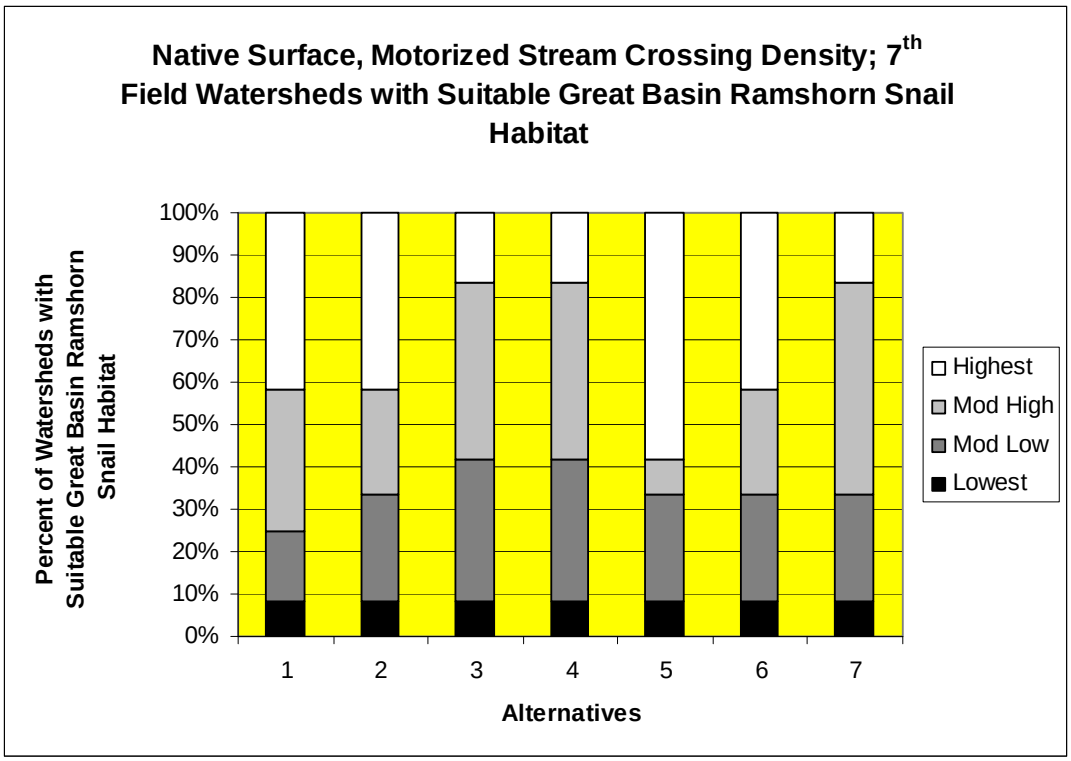

Figure 3.03-14. Native Surface, Motorized Stream Crossing Density 7th Field Watersheds with Suitable Great Basin Ramshorn Snail Habitat

Cumulative Effects

Cumulative Effects Boundary in Space and Time

The geographic boundary for assessing cumulative effects to the Great Basin ramshorn snail on the Tahoe NF within the fifteen watersheds that may potentially indirectly impact suitable habitat for the species. Suitable habitat for this species occurs within slow flowing segments of the Truckee and Little Truckee Rivers and associated tributaries on the eastside of the Forest. This cumulative effects boundary is sufficiently large to assess all past, present, and future cumulative effects to suitable habitat for the ramshorn snail. Any larger boundary could dilute the effects of past, present, and future cumulative impacts to this species. The timeframe for assessing cumulative impacts in the past includes activities that occurred within the last 50 to 100 years. Reasonably foreseeable future impacts expand out to approximately 25 years into the future.

Cumulative Effects of Past, Present, and Reasonably Foreseeable Actions

Historically, the Great Basin ramshorn snail has been observed in the Truckee River directly downstream of Lake Tahoe, on the Lake Tahoe Basin Management Unit. The current knowledge of the species distribution within the Great Basin is limited in scope. Potential past cumulative effects to this species includes habitat degradations from water diversions, reduced water quality, urbanization, livestock grazing, recreational activities, and others. Relatively little is known about the life history of this species

to adequately and effectively address cumulative effects to this species without a lot of speculation. Therefore, there is a great deal of uncertainty surrounding the past cumulative effects to this species from these activities.

Under Alternative 1, cumulative effects from routes unauthorized to motorized public travel would be greatest where HUC7 watersheds with potential ramshorn snail habitat would have the highest RCA route densities and the highest route crossing densities. The indirect impacts of potential sediment delivery from existing motorized routes unauthorized to motorized public use in Alternative 1 would add considerable cumulative impacts to potential ramshorn snail habitat where 83% (10 of 12) HUC7 watersheds route densities within the highest route density category. Alternative 1 would have the highest stream crossing densities compared to all the action alternatives. The remaining alternatives improve both route density within Riparian Conservation Areas and stream crossing densities with Alternative 5 reducing the least and alternatives 3, 4, and 7 reducing the most.

For all the action alternatives, future unmanaged cross country motorized travel would be prohibited. In addition, prohibition of cross country travel, including on the majority of exiting routes unauthorized to motorized public use, would likely benefit suitable ramshorn snail habitat in the long-term once these routes are rehabilitated through obliteration or other means. Non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on these routes that would be prohibited to motorized use. In general, it is expected that impacts from non-motorized use would be less than motorized use. Over time, it is expected that these routes would become revegetated and recover through active or passive means, and ultimately benefit habitat for the Great Basin ramshorn snail in the future.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table 3.03-149 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail crossings within Great Basin ramshorn snail HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table 3.03-149. Great Basin ramshorn snail 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Motorized Stream Crossings	207	207	207	207	207	207	207
Native Surfaced, Motorized Trail Crossing Additions*	74	22	0	5	26	21	7
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	8	0	0	8	8	0
Cross Country Travel Prohibited on Motorized Stream Crossings unauthorized to motorized use	0	44	74	69	40	45	67
Net Native Surfaced, Motorized Crossings	281	237	207	212	241	236	214
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
Acres of RCA Cross Country Travel	Continues on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 12,359 RCA acres, including on 74 native surfaced, stream crossings. Motorized use continues on 281 native surfaced, crossings (207 NFTS and 74 unauthorized) No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 44 native surfaced, stream crossings. 237 NFTS crossings available for motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 74 native surfaced, stream crossings. 207 NFTS crossings available for motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 69 native surfaced, stream crossings. 212 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 40 native surfaced, stream crossings. 241 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 45 native surfaced, stream crossings. 236 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 67 native surfaced, stream crossings. 214 NFTS crossings available for motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, crossings unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

Table 3.03-150 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail miles within GBRS HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table 3.03-150. Great Basin Ramshorn Snail 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	85.5	85.5	85.5	85.5	85.5	85.5	85.5
RCA Miles of Native Surfaced, Motorized Trail Additions*	51.1	7.9	0	2.3	12.8	7.0	3.1

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	0.7	0	0	0.7	0.7	0
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	42.5	51.1	48.8	37.5	44.4	47.9
Net NFTS Native Surfaced, Motorized RCA Miles	136.6	94.1	85.5	87.8	99.1	92.2	88.7
Acres of RCA Cross Country Travel	Continues on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres	Prohibited on 12,359 RCA acres
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	None	None	None	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	Wet Weather Restrictions would be implemented	None
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 12,359 RCA acres, including on 51.1 RCA miles of routes unauthorized to motorized use. Motorized use continues on 136.6 RCA miles (85.5 mi. NFTS and 51.1 mi. unauthorized). No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 42.5 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 94.1 RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 51.1 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 85.5RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 48.8 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 87.8RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 37.5 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 99.1RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 44.4 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 92.2RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 47.9 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 88.7 RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

California Floater: Affected Environment

The California floater (*Anodonta californiensis*) is listed as a Sensitive Species in Region 5 and designated as a "species of special concern" by the State of California. The California floater occurs in lakes and slow rivers (Taylor 1981), generally, on soft substrates (mud-sand), in fairly large streams and lakes, in relatively slow currents (Frest and Johannes 1995).

The current known distributions in California are the Lassen, Modoc, and Shasta-Trinity National Forests. This species still survives in Fall and Pit Rivers, Shasta Co. The California floater has been reported to occur adjacent to the Tahoe NF, but no occurrences have been documented on National Forest system lands within the boundary of the Tahoe NF. Donner Lake is reported as the locality of an unconfirmed historic sighting in a mollusk database created by Drs. Jayne Brim-Box and Jeff Kershner (pers. communication). The species has been reported to occur at the following sites in Nevada: 1)Truckee River, 2) Humboldt River, Humboldt Basin, Elko, Co. in 1979, 3) Thousand Springs Valley northeast of Wells, Elko Co., Lake Bonneville Basin in 1989 (Nevada Natural Heritage Database).

Howard and Cuffey (2003) found that the California floater was almost exclusively found in pools with no riffles and very few in runs in the south Fork of the Eel River in Oregon.

Road and trail-associated risks to the California floater are similar to those described for other aquatic species described above, and include changes in sedimentation delivery, habitat alteration, changes in water flow regime, changes in water quality and loss of hosts for development.

Direct, Indirect and Cumulative Effects

The California floater has not been confirmed to occur on the Tahoe NF, therefore the project alternatives would not directly or indirectly affect the California Floater. Historically, the California floater was reported from Donner Lake within private lands and near Lake Tahoe within the Truckee River. Potentially suitable habitat for the floater on the Tahoe NF includes the Truckee River and streams tributary to it. Direct, indirect and cumulative effects to potentially suitable habitat of the floater would be similar to those addressed for the Great Basin ramshorn snail. See Environmental Consequences in the previous section.

Compliance with Forest Plan and Other Direction

The Tahoe LRMP, as amended by the SNFPA 2004, provides management direction for riparian and aquatic dependent resources. The following management standards and guidelines apply to the Tahoe NF Travel Management Project for aquatic species and were considered for the analysis of the alternatives.

- *Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives (RCOs) at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species (Management Standard & Guideline 92).*

In the sections above, the alternatives for the Tahoe NF Motorized Travel Management Project were analyzed for consistency with the LRMP riparian conservation objectives (See RCO analysis).

Management design standards and mitigation measures were developed to minimize the risk of increasing sediment to aquatic systems and to minimize impacts to habitat for aquatic and riparian dependent species. All proposed action alternatives reduce or minimizes adverse effects to aquatic systems, particularly through the prohibition of cross country travel within close proximity or adjacent to aquatic ecosystems.

- *Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity (RCO#2, Management Standard & Guideline 100).*

Under the action alternatives, native surfaced, motorized trail and area additions and their associated stream crossings were evaluated for their hydrologic condition. Corrective actions and mitigation measures were developed when it was deemed necessary. See Appendix A (Road Cards), Soil and Watershed Section Chapter 3.03-2, and Appendix R (Riparian Conservation Objectives).

- *Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage for aquatic-dependent species. Locate water drafting sites to avoid adverse effects to in stream flows and depletion of pool habitat. Where possible, maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows, wetlands, and other special aquatic features (RCO#2, Management Standard & Guideline 101).*

Proposed stream crossings additions were inventoried and evaluated for their condition. Appropriate mitigation measures were developed (See Appendix A, Road Cards).

- *Prior to activities that could adversely affect streams, determine if relevant stream characteristics are within the range of natural variability. If characteristics are outside the range of natural variability, implement mitigation measures and short-term restoration actions needed to prevent further declines or cause an upward trend in conditions. Evaluate required long-term restoration actions and implement them according to their status among other restoration needs (RCO#2, Standard and Guideline 102).*

Proposed route and trail additions to the NFTS were inventoried and assessed for their condition. Conditions were described and mitigations measures were developed as appropriate.

- *Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, and day use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions (RCO#3, Management Standard and Guideline 116).*

For the Tahoe NF Travel Management Project, each proposed route addition was evaluated for their potential to degrade water quality or habitat for aquatic and riparian-dependent species. Proposed route additions were evaluated for their proximity to aquatic habitats and their potential to affect aquatic systems, including water quality, soil condition, hydrologic connectivity, and riparian vegetation.