TERRESTRIAL WILDLIFE BIOLOGICAL EVALUATION

Public Wheeled Motor Vehicle Travel Management Plan

Plumas National Forest

Plumas National Forest
Pacific Southwest Region
December 2008

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Introduction

Forest Service Manual (FSM) 2670.32 directs that a biological evaluation (BE) be prepared to determine the effects of proposed projects on Forest Service Region 5 designated “sensitive species”. The purpose of this document is to ensure that project decisions do not adversely affect species viability or create significant trends towards federal listing. This document will analyze the potential effects of the Plumas National Forest Motorized Travel Management project on terrestrial wildlife designated as sensitive in Region 5 of the Forest Service. A separate Biological Assessment has been prepared analyzing effects upon species that are listed as threatened or endangered under the Federal Endangered Species Act (California red-legged frog).

Region 5 Designated Sensitive Species

The Regional Forester's list of Sensitive Species for Region 5 (dated June 8, 1998), identifies the following sensitive species that may occur on the Plumas National Forest.

bald eagle (*Haliaeetus leucocephaus***)**
California spotted owl (*Strix occidentalis occidentalis***)**
northern goshawk (*Accipiter gentilis***)**
great gray owl (*Strix nebulosa***)**
willow flycatcher (*Empidonax traillii***)**
greater sandhill crane (*Gus Canadensis labida***)**
Swainson’s hawk (*Buteo swainsoni***)**
American marten (*Martes americana***)**
Pacific fisher (*Martes pennanti pacifica***)**
California wolverine (*Gulo gulo luscus*)
Sierra Nevada red fox (*Vulpes vulpes necator***)**

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 LRMP. Management decisions related to public wheeled 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 wheeled motorized public use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to public wheeled motorized travel on NFS lands must consider effects and wildlife and their habitat.

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

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

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

Forest Service Manual and Handbooks (FSM/H 2670) - Forest Service Sensitive (FSS) species are plant species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and ensure their continued viability on national forests. It is forest service policy to analyze impacts to sensitive species to ensure management activities do not create a significant trend toward federal listing or loss of viability.

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): See Water Resources section.
- 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 (Management Standard & Guideline 92): See Water Resources section.
- Bog and Fen Habitat (SNFPA ROD page 65, S&G #118): Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs

and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles.

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-successional forests is another commonly identified impact of roads.

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

1. Increased terrestrial 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. Raptors may also be vulnerable to collisions from forest roads and trails because of their foraging behavior, however, 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. Electrocution and collisions with transmission lines are sources of mortality to raptors associated with powerline corridors.

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 are 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 wheeled 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. 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 (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 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 persists for decades.

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. 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 Plumas 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. 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 Forest

Service Region 5 Sensitive Species. More detailed information is also found in the Biological Evaluation/Biological Assessment for aquatic species and Project-Level Management Indicator Species project report and Plumas NF Management Indicator Species report, and are incorporated by reference.

This evaluation 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 species on the Plumas NF were used to develop the list of species and to develop species groups. Forest Service Sensitive Species were selected and placed into species groups based on the potential for these species or their habitats to be affected by motorized wheeled vehicle use on the Plumas NF. Local knowledge and sources included corporate databases including distribution of Forest Service Region 5 Sensitive Species, vegetation maps, etc., which were used to develop species or habitat groups. Table 1 provides a list of all the Forest Service Region 5 Sensitive Species described by status, habitat indicator, and distribution on the Plumas NF.

Table 1. Potential Occurrence of USDA Forest Service Region 5 Sensitive Species and their Habitats in the Wildlife Analysis Area

Species Name Species Status	Elev. Range (feet)	Habitat	Potential Threats	Suitable Habitat w/in Wildlife Analysis Area	Detection w/in Wildlife Analysis Area	Analysis synopsis
Birds						
Bald Eagle *Haliaeetus leucocephaus* Forest Service R5 Sensitive	Sea level - 7000	Throughout northern and central CA. Wintering and nesting habitat associated with lakes, reservoirs, rivers or large streams. Needs large, old trees near water for nesting.	Removal of nesting habitat, high recreation use on lakes, DDT in eggshells, disturbance near nest sites	Yes	Yes	Analyzed in text. Several active territories on the PNF.
California spotted owl *Strix occidentalis occidentalis* Forest Service R5 Sensitive Federal Species of Concern	1000 – 7440	Sierra Nevada province in CA. Needs at least 40% canopy closure and an average dbh of 30 inches for nesting.	Timber harvest, fire suppression, excessive build-up of fuels, decline in snag density.	Yes	Yes	Analyzed in text. Known to breed throughout the PNF.

Species Name Species Status	Elev. Range (feet)	Habitat	Potential Threats	Suitable Habitat w/in Wildlife Analysis Area	Detection w/in Wildlife Analysis Area	Analysis synopsis
Northern goshawk *Accipiter gentilis* Forest Service R5 Sensitive Federal Species of Concern	2500 – 10000	Throughout northern CA and Sierra Nevada; Dense mature conifer and deciduous forests interspersed with meadows, other openings and riparian areas. Found in Mixed Conifer to Lodgepole Pine	Logging, catastrophic (stand replacing) fire	Yes	Yes	Analyzed in text. Known to breed throughout the PNF.
Great gray owl *Strix nebulosa* Forest Service R5 Sensitive	2500 – 9000	Western Sierra Nevada's with 60% in Mariposa and Tuolumne Co. Breeds in Yosemite NP area. Found in montane meadows surrounded by dense forest of medium to large mixed conifer and red fir.	Grazing, logging of suitable nest trees and buffer.	Yes	Yes	Analyzed in text. Recent detections on the west side of Lake Davis – Beckwourth RD.
Willow flycatcher *Empidonax trailii brewsteri* Forest Service R5 Sensitive Federal Species of Concern	2000 – 8000	Western Sierra Nevada. Found in, willow-dominated riparian areas, including moist meadows with perennial streams and smaller spring-fed or boggy areas.	Grazing, adjacent land use, brown-headed cowbird parasitism, reduction in nesting habitat	Yes	Yes	Analyzed in text. Known to breed in Occupied WIFL habitat on the PNF.
Greater sandhill crane *Grus canadensis labida* Forest Service R5 Sensitive	–	Breeds in Siskiyou, Modoc, Lassen, Sierra Valley, Plumas and Sierra counties and winters primarily in the Central Valley; found in wet meadow, shallow lacustrine, and fresh emergent wetland habitats	Loss of extensive wetland habitat required for breeding; human disturbance; grazing	Yes	Yes	Analyzed in text. Known to occur on the PNF. No known breeding sites on the PNF.

Species Name Species Status	Elev. Range (feet)	Habitat	Potential Threats	Suitable Habitat w/in Wildlife Analysis Area	Detection w/in Wildlife Analysis Area	Analysis synopsis
Swainson's Hawk *Buteo swainsoni* Forest Service R5 Sensitive		Uncommon breeding resident and migrant in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen Co., and Mojave Desert; found in open desert, grassland, or cropland containing scattered, large trees or small groves.	Loss of nesting habitat to agriculture and grazing	Yes	No	Not known to occur on the PNF. Verified nesting documented in the Sierra Valley adjacent to the PNF.
Mammals						
Pacific fisher *Martes pennanti pacifica* Forest Service R5 Sensitive Federal Species of Concern	4900 – 7900	Forests with high canopy closure and structural elements of late successional old-growth forest. Closely associated with water or riparian habitats (328 ft). Rest sites include large standing conifers or hardwoods. Dens occur in cavities of standing large diameter conifers or hardwoods (snags or live trees).	Forest fragmentation, logging, fire, climate, land use patterns, metapopulation (a group of spatially separated populations) dynamics	Yes	No	Analyzed in text. Not known to occur on the PNF.
American marten *Martes americana* Forest Service R5 Sensitive Federal Species of Concern	>6000	Found in mesic, late successional coniferous forests. Dens are in trees, snags, downed logs and rocks in structurally complex old forests.	Forest fragmentation, logging, fire, climate, land use patterns, metapopulation dynamics	Yes	No	Analyzed in text. Known to occur exclusively in the Lakes Basin area on the Beckwourth RD.
Sierra Nevada red fox *Vulpes vulpes necator* Forest Service R5 Sensitive Federal Species of Concern	5000 – 12000	Red fir and Lodgepole pine in subalpine and alpine fell-fields of the Sierra Nevada. Similar to marten and fisher. Dens seem to be in rock/talus slides or earthen excavations/holes.	Conversion of late serial stage forest to early serial stage forest, which favors competitors such as coyote and non-native red fox.	Yes	No	Analyzed in text. No historical sightings on the PNF.

Species Name Species Status	Elev. Range (feet)	Habitat	Potential Threats	Suitable Habitat w/in Wildlife Analysis Area	Detection w/in Wildlife Analysis Area	Analysis synopsis
California wolverine *Gulo gulo luteus* Forest Service R5 Sensitive Federal Species of Concern	6400 – 10800	Use a variety of habitats. Dens include snow-covered roots, standing or down logs with large cavities, holes under coarse woody debris, old beaver lodges, bear dens or rocky areas.	Recreation, vehicles, decrease in wild areas, logging, fires, mining, decrease in deer population.	Yes	No	Analyzed in text. No confirmed historical sightings on forest.

Primary Sources: California's Wildlife, Volumes I, II and III. CWHR. Zeiner et al. 1988, 1990a, 1990b, Jennings and Hayes 1994, USDA Forest Service 1993

A total of 14 species are included in the species group assessment. These include 7 bird species and 7 mammal species. These species were divided into wildlife groups (some species occurred in more than one group) as described in Table 2.

Table 2. Wildlife group and species represented within groups

Wildlife group	Species
Wide-ranging carnivores	wolverine, Sierra Nevada red fox
Late-successional closed canopied coniferous forest associated species	California spotted owl, northern goshawk, great gray owl, American marten, Pacific fisher
Riparian and wetland species [including lacustrine (lakes) and riverine habitat (rivers, streams)]	Bald eagle, great gray owl, greater sandhill crane, willow flycatcher, Sierra Nevada red fox, Western red bat
Montane Hardwood and Montane Hardwood-conifer species	Pallid bat

Step 2. Identify road and trail-associated factors: Several studies have identified a classification or conceptual model for responses of wildlife to road and trail-associated activities *(*Knight and Cole 1991, *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 Plumas NF, these three broad disturbance classifications were used for this assessment. Table 3 lists the road and trail-associated factors along with their disturbance type, activity type effects, and affected wildlife groups.

Table 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
Poaching	Harvest	Increased illegal take of animals as facilitated by trails and roads	• Wide-ranging carnivores • Ungulates
Collisions	Harvest	Mortality or injury resulting from a motorized vehicle running over or colliding with an animal	• Wide-ranging carnivores • Late successional species • Riparian species • Ungulates
Habitat loss and fragmentation	Habitat modification	Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities	• Wide-ranging carnivores • Late successional species • Riparian species • Ungulates
Edge effects	Habitat modification	Changes to habitat microclimate associated with the edge induced by roads or trails	• Late successional
Snag or downed log reduction	Habitat modification	Reduction in density of snags and down logs due to their removal near roads as facilitated by road access	• Wide-ranging carnivores • Late successional species
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 • 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 carnivores • Late successional • Riparian species
Disturbance at a specific site	Disturbance	Displacement of individual animals from a specific location that is being used for reproduction and rearing of young	• Wide-ranging carnivores • Late successional • Aquatic-Riparian associated • Ungulates
Physiological response	Disturbance	Increase in heart rate or stress hormones when near a road or trail or network of roads or trails	• Ungulates • Late successional • Riparian associated • Wide-ranging 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 wheeled motorized travel routes (road and trails) on the Plumas NF was done in two primary steps: 1) the cumulative effects of travel routes to species groups were assessed based on a similar process completed by Gaines et al. 2003, and 2) the relative environmental risk of roads and trails to riparian 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 two actions: (1) the prohibition of cross-country wheeled motorized vehicle travel, and (2) adding facilities (unauthorized roads, trails, and/or areas) to the National Forest Transportation System (NFTS).

Wildlife Analysis Assumptions

1) All vehicle types result in the same amount of disturbance effect to wildlife, unless there is local information enabling a separate analysis by vehicle type.
2) Location of trail is equal to disturbance effects from that trail (i.e., assume all trails provide the same level of disturbance), unless local data or knowledge indicate otherwise.
3) Habitat is already impacted in the short-term. In the long-term, habitat will remain the same on added trails, but will increase to at least some degree on non-added trails with ban of cross-country travel and subsequent passive restoration.
4) The focus is on suitable habitat (assumption is that site-specific species wildlife surveys have not been conducted). Therefore, suitable habitat is assumed occupied.
5) The type and amount of use along the different types of routes may differ in their effects, all motorized routes are treated equally in this analysis because data is lacking in the amount of use received by all the routes within the Plumas NF. This sort of detailed analysis would be difficult and complex. In addition, the type of motorized road or trail likely varies in how they contribute to disturbance and habitat fragmentation. For example, high clearance roads generally receive less use than roads used by passenger vehicles which would equate to less noise disturbance. In addition single track motorcycle trails would likely fragment habitat less than would a passenger road due to the narrower width of the single track motorcycle routes that would result in removing less habitat. However, noise generated from motorcycles along trails may contribute to greater noise disturbance than a 4x4 jeep would. Where impacts are not well understood, impacts from all motorized routes, regardless of route type and intensity of use, are treated the same.
6) The estimation of route densities for Alternative 1 (no action) includes all existing unauthorized routes; this is based on the assumption that these routes would continue to be used under continued cross-country travel. Under the action alternatives, only routes proposed for addition to the National Forest Transportation system (NFTS) are included in the estimation of route densities, since under the ban for cross-country travel, motorized use would only occur on the NFTS.

Wildlife Sources of Information

- GIS layers of the following wildlife resources were used for analysis:
  - Bald Eagle – nesting territory 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
  - Forest Carnivores (marten, fisher, Sierra Nevada red fox, and wolverine) – Draft Plumas Forest Carnivore Network, CWHR habitat types 4M, 4D, 5M, 5D, & 6)
  - Other wildlife species – appropriate CWHR habitat types.

Analysis Indicators

Each indicator is designed to be calculated using the sources of information above, using GIS queries. They are focused on assessing the effects of adding facilities to the NFTS. The effects of prohibition of cross-country travel and changes/identification of seasons of use and vehicle class for routes are assessed qualitatively, as described below.

- Miles of wheeled motorized routes and acres of areas to measure potential disturbance (at forest-wide scale and within the habitat for each species group).
- Zone of influence [proportion of a species (or species group's) key habitat that is affected by motorized routes].

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-successional forest associated species, and riparian associated species. Selected species represented within each group include Forest Service Region 5 Sensitive Species. 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 Plumas NF is also presented in the affected environment section for each selected 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 Plumas National Forest. The analysis area includes wheeled motorized roads and trails, collectively referred to as routes. Routes including existing system routes and unauthorized routes (unclassified or user created routes, and historic routes).

Cumulative Effects Boundary (Space and Time)

The cumulative effects analysis includes all wheeled motorized routes that occur within the boundary of the Plumas NF on National Forest System lands. This cumulative effects geographic boundary pertains to all species groups.

National Forest System lands encompasses 1,204,225 acres and non-NFS lands encompasses 273,308 acres within the boundary of the Plumas NF. The total NFS and non-NFS lands within the boundary of the Plumas NF comprises 1,477,533 acres. All Forest Service System lands within the boundary of the Plumas NF is an appropriate scale to analyze cumulative effects of terrestrial species for activities associated with wheeled 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 are analyzed on the accumulation of all past, present, and future actions including existing system routes, existing unauthorized routes, and any future routes that would be created within the next 20 years within the boundary of the Plumas NF (NFS lands). Twenty years is a reasonable timeframe for estimating cumulative impacts of wheeled 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 addition, the timeframe for analyzing past cumulative effects for other activities such as timber harvest, grazing, and non-motorized recreation is approximately 20 years prior.

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 wheeled motorized routes. Two primary analysis measures were used to compare project effects of each alternative: miles of routes proximal to a specific site (reproductive site or species presence) and Zone of Influence of wheeled motorized routes.

Density of wheeled 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 Plumas 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 7^{th} 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 a any smaller scale may actually be amplified and therefore overestimate the effects to wildlife.

Table 4. Proportion of Plumas NF acreage with route densities between 0 miles per square mile and >6 miles per square mile (averaged by 7^{th} field watershed)

Alternatives		**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Wildlife						
Motorized Route Density (Percent of Forest Total)	**0 Miles/Square Mile**	0%	0%	0%	0%	0%
	0-2 Miles/Square Mile	21%	30%	35%	30%	30%
	2-4 Miles/Square Mile	59%	58%	59%	62%	58%
	4-6 Miles/Square Mile	19%	12%	6%	8%	12%
	>6 Miles/Square Mile	1%	0%	0%	0%	0%

Miles of wheeled 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 terrestrial wildlife species on the Plumas NF.

Forest-wide miles of motorized routes

Overall miles of motorized routes on the Plumas 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 an 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). 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). Two species were included in the wide-ranging carnivore habitat assessment group –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):

- 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
- 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

Changes in Class of Vehicles

Responses to motorized vehicle use varies by species and depends upon the type of vehicle, the intensity, timing, speeds, and amount motorized vehicle use. 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 wildlife species for all of the proposed alternatives.

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) are lands that fall within the boundary of the Plumas NF including all National Forest System lands only. The Plumas NF boundary is sufficiently large to encompass the home ranges of wide-ranging species located on the Plumas 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. The timeframe for analyzing cumulative effects for wide-ranging species is approximately twenty years into the past and the 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.

Wolverine and the 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. (2007), 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. 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 individual and is a male. DNA testing also indicates this individual is not related to the wolverine population from the southern Sierra Nevada region and it is also not related to wolverine populations in the Cascades region of Washington state. 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).

The current distribution and population status of the Sierra Nevada red fox is uncertain (CDFG 2004). A small population of Sierra Nevada red fox occurs in the Lassen Peak vicinity and represents the only verified detections of the subspecies in recent years.

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 exists which correlates motorized route density with wolverine population numbers due to the scarcity of research, the low population numbers, and overall difficulty in studying this species that encompasses 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 Sierra Nevada red fox has not been verified to occur on the Plumas 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 located in the Lassen Peak vicinity (Lassen National Park and Lassen National Forest). 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 a unknown, it is evident that the non-native red foxes thrive in human-altered environments. 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 the Sierra Nevada Red Fox: Environmental Consequences

Route Density: 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: 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 200 meters of routes was used as a measure for analyzing habitat fragmentation and includes loss of snags and down logs along routes within mature to late-successional forest habitat as classified by 4M, 4D, 5M, 5D, & 6 CWHR types within the Plumas NF. Furthermore, additional analysis of habitat fragmentation is presented within Old Forest Emphasis Areas (OFEAs) and within the Draft Plumas NF Forest Carnivore Network which is presented in the section for Late-successional Forest Associated Species Group.

Disturbance to a Specific Site: 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 wheeled motorized routes represent potential direct disturbance to wolverine using the area. Since no wolverine detections have occurred anywhere on the Plumas NF and the recent Tahoe wolverine detections are more that 50 miles from the southern Plumas NF boundary, no specific site disturbances are anticipated.

Disturbance to Wolverine Den Sites: 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). On the Plumas NF, subalpine and treeline habitats generally occur near or above 8,000 feet. On the Plumas NF, areas that have late spring, deep, persistent snow varies depending on the precipitation and the aspect. Activities associated with motorized wheeled routes are associated for their potential to disturb wolverine den sites.

Direct and Indirect Effects

Route Density. 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, route density across the Plumas 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 route density within 7^{th} field watersheds was determined for all motorized routes including those on National Forest System lands and non-National Forest System lands. 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, route densities are compared within mature and late-successional habitat types (CWHR types 4M, 4D, 5M, 5D, &6), Old Forest Emphasis Areas, and within the Draft Plumas NF Forest Carnivore Network (See Late-successional Forest Associated Species Section).

Table 5 provides data on the proportion of lands within the Plumas NF with motorized route densities between 0 and > 6 miles/square mile. Alternative 1 has the lowest proportion of land with routes <2 miles/square mile (21% - high to moderate security). Alternatives 2, 4, and 5 are identical in their proportion of land base with route density <2 miles/square mile (30%). Alternative 3 shows 35% of routes < 2 miles/sq. mi. have moderately high security. Moderate security habitat represented by route density category of 2-4 miles/square mile indicates an even distribution (58%-62%) across all the alternatives, with Alternative 4 having the highest proportion. Alternative 1 provides the most amount of area with lower (19% - 4 to 6 mi/sq. mi.) and least secure habitat (1% > 6 mi/sq. mi.). Alternative 3 provides 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 5. Percent of Plumas NF with route densities between zero and >6 miles/square mile

Motorized Route Density	Security Level	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
0 Miles/Square Mile	High Security	0%	0%	0%	0%	0%
0-2 Miles/Square mile	Moderately High Security	21%	30%	35%	30%	30%
2-4 Miles/Square mile	Moderate Security	59%	58%	59%	62%	58%
4-6 Miles/Square mile	Lower Security	19%	12%	6%	8%	12%
>6 Miles/Square mile	Least Security	1%	0%	0%	0%	0%

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 Plumas NF including all National Forest System lands and non-National Forest System lands (private). The Plumas NF boundary is sufficiently large to encompass the home ranges of the wolverine and Sierra Nevada red fox located on the Plumas 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 route density, habitat fragmentation from past, present, and reasonably foreseeable actions (Table 6). Past and present route densities are combined to represent the current existing condition. Since no thresholds of route density for these species have been established, route density is only used to compare the relative differences between the alternatives. Route densities categories >4 miles/square mile are used as a metric to compare relative route densities of the alternatives where human impacts of 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 determine cumulative impacts of the proposed alternatives.

Table 6. Cumulative effects to Wolverine and Sierra Nevada Red Fox from Route Density, Habitat Fragmentation, and Disturbance to a Specific Site

Alternatives	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Present and Past Effects					
Route Density - Total Combined Percent of Plumas NF with route densities categories of 4 to 6 Miles/square mile (lower security) and >6 miles/square mile (least security habitat)	20%	12%	6%	8%	12%
Habitat Fragmentation - Total Percent of Forest within 200 meters of existing and proposed motorized routes (approximate percentage, some overlap on routes may occur)	14%	5%	3%	3.5%	4.6%
Future Effects					
Potential for route proliferation contributing to 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
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 Alternative 5	Lowest cumulative effects of route density and habitat fragmentation.	Cumulative effects of route density and habitat fragmentation are similar to Alternative 3.	Cumulative effects of route density and habitat fragmentation are similar to Alternative 2

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 wide ranging species (wolverine, 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 wheeled drive vehicles, ATVs, and motorcycles.

The Plumas NF currently has 42 active livestock grazing allotments including both cattle and sheep. The Plumas NF 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 2000, more than 73,345 acres of vegetation management activities have occurred on the Plumas NF. These activities 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 1990 and 2007, approximately 266,963 acres burned on the Plumas NF, some of which have removed forested habitat for wide-ranging species.

On the Plumas 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 Plumas NF recreation activities includes many forms of recreation including both passive and active recreation. Summer recreation which includes fishing, hiking, camping at developed and dispersed sites, hunting, off highway use, and wildlife viewing. Winter recreation includes cross country skiing and over snow recreation. It is unknown how these recreational activities affect the distribution and abundance of wolverine and the red fox, although, no scientific studies are available that show how these activities impact these species.

The wolverine and the red fox is considered to be primarily associated with areas with low human influence, such as remote wilderness and roadless areas. Increased recreational use on the Plumas 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 wheeled 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 Plumas NF, where 20% of the Plumas NF has route densities that fall in the lower security (route density category 4-6 mi/sq. mi.) and least secure (route density category >6 mi/sq. mi.) habitat condition, followed by alternatives 2, 5, and 6 (12%). Alternative 4 only increases overall cumulative impacts by 8% to wolverine and Sierra Nevada red fox on the Plumas NF. All the action alternatives will result in a beneficial impact to wolverine prey (mule deer) from closure of between 708 and 828 miles of motorized routes depending on the alternative (Alternative 5 least benefit to Alternative 3 greatest benefit) compared to Alternatives 1.

Sensitive Species Determinations

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the California wolverine or the Sierra Nevada red fox. This determination is based on the rationale that cross country travel would continue in the future and lead to additional loss of habitat, an increase in habitat fragmentation, and result in an increase in the percent of habitat within the lower and least security level habitat categories over time.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or 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 Plumas National Forest. This determination is based on the rationale that the action alternatives would prohibit current and future cross-country travel across the PNF, that habitat fragmentation and route densities would be considerably reduced compared to Alternative 1 (No-action), and that a higher percentage of habitat would be maintained at the High and Moderately High security level categories.

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.

Late-successional Forest Associated Species: Affected Environment

The late-successional 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*), and Pacific fisher (*Martes pennanti*). These species are associated with late-successional forests that can be impacted by activities associated with trails and roads. Gaines et al. (2003), conducted a literature review where 71 late-successional 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-successional 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 Plumas NF Land and Resource Management Plan (1988), habitat types that are important for late-successional/old 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 Plumas NF developed a Draft

Carnivore Network based on suitable and potential suitable habitat for marten and fisher that provides another way of evaluating impacts to late-successional species and their habitats.

Summary of trail and road associated impacts to late-successional 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
- 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
- Increase in heart rate or stress hormones when near a road or trail or network of roads or trails

Late-successional Forest Associated Species: Environmental Consequences

Effects Common to All Late-successional Associated Species

Changes in Class of Vehicles: Responses to motorized vehicle use varies by species and depends upon the type of vehicle, the intensity, timing, speeds, and amount motorized vehicle use. For this analysis, it is assumed that all vehicle types result in the same disturbance to all late-successional species. Therefore, changes in the class of vehicles would not vary in their effects to late-successional associated species for all of the proposed alternatives.

Analysis Measures for Direct and Indirect Effects

Two primary metrics will be used to evaluate the effects of the alternatives to late-successional forest species as follows:

1. **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 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 within 200 meters of OFEAs encompasses a greater array of potential route associated effects to old forest species including edge effects, habitat fragmentation, and habitat effectiveness.
2. **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 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 been shown to disrupt or cause reproductive failure to these species.

Analyzing for Cumulative Effects

This analysis of cumulative effects focuses on the cumulative effects associated with roads and trails including motorized on National Forest System lands. Other cumulative effects to old 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.

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 unauthorized motorized routes proposed for addition and existing motorized routes on National Forest System lands. 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. Reasonably foreseeable impacts of motorized use is considered by assessing the potential for motorized route proliferation for each alternative.

Cumulative Effects Boundary

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

Late-successional Forest Habitat (CWHR types 4M, 4D, 5M, 5D, and 6)

Zone of Influence: For each of the proposed alternatives, the Zone of Influence within late- successional forest habitat (CWHR 4M, 4D, 5M, 5D, 6) was determined at the 200 meter scale(Table 7). 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. 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 can be included 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-successional 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. A 200 meter Zone of Influence will encompass all three distance scales.

Zone of Influence may vary by species and by species responses to route type, level of use and intensity. Since absolute thresholds of concern for any given species are difficult to determine due to limited research on effects of routes, a 200 meter Zone of Influence was 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 200 meter Zone of Influence will be discussed in detail.

Direct and Indirect Effects

Zone of Influence at 200 Meters

Comparing the Zone of Influence at 200 meters of proposed unauthorized motorized routes within mature and late-successional 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-successional 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-successional 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.

Table 7 displays the direct and indirect effects of the five alternatives analyzed and the amount of late-successional forest habitat that would be impacted by open unauthorized routes or proposed trail additions to the transportation system. Alternative 1 contributes considerably to reduced habitat effectiveness for old forest species where 126,276 acres of late-successional forest habitat would be negatively influenced by unauthorized routes. The amount of habitat affected would be expected to increase over time since cross country travel would be allowed to continue under Alternative 1. All the action alternatives (2-5) are expected to improve habitat effectiveness for late successional forest species compared to Alternative 1 due to the prohibition of cross country travel and the significantly reduced acres affected by each alternative. Alternatives 2 reduces habitat effectiveness for old forest associated species on approximately 38,431 acres, an improvement of 87,845 acres when compared to Alternative 1. Alternative 5 reduces habitat effectiveness for old forest associated species on approximately 27,451 acres, an improvement of 98,825 acres when compared to Alternative 1. Alternative 4 reduces habitat effectiveness for old forest associated species on approximately 16,741 acres, an improvement of 109,535 acres when compared to Alternative 1. Alternative 3 would not contribute to a direct or indirect reduction in habitat effectiveness for late-successional forest associated species at 200 meters as no unauthorized routes would be added to the system.

Table 7. Acres of CWHR 4M, 4D, 5M, 5D and 6 (Late-successional Forest) that lie within 200-meters of proposed trail additions or open unauthorized routes.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Acres of late-successional forest (CWHR 4M, 4D, 5M, 5D and 6) within a 200-meter Zone of Influence	126,276	38,431	0	16,741	27,451

Cumulative Effects

The cumulative effects appendix provides a list and description of present and reasonably foreseeable projects on National Forest System lands within the Plumas NF boundary. Some, but not all, of these activities will contribute to impacts to late-successional 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-successional species.

Zone of Influence: The cumulative effects to mature/late-successional forests (CWHR types 4M, 4D, 5M, 5D, 6) within a 200 meter Zone of Influence is compared for the proposed alternatives (Tables 8, 9, and 10).

200 Meter Zone of Influence

When comparing the cumulative effects to late-successional forests within a 200-meter Zone of Influence by adding up all of the direct and indirect effects of the alternatives plus the cumulative effects of past, present and future actions, Alternative 1 poses the highest cumulative effects and the greatest risk to habitat connectivity associated with routes within late-successional forest habitat due to two primary factors; 1) Alternative 1 would contribute considerably and add to the proliferation of unauthorized routes since unmanaged cross-country motorized travel would continue into the future and would have a high likelihood of increasing in future years, and 2) Alternative 1 affects approximately 142,747 acres of late-successional forest habitat, which is significantly higher than any of the action alternatives (2-5).

All the action alternatives significantly reduce cumulative effects to late-successional forest habitat when compared to Alternative 1. Alternatives 2 and 5 reduce cumulative effects significantly down to 54,902 and 43,922 acres respectively, and pose a moderate risk to habitat connectivity associated with routes within late successional forest habitat. In addition to the significant reduction in acres affected under Alternatives 2 and 5, these action alternatives also prohibit cross country travel and the proliferation of additional routes across the Forest.

Alternative 4 further reduces cumulative effects down to 32,842 acres and represents a low risk to habitat connectivity associated with routes within late successional forest habitat. Alternative 4 also prohibits cross country travel and the proliferation of additional routes across the Forest.

Alternative 3 represents the alternative with the lowest cumulative effect and lowest risk to habitat connectivity associated with routes within late successional forest habitat. Alternative 3 would cumulatively affect only 16,471 acres of late-successional forest habitat, which is a reduction of over 126,006 acres when compared to the cumulative effects represented by Alternative 1. In addition, Alternative 3 prohibits cross country travel and the proliferation of additional routes across the Forest. Alternative 3 would pose the best scenario for late-successional forest species.

Table 8. Cumulative Effects for Proportion of Late-successional Forest (CWHR 4M, 4D, 5M,5D, 6) within 200 meters of Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect Effects of proposed alternatives					
Existing unauthorized routes or proposed route additions [1]	126,276	38,431	0	16,741	27,451
Cumulative effects of past, present, and proposed actions					
Existing motorized routes- NFS lands	16,471	16,471	16,471	16,471	16,471
Total Cumulative Effects					
Overall Cumulative Effects equals the total of all impacts	**142,747**	**54,902**	**16,471**	**32,942**	**43,922**

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

Direct and Indirect Effects in Old Forest Emphasis Areas and Late-successional Forests

Zone of Influence in Old Forest Emphasis Areas (OFEAs)

The zones of influence within OFEAs are analyzed for the proposed alternatives within 200 meters of proposed unauthorized motorized routes (Table 9).

Zone of Influence at 200 Meters

Comparing the Zone of Influence at 200 meters of unauthorized routes and proposed trails provide a relative indication of how the alternatives affect habitat effectiveness for late-successional forest associated species within OFEAs. Potential negative impacts within a 200-meter Zone of Influence to late-successional 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.

Table 10 provides data from the analysis conducted on a 200 meter zone of influence from unauthorized routes (Alternative 1) and proposed trails (Alternatives 2-5) to determine the amount of OFEAs that would have direct and indirect impacts. Alternative 1 would contribute to the highest reduced habitat effectiveness for old forest species where 91,865 acres of OFEAs would be directly and indirectly influenced by continued use of existing unauthorized routes. This level of impact would likely increase in future years due to the proliferation of additional routes across the landscape as cross country travel would be allowed under Alternative 1.

All of the action alternatives (2-5) significantly reduce direct and indirect impacts to late successional associated species within OFEA, plus prohibit cross country travel and the proliferation of additional routes across the landscape. Alternative 2 would have direct and indirect impacts on 22,966 acres of OFEA's, which represents a reduction of 68,899 acres from Alternative 1. Alternative 5 would have direct and indirect impacts on 17,225 acres of OFEAs, which represents a reduction of 74,640 acres from Alternative 1. Alternative 4 would have direct and indirect impacts on 8,612 acres of OFEAs, which represents a reduction of 83,253 acres from Alternative 1. Alternative 3 would not contribute to direct or indirect impacts to late successional associated species within OFEAs, since no new trails would be added.

Table 9. Acres of OFEAs occurring within the 200-meter Zone of Influence of unauthorized routes and proposed trails to be added to the system.

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Acres of OFEAs within 200 meters of unauthorized routes and proposed trails.	91,865	22,966	0	8,612	17,225

Cumulative Effects from Zone of Influence in Old Forest Emphasis Areas (OFEAs)

The cumulative effects to OFEAs within a 200-meter Zone of Influence are compared for the proposed alternatives (Table 10).

200-Meter Zone of Influence

Table 10 displays the data generated from analysis of cumulative effects to OFEA within a 200-meter Zone of Influence. Cumulative effects to OFEAs within a 200-meter Zone of Influence were determined by summing the direct and indirect effects of the alternatives and the cumulative effects of past, present and future actions,

Alternative 1 poses the highest cumulative effect to late successional species within OFEAs based on two primary factors; 1) the allowance of cross country travel and the potential for proliferation of additional routes across of the forest, and 2) cumulatively impacts 103,348 acres of OFEAs on the PNF.

Alternatives 2 and 5 pose a moderate cumulative effect by reducing impacts to late successional species within OFEAs when compared to Alternative 1. This is based on two primary factors: 1) Alternatives 2 and 5 would prohibit cross country travel and the proliferation of additional routes across the forest, and 2) would reduce the amount of OFEAs impacted from 103,348 acres under Alternative 1 down to 34,449 acres under Alternative 2 and down to 28,708 acres under Alternative 5.

Alternative 4 poses a low cumulative effect by reducing impacts to late successional species within OFEAs when compared to Alternative 1. This is based on two primary factors: 1) Alternative 4 would prohibit cross country travel and the proliferation of additional routes across the forest, and 2) would reduce the amount of OFEAs impacted from 103,348 under Alternative 1 down to 20,095 acres under Alternative 4.

Alternative 3 poses the lowest cumulative effects by reducing impacts to late successional species within OFEAs when compared to Alternative 1. This is based on two primary factors; 1) Alternative 3 would prohibit cross country travel and the proliferation of additional routes across the forest, and 2) would reduce the amount of OFEAs impacted from 103,348 under Alternative 1 down to 11,483 acres under Alternative 3. Alternative 3 would pose the best scenario for late-successional forest species within OFEAs.

Table 0. Cumulative Effects to Old Forest Emphasis Areas within a 200-meter Zone of Influence of All Routes within the Boundary of the PNF.

	Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect Effects of the alternatives					
Existing unauthorized routes or proposed trail additions	91,865	22,966	0	8,612	17,225
Cumulative Effects of past, present and proposed actions					
Existing motorized trails - NFS lands	11,483	11,483	11,483	11,483	11,483
Overall Cumulative Effects	**103,348**	**34,449**	**11,483**	**20,095**	**28,708**
Total Cumulative Effects					

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed trails.

Spotted Owl: Affected Environment

The California spotted owl is designated by the Regional Forester as a Sensitive Species and is selected as an Management Indicator Species on the Plumas NF. The Plumas NF has 277 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 549,028 acres suitable spotted owl habitat with CWHR types 6, 5D, 5M, 4D, and 4M on the Plumas NF (not including the pure eastside pine type).

The Plumas NF has conducted surveys for spotted owl presence and reproductive status across the forest since the early 1980s. Based on survey results to date, 277 Protected Activity Centers (PACs) and 268 Home Range Core Areas (HRCA) have been designated covering 278,747 acres within the Plumas NF administrative boundary. PACs are and HRCAs are comprised of the best available habitat encompassing approximately 300 and 700 acres respectively.

Table 11. Number of Plumas NF Spotted owl PACs by Ranger District

Ranger District	Number of PACS
Mount Hough	116*
Feather River	124
Beckwourth	37
Total	**277**

*incorporates loss of 20 PACs as a result of the 2007 Moonlight Fire

Spotted Owl: Environmental Consequences

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 Plumas 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 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. 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, Mara and Holberton (1998) reported that chronic high levels of stress hormones (corticosterone) may have negative effects on reproduction or physical condition of individual owls. Swartout and Steidl (2001) found hikers caused juvenile and adult spotted owls to flush at <12m 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 trails fragment suitable habitat. Several studies indicate the California spotted owl are sensitive to changes in forest canopy closure and habitat fragmentation (Seamans 2005, Blakesley 2003) that could result from a network of roads. Roads and trails can result in a reduction in interior forest patch size which decreases the amount of habitat available and increases the distance between suitable interior forest patches for late-successional species such as the 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 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 open for public use 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 proposed alternative impacts to spotted owl from motorized routes: Although, the type and amount of use along the different types of routes may differ in their effects to spotted owls, all motorized routes are treated equally in this analysis because data is lacking in the amount of use received by all the routes within the Plumas NF, this sort of detailed analysis would be difficult and complex. In addition, the type of motorized road or trail likely varies in how they contribute to spotted owl disturbance and habitat fragmentation. For example, high clearance roads generally receive less use than roads used by passenger vehicles which would equate to less noise disturbance to owls. In addition 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 a 4x4 jeep would. Since impacts to spotted owls are not well understood, impacts from all motorized routes, regardless of route type and intensity of use, are treated the same.

Analysis Measures for Direct and Indirect Effects to Breeding Spotted Owls

Miles of proposed unauthorized motorized routes within Spotted Owl Protected Activity Centers (PACs) and within 0.25 mile of Spotted Owl Activity Centers to Assess Potential Disturbance to Breeding Spotted Owls: The direct and indirect effects to breeding spotted owls may be measured by the amount of disturbance that may be generated from noise or other trail and road associated factors within 1) the designated **Protected Activity Centers (PACs)** and within 2) a **0.25 miles radius circle of spotted owl Activity Centers** (nest or nest stand). 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 which include 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. Activity Centers are known nest sites or suspected nest stands.

Zone of Influence within PACs and HRCAs to assess potential habitat fragmentation and edge effects: In addition to determining the habitat fragmentation potential from zones of influence within suitable spotted owl habitat within CWHR types 4M, 4D, 5M, 5D, & 6 (See effects to late-successional forest habitats in effects common to all late-successional forest associated species), zones of influence were determined within spotted owl PACs and HRCAs within the 200 meters scale from routes.

Direct and Indirect Effects to Breeding Spotted Owls

Protected Activity Centers

The miles of proposed unauthorized motorized routes to be added to the travel management system 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.

Table 12 displays by alternative the total miles of unauthorized motorized routes within spotted owl Protected Activity Centers (PACs) that are proposed for adding to the route system, and the number and percentage of PACs affected.

Alternative 1 results in the highest level of direct and indirect impacts within spotted owl PACs and to breeding spotted owls. Under Alternative 1, a total of 77 miles of unauthorized routes would impact approximately 139 PACS, and have the potential to directly and indirectly affect breeding across 50% of the known owl territories on the PNF. These direct and indirect effects are expected to increase under Alternative 1 since cross country travel would be allowed and the potential for proliferation of additional routes across the Forest.

All action alternatives (2-5) significantly reduce direct and indirect impacts to spotted owl PACs and breeding owls across the PNF. In addition, under Alternatives 2-5, cross-country travel is prohibited, which further reduces any direct or indirect impacts that may result from the proliferation of additional routes across the Forest.

Alternative 2 significantly reduces direct and indirect impacts to owl PACs and to breeding owls by reducing proposed trail miles within PACs by 50 miles (77 miles – 27 miles) and impacting 88 less owl PACs (139 – 51) when compared to Alternative 1. Alternative 2 also reduces the direct and indirect effects to breeding from 50% under Alternative 1 to 18% of the known owl territories on the PNF.

Alternative 5 significantly reduces direct and indirect impacts to owl PACs and to breeding owls by reducing proposed trail miles within PACs by 59 miles (77 miles – 18 miles) and impacting 104 less owl PACs (139 – 35) when compared to Alternative 1. Alternative 5 also reduces the direct and indirect effects to breeding from 50% under Alternative 1 to 13% of the known owl territories on the PNF.

Alternative 4 significantly reduces direct and indirect impacts to owl PACs and to breeding owls by reducing proposed trail miles within PACs by 67 miles (77 miles – 10 miles) and impacting 120 less owl PACs (139 – 19) when compared to Alternative 1. Alternative 4 also reduces the direct and indirect effects to breeding from 50% under Alternative 1 to just 7% of the known owl territories on the PNF.

Alternative 3 does not result in direct or indirect impacts to owl PACs or breeding owls since no proposed trails will be added to the transportation system.

Table 12. Miles of Proposed Unauthorized Motorized Routes within Spotted Owl Protected Activity Centers on the Plumas NF

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Miles of Proposed Unauthorized Motorized Routes within Spotted Owl Protected Activity Centers (PACs)	77	27	0	10	18
Number of Spotted Owl PACs Intersected by Proposed Unauthorized Routes	139	51	0	19	35
Percent of PACs Affected by Unauthorized Motorized Route Additions (Total Plumas NF PACs = 297)	50%	18%	0%	7%	13%

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

When considering the potential effects of the proposed alternatives on breeding spotted owls within a 0.25 mile radius circle (Table 13), Alternative 1 results in the highest direct and indirect effects to breeding owls as a result of noise disturbance by allowing cross country travel to continue and the potential for proliferation of additional routes across the landscape, plus approximately 25.4 miles of unauthorized routes occurring within a 0.25 mile distance of owl activity centers.

All of the action alternatives (2-5) significantly reduce the magnitude of direct and indirect effects to breeding spotted owls as the result of two primary factors: 1) the prohibition of cross country travel and 2) the significantly reduced miles of proposed trail that would occur within 0.25 miles of an Activity Center. Alternative 2 would have direct and indirect effects to breeding owls by containing 9 miles of proposed trails that would lie within 0.25 miles of an owl activity center. This represents a reduction of 16.4 miles when compared to Alternative 1.

Alternative 5 would have direct and indirect effects to breeding owls by containing 6 miles of proposed trails that would lie within 0.25 miles of an owl activity center. This represents a reduction of 19.4 miles when compared to Alternative 1 .

Alternative 4 would have direct and indirect effects to breeding owls by containing 3.5 miles of proposed trails that would lie within 0.25 miles of an owl activity center. This represents a reduction of 21.9 miles when compared to Alternative 1.

Alternative 3 would have no effect on breeding spotted owls, as no trails are proposed to be added under this alternative.

Table 13. Miles of Unauthorized Motorized Routes 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
Miles of Proposed Unauthorized Motorized Routes within 0.25 mile radius circle of Activity Centers (nest site or nest stand)	25.4	9.0	0	3.5	6

Cumulative Effects to Spotted Owl Breeding Sites

Cumulative Effects Boundary (space and time)

The cumulative density of proposed 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 Plumas NF. This is an appropriate scale for determining cumulative effects to spotted owls, since the Plumas NF boundary is sufficiently large which includes 277 spotted owl territories and their home ranges across the Forest. In addition, the Plumas 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

The cumulative effects appendix provides a list and description of past, present, and reasonably foreseeable projects on public and private lands within the Plumas 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 2006a).

Between 1990 and 2007, wildfires resulted in burning approximately 266,963 acres of various habitats across the Plumas NF. Some, but not all have resulted in impacts to spotted owl habitats. Since

2000, more than 73,345 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. These wildfires and vegetation treatment projects have resulted in a reduction in the amount and quality of spotted owl habitat on the Plumas NF since 1988.

Thinning projects designed to reduce hazardous fuels will continue to be the primary activity affecting spotted owl habitat on the Plumas (see cumulative effects appendix). 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).

Assessing Cumulative Effects from Routes

Cumulative effects to breeding spotted owls are assessed by determining the sum total miles of all motorized routes (proposed and existing) on the Plumas NF 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 unauthorized routes (direct and indirect impacts) with existing motorized routes (NFS lands).

Cumulative Effects to Breeding Owls within Protected Activity Centers

When considering the cumulative effects of all motorized NFS trails and open routes, Alternative 1 has the highest cumulative miles of routes (89.4 miles) within spotted owl PACs on the PNF and therefore poses the greatest overall potential risk and cumulative impacts to breeding spotted owls on the PNF (Table 14). 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 cross-country travel, there is a potential that route proliferation may add additional routes across the PNF and increase associated cumulative impacts upon spotted owls over time.

All of the action alternatives (2-5) result in significantly less cumulative effects to breeding spotted owls when compared to Alternative 1. This is do to two primary factors: 1) cross country travel is prohibited under all four of the action alternatives (2-5), and 2) all the action alternatives (2-5) have significantly reduced miles of proposed trails within spotted owl PACs.

Alternative 2 presents a moderate risk to breeding spotted owls, which cumulatively has approximately 39.4 miles of proposed trails and existing NFS motorized trails. This risk is significantly reduced compared to Alternative 1 and represents a reduction of 50 miles of routes within PACs.

Alternative 5 presents a moderate risk to breeding spotted owls, which cumulatively has approximately 30.4 miles of proposed trails and existing NFS motorized trails. This risk is significantly reduced compared to alternative 1 and represents a reduction of 59 miles of routes within PACs.

Alternative 4 presents a low risk to breeding spotted owls, which cumulatively has approximately 22.4 miles of proposed trails and existing NFS motorized trails. This risk is significantly reduced compared to Alternative 1 and represents a reduction of 67 miles of routes within PACs.

Alternative 3 presents the lowest risk to breeding spotted owls, which cumulatively has approximately 12.4 miles of existing NFS motorized trails. This risk is significantly reduced compared to alternative 1 and represents a reduction of 77 miles of routes within PACs. Alternative 3 would pose the best scenario for breeding spotted owls and PACs.

Table 14. Cumulative Miles of Proposed Motorized Routes within Spotted Owl Protected Activity Centers

Route Miles	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of proposed alternatives					
Miles of proposed unauthorized routes or proposed route additions [1]	77.0	27	0	10	18
Cumulative effects of past, present, and proposed actions					
Miles of Existing Routes on NFS lands	12.4	12.4	12.4	12.4	12.4
Total Cumulative Effect					
Total Cumulative Impact (Miles of All Routes)	**89.4**	**39.5**	**12.4**	**22.4**	**30.4**

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

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

Table 15 presents the analysis of cumulative effects of route or trail miles the lie within the 0.25-mile radius circle of spotted owl activity centers (nest site or nest stand). The cumulative effects analysis for activity centers results in a similar conclusion and ranking of alternatives as the cumulative effects found for PACs.

Alternative 1 has the highest cumulative miles (29.8 miles) of motorized trails and open routes when compared to the four action alternatives (2-5). Alternative 1 clearly poses the greatest cumulative risk to nesting spotted owls by allowing continued cross-country travel and the potential for proliferation of additional routes across the PNF which could increase routes miles within 0.25 miles of an activity centers in the future.

All action alternatives (2–5) significantly reduce cumulative effects to breeding owls by having less routes miles within the 0.25-mile radius circle of activity centers, and by prohibiting cross country travel and the potential of additional routes across the PNF.

Alternative 2 poses a moderate risk to breeding spotted owls by having 13.4 miles of proposed and existing trails within 0.25 miles of an activity center. The risk under Alternative 2 is moderated due to the reduction of 16.4 miles of route when compared to Alternative 1.

Alternative 5 poses a moderate risk to breeding spotted owls by having 10.4 miles of proposed and existing trails within 0.25 miles of an activity center. The risk under Alternative 5 is moderated due to the reduction of 19.4 miles of route when compared to Alternative 1.

Alternative 4 poses a low risk to breeding spotted owls by having 7.9 miles of proposed and existing trails within 0.25 miles of an activity center. The risk under Alternative 4 is lowered due to the reduction of 21.9 miles of route when compared to Alternative 1.

Alternative 3 poses the lowest risk to breeding spotted owls by having only 4.4 miles of existing trail within 0.25 miles of an activity center. The risk under Alternative 3 is low due to the reduction of 25.4

miles of route when compared to Alternative 1. Alternative 3 would pose the best scenario for breeding spotted owls and activity centers.

Table 15. Cumulative Miles of 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
Direct and Indirect effects of proposed alternatives					
Miles of proposed unauthorized routes or proposed route additions [1]	25.4	9.0	0	3.5	6
Cumulative effects of past, present, and proposed actions					
Miles of existing motorized routes - NFS lands	4.4	4.4	4.4	4.4	4.4
Total Cumulative Effects					
Overall Cumulative Impact	**29.8**	**13.4**	**4.4**	**7.9**	**10.4**

[1] Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

Summary of Cumulative Effects to Breeding Spotted Owls

An analysis of breeding spotted owls on the Plumas 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 Plumas NF. Under all of the other alternatives, cross-country motorized travel would be prohibited.

Direct and Indirect Effects to Fragmentation and Edge Effects within California Spotted Owl Protected Activity Centers

Habitat fragmentation and edge effects were described for late-successional associated species within late-successional forest types (CWHR types 4M, 4D, 5M, 5D, & 6) and within Old Forest Emphasis Areas (OFEAs) under the section “Effects Common to All Late-successional Associated Species.” Those analyses provided a forest-wide view of how the project alternatives affect spotted owl habitat fragmentation within late-successional 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 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 Plumas 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 the spatial scale of within 200 meters of unauthorized motorized routes (Table 16). The 200 meters Zone of Influence represents all impacts which could occur to spotted owls and includes - 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 et. al. 1999). However, current ongoing studies on spotted owls and off-highway vehicles interactions in northern California should contribute to our scant knowledge on the effects of off-highway vehicles on spotted owls.

Zone of Influence at 200 Meters

Table 16 displays the direct and indirect effects by showing the amount of PAC acres that fall within the 200-meter Zone of Influence of proposed trails and open unauthorized routes. Direct and indirect effects of Alternative 1 within spotted owl PACs show that 14,127 acres would have reduced habitat effectiveness for spotted owls. These acres would be expected to increase under Alternative 1 over time as cross country travel would still be allowed, and the potential for route proliferation and additional routes to be added across the PNF would still exist.

All of the action alternatives (2-5) significantly reduce impacts to PACs within the 200-meter zone of influence when compared to Alternative 1. In addition all of the action alternatives prohibit cross country travel and would further reduce any future potential impacts to PACs.

Alternative 2 would directly and indirectly affect habitat effectiveness on 3,740 acres within PACs. When compared to Alternative 1, this is a reduction of 10,387 acres.

Alternative 5 would directly and indirectly affect habitat effectiveness on 2,493 acres within PACs. When compared to Alternative 1, this is a reduction of 11,634 acres.

Alternative 4 would directly and indirectly affect habitat effectiveness on 1,412 acres within PACs. When compared to Alternative 1, this is a reduction of 12,715 acres.

Alternative 3 does not propose any new trails, therefore no direct and indirect effects to habitat effectiveness within PACs would occur under this alternative.

Table 16. Proportion of California spotted owl PACs within 200 Meters of Proposed Unauthorized Motorized Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Percent of spotted owl PACs within a 200 meter Zone of Influence of Proposed Unauthorized Motorized Routes	14,127	3,740	0	1,412	2,493

Cumulative Effects

Zone of Influence at 200 meters

The cumulative effects to spotted owl PACs within a 200-meter Zone of Influence are compared for the proposed alternatives (Table 17).

200 Meter Zone of Influence

Error! Reference source not found.7 displays the results of the cumulative effects analysis for the five alternatives analyzed for impacts to habitat effectiveness within PACs that result from motorized trails and open unauthorized routes on NFS lands. When comparing the cumulative effects of trails and/or routes and their 200-meter zone of influence to spotted owl PACs (by summing the direct and indirect effects of the alternatives and the cumulative effects of past, present and future actions), Alternative 1 has the highest overall cumulative impact to PACs by affecting habitat effectiveness on 15,789 acres. Alternative 1 also poses additional risk to habitat connectivity and other negative cumulative impacts associated (including noise disturbance) by allowing cross-country travel to continue into the future.

All action alternatives significantly reduce impacts to habitat effectiveness within PACs by prohibiting cross-country travel and reducing acres affected within PACs by over 10,000 acres, when compared to Alternative 1. For example, Alternative 2 contributes to overall cumulative impacts within PACs on just 5,402 acres. Alternative 5 has slightly less cumulative effects than Alternatives 2, with only 4,155 acres affected. Alternative 4 affects the lesser amount of spotted owl habitat with 3,075 acres. Alternative 3 represents the least impact to habitat effectiveness within PACs with 1,662 acres affected.

Table 17. Cumulative Effects - Proportion of Spotted Owl Protected Activity Centers within 200 meter Zone of Influence of All Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of proposed alternatives					
Unauthorized routes or proposed route additions (negative impact)[1]	14,127	3,740	0	1,413	2,493
Cumulative effects of past, present, and proposed actions					
Existing motorized routes - NFS lands (negative impact)	1,662	1,662	1,662	1,662	1,662
Total Cumulative Effects					
Overall Cumulative Effects	**15,789**	**5,402**	**1,662**	**3,075**	**4,155**

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

Cumulative Effects Summary to PACs at 200 meter Zone of Influence

Cumulative effects of habitat effectiveness within California spotted owl PACs were assessed by determining the amount of spotted owl PACs that are influenced by motorized trails and open routes on NFS lands. A 200-meter Zone of Influence was used to determine potential effects from the influence of noise, edge effects and habitat alteration associated with motorized trails and routes.

Alternative 1 poses the highest cumulative effects and greatest risk to habitat effectiveness within PACs at the 200-meter of Zone of Influence scale. Under Alternative 1 cumulative effects would result in 15,789 acres of PAC habitat with reduced habitat effectiveness. In addition, the risk is increased since Alternative 1 would still allow cross country travel and the potential for route proliferation to add additional routes across the PNF.

Alternatives 2 significantly reduces cumulative effects to habitat effectiveness and poses a low risk to habitat effectiveness within PACs. Alternative 2 results in 5,402 acres of cumulative effects to

PACs and would prohibit cross country travel. The prohibition of cross country travel would reduce the risk of route proliferation into the future.

Alternative 5 significantly reduces cumulative effects to habitat effectiveness and poses a low risk to habitat effectiveness within PACs. Alternative 5 results in 4,155 acres of cumulative effects to PACs and would prohibit cross country travel. The prohibition of cross country travel would reduce the risk of route proliferation into the future.

Alternative 2 significantly reduces cumulative effects to habitat effectiveness and poses a low risk to habitat effectiveness within PACs. Alternative 2 results in 3,075 acres of cumulative effects to PACs and would prohibit cross country travel. The prohibition of cross country travel would reduce the risk of route proliferation into the future.

Alternative 3 significantly reduces cumulative effects to habitat effectiveness and poses a lowest risk to habitat effectiveness within PACs. Alternative 3 results in 1,662 acres of cumulative effects to PACs and would prohibit cross country travel. The prohibition of cross country travel would reduce the risk of route proliferation into the future. Alternative 3 would pose the best scenario for habitat effectiveness within PACs for the spotted owl.

Home Range Core Areas - Direct and Indirect Effects

Zone of Influence at 200 meters

Delineated California spotted owl Home Range Core Areas (HRCAs) are comprised of approximately 700 acres (including the PAC) of the best available spotted owl habitat (SNFPA 2004 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 200 meters (Table 18).

Zone of Influence at 200 Meters

Alternative 1 directly and indirectly reduces habitat effectiveness on 35,607 acres within spotted owl HRCAs. All action alternatives (2-5) significantly reduce impacts to habitat effectiveness within HRCAs by over 25,000+ acres. Alternatives 2 results in a reduction of habitat effectiveness within spotted owl HRCAs on 9,391 acres. Alternative 5 results in a reduction of habitat effectiveness within spotted owl HRCAs on 6,456 acres. Alternative 4 results in a reduction of habitat effectiveness within spotted owl HRCAs on 3,522 acres. Alternative 3 proposes no additional proposed trails and, therefore, would have no direct and indirect effects within the 200-meter Zone of Influence in spotted owl HRCAs.

Table 18. Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within 200 Meters influenced by open Unauthorized Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Acres of spotted owl HRCAs within a 200- meter Zone of Influence of Proposed Unauthorized Motorized Routes	35,607	9,391	0	3,522	6,456

Cumulative Effects to HRCAs

Zone of Influence at 200 meters

The cumulative effects to spotted owl HRCAs within a 200 meter Zone of Influence are compared for the proposed alternatives (Table 19). As previously discussed, the cumulative effects analysis presented here only provides a relative comparison of cumulative effects to spotted owl foraging habitat from motorized routes.

200 Meter Zone of Influence

Table 19 displays the cumulative effects of the proposed alternatives of motorized routes on NFS lands within spotted owl HRCAs. When comparing the cumulative effects to HRCAs from routes and their associated 200-meter Zone of Influence (i.e., summing the direct and indirect effects of the alternatives and the cumulative effects of past, present and future actions), Alternative 1 has the highest cumulative impact where approximately 39,520 acres of foraging habitat within HRCAs would be affected. Alternative 1 would pose the highest risk to habitat connectivity and other negative cumulative impacts (i.e., noise disturbance) within spotted owl HRCAs due to continued route proliferation since unmanaged cross-country travel would continue into the future.

All the action alternatives significantly reduce cumulative effects to spotted owl foraging habitat within HRCAs. Alternative 2 contributes to overall cumulative impacts within HRCAs on 13,304 acres, which is a decrease of 26,216 acres from Alternative 1. Alternative 5 contributes to overall cumulative impacts within HRCAs on 10,369 acres, which is a decrease of 29,151 acres from Alternative 1. Alternative 4 contributes to overall cumulative impacts within HRCAs on 7,435 acres, which is a decrease of 32,085 acres from Alternative 1. Alternative 3 contributes to overall cumulative impacts within HRCAs on 3,913 acres, which is a decrease of 35,607 acres from Alternative 1.

Table 19. Cumulative Effects - Proportion of California Spotted Owl Home Range Core Areas (HRCAs) within a 200-meter "Zone of Influence" of Proposed Addition of Unauthorized Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of proposed alternatives					
Unauthorized routes or proposed route additions [1]	35,609	9,391	0	3,522	6,456
Cumulative effects of past, present, and proposed actions					
Existing motorized routes - NFS lands	3,913	3,913	3,913	3,913	3,913
Total Cumulative Effects					
Overall Cumulative Effects equals the total of all impacts	**39,520**	**13,3**	**3,91**	**7,43**	**10,3**

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
		04	3	5	69

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

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

The proportion of spotted owl Home Range Core Areas (HRCAs) within a 200-meter Zone of Influence of all motorized trails and open unauthorized routes within NFS lands was determined to assess the cumulative effects from the alternatives.

Alternative 1 poses the highest cumulative effects and greatest risk to spotted owl HRCAs that would be used for foraging spotted owls from route associated factors including noise, edge effects and habitat fragmentation based on two primary factors: 1) the amount of acres affected which total 39,520 acres, and 2) the continued allowance of cross country travel and the risk for potential addition of routes as a result of route proliferation.

Alternative 2 poses a moderate cumulative effect and risk to spotted owl HRCAs. This is based on two primary factors: 1) the amount of acres affected which total 13,304 acres, and 2) the prohibition of cross country travel and reduced risk of route proliferation across the PNF.

Alternative 5 poses a moderate cumulative effect and risk to spotted owl HRCAs. This is based on two primary factors: 1) the amount of acres affected which total 10,369 acres, and 2) the prohibition of cross country travel and reduced risk of route proliferation across the PNF.

Alternative 4 poses a low cumulative effect and risk to spotted owl HRCAs. This is based on two primary factors: 1) the amount of acres affected is low, 7,435 acres, and 2) the prohibition of cross country travel and reduced risk of route proliferation across the PNF.

Alternative 3 poses the lowest cumulative effect and risk to spotted owl HRCAs. This is based on two primary factors: 1) the amount of acres affected are the lowest at 3,913 acres, and 2) the prohibition of cross country travel and reduced risk of route proliferation across the PNF.

Sensitive Species Determinations

Based on the spotted owl analysis of effects, the Biological Evaluation for this EIS made a determination for the California Spotted Owl.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the California spotted owl. This determination is based on the rationale that cross country travel would continue in the future and lead to additional loss of habitat, an increase in habitat fragmentation, and result in high risk to spotted owl PACs and HRCAs.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the California spotted owl within the planning area of the Plumas National Forest. This determination is based on the rationale that the action alternatives would prohibit current and future cross-country travel across the PNF, that risks to spotted owl PACs and HRCAs would be significantly reduced compared to Alternative 1 (No-action), and that a higher amount of owl nesting and foraging habitat would be maintained for the owl.

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.

Northern Goshawk: Affected Environment

The northern goshawk is designated as a Forest Service Sensitive Species in Region 5. There are currently 549,028 acres of suitable goshawk habitat on the Plumas NF as defined by CWHR types 4 M, 4D, 5M, 5D, and 6. Northern goshawk territories are managed on the Plumas National Forest as Protected Activity Centers (PACs) as prescribed by the Sierra Nevada Forest Plan Amendment (2004). To date, the Plumas National Forest has 156 known northern goshawk PACs (Table 20).

Table 20. Number of goshawk Protected Activity Centers by ranger district on the Plumas National Forest

Ranger District	Number of PACs
Feather River	60
Beckwourth	48
Mt. Hough	48
Total Number of PACs	**156**
Total Acres of PACs	**32,995**

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 2001a) 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 has the potential to affect local individual territories that receive repeated visits and harvesting. No specific incidence of illegal goshawk harvest is known from the Plumas 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 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. Maintenance level 2 roads and trails probably do not pose as much a risk to habitat fragmentation compared to maintenance level 3, 4, & 5 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

Miles of proposed unauthorized motorized routes within Northern goshawk Protected Activity Centers (PACs) and within 0.25 mile of Northern goshawk Activity Centers to Assess 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 trail and road associated factors within 1) the designated **Protected Activity Centers (PACs)** and within 2) a **0.25 miles radius circle of goshawk Activity Centers** (nest or nest stand). PACs are delineated surrounding all known and newly discovered breeding territories on National Forest System lands on the Plumas 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 2 or more canopy layers, (1) trees in the dominant and co-dominant crown classes averaging 24” dbh or greater; (2) in westside conifer and eastside mixed conifer forest types, stands have at least 70 percent tree canopy cover; and (3) in eastside pine forest types, stands have at least 60 percent tree canopy cover. 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.

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-successional forest habitats in effects common to all late-successional 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 Breeding Northern Goshawks

Protected Activity Centers

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

Table 21 displays the total miles of unauthorized motorized routes that are proposed within goshawk Protected Activity Centers (PACs) by alternative. It also displays the number and percentage of PACs affected by proposed routes for each alternative. There are a total of 156 goshawk PACs designated on the Plumas NF. Alternative 3 does not propose any unauthorized motorized routes 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 45 miles of unauthorized motorized routes, where 54% of goshawk PACs (84 PACs) on the Plumas NF would be subjected to disturbance from the continued use of unauthorized motorized routes. Alternative 5 proposes approximately 9 miles of unauthorized routes to be added to the Plumas NF route system that would contribute to direct and indirect effects to 11% of the Plumas NF goshawk PACs (18 PACs).

Alternative 2 would affect a total of 26 goshawk PACs, where approximately 13 miles of unauthorized routes would affect 17% of the Plumas NF goshawk PACs. Implementing Alternative 4 would impact 6% of goshawk PACs on the Plumas NF with 5 miles of unauthorized routes, and represents the action alternative with the least impact on goshawk PACs.

Table 21. Miles of Proposed Unauthorized Motorized Routes within Northern Goshawk Protected Activity Centers on the Plumas NF

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Miles of Proposed Additions of Unauthorized Motorized Routes within Goshawk Protected Activity Centers (PACs)	45.1	13	0	5	9
Number of Goshawk PACs Intersected by Proposed Unauthorized Routes	84	26	0	10	18
Percent of Goshawk PACs Affected by Unauthorized Motorized Route Additions (Total Plumas NF Goshawk PACs = 156)	54%	17%	0%	6%	11%

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

Table 22 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 29.8 miles of unauthorized routes within 0.25 miles of goshawk activity centers. Alternative 2 poses the next greatest risk of noise disturbance from motorized vehicles to breeding goshawk where approximately 10.4 miles of unauthorized motorized routes would be added within the 0.25 mile radius circle of goshawk nest sites. Alternatives 5 and 4 pose the next greatest direct and indirect impacts compared to Alternative 2 where approximately 7.1 miles and 3.9 miles of unauthorized motorized routes, respectively, are proposed within the 0.25 mile radius circle of goshawk activity centers. Alternatives 3 does not directly or indirectly affect breeding goshawk within 0.25 mile radius circle of known or suspected goshawk nest sites/stands.

Table 22. Miles of Unauthorized 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
Miles of Proposed Additions of Unauthorized Motorized Routes within 0.25 mile radius circle of Activity Centers (nest site or nest stand)	29.8	10.4	0	3.9	7.1

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

Plumas NF. This is an appropriate scale for determining cumulative effects to the goshawk, since the Plumas NF boundary is sufficiently large which includes 156 goshawk territories. In addition, the Plumas 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 Plumas NF 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 unauthorized routes (direct and indirect impacts) with existing motorized routes (NFS lands only).

Protected Activity Centers

Table 23 displays the cumulative effects of all unauthorized routes, proposed trails and existing motorized trails on NFS lands. The data indicates that Alternative 1 has the most cumulative miles of routes (49 miles) within goshawk PACs on the PNF. Alternative 1 also continues the allowance of cross country travel, and therefore poses the greatest overall potential risk and cumulative impacts to breeding goshawk on the PNF.

All of the action alternatives significantly reduce cumulative effects to Goshawk PACs as a result of significantly less trail miles within PACs and the prohibition of cross country travel. Based on proposed and existing motorized trails, Alternative 2 has 16.9 miles that lie within goshawk PACs. Alternative 5 results in less cumulative miles within PACs within 12.9 miles. Alternative 4 results in 8.9 cumulative miles within Goshawk PACs. Alternative 3 results in the least amount cumulative effects to goshawk PACs within only 3.9 miles of existing trails.

Table 23. Cumulative Miles of All Routes within Goshawk PACs on Plumas NF

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of proposed alternatives					
Miles of routes to be added to system	45.1	13	0	5	9
Cumulative effects of past, present, and proposed actions					
Miles of existing motorized routes - NFS lands	3.9	3.9	3.9	3.9	3.9
Total Cumulative Effects					
Total Cumulative Impact	**49**	**16.9**	**3.9**	**8.9**	**12.9**

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

Table 24 displays data from the analysis of cumulative effects within the 0.25-mile radius circle of goshawk Activity Centers (nest site or nest stand).

Alternative 1 has the most cumulative open route/trail miles (32.3 miles) and represents the highest cumulative effect to Goshawk activity centers. In addition, risk to Goshawk Activity Centers is increased under Alternative 1 since cross country travel would continue and the potential for route proliferation would add additional routes across the PNF.

All action alternatives (2-5) reduce cumulative effects significantly compared to Alternative 1. Alternative 2 reduces impacts to goshawk activity centers down to 12.9 miles. Alternative 5 further reduces cumulative effects down to 9.6 miles. Alternative 4 contains 6.4 miles of proposed trail within 0.25 miles of Activity Centers representing low cumulative effects to Goshawks. Alternative 3 does not add to the existing trail miles, but does represent 2.5 miles of existing trails that lie within 0.25 miles of a Goshawk Activity Center. Alternative 3 represents the least risk to nesting goshawk compared to all other alternatives.

Table 24. Miles of All Routes within 0.25 mile of Goshawk Activity Centers (nest site or nest stand) on the Plumas NF

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of proposed alternatives					
Miles of unauthorized routes or proposed route additions (negative impact)[1]	29.8	10.4	0	3.9	7.1
Cumulative effects of past, present, and proposed actions					
Miles of existing motorized routes - NFS lands (negative impact)	2.5	2.5	2.5	2.5	2.5
Total Cumulative Effects					
Net Cumulative Impact = Sum Total of Negative Impacts minus positive impacts	**32.3**	**12.9**	**2.5**	**6.4**	**9.6**

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized 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-successional associated species within late-successional forest types (CWHR types 4M, 4D, 5M, 5D, & 6) and within Old Forest Emphasis Areas (OFEAs) under the section "Effects Common to All Late-successional Associated Species." Those analyses provided a forest-wide view of how the project alternatives affect spotted owl habitat fragmentation within late-successional 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 Plumas 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 proposed unauthorized motorized routes (Table 25). Although, absolute disturbance thresholds for goshawk is 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 were 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.

Table 25 displays the direct and indirect effects to goshawk PACs within a 400-meter Zone of Influence of open unauthorized routes and proposed trails. The data indicates that Alternative 1 reduces habitat effectiveness and associated habitat fragmentation (including noise disturbance) within 14,188 PAC acres.

All the action alternatives (2-5) result in significantly reduced direct and indirect effects to Goshawk PACs. Alternative 2 reduces habitat effectiveness of within goshawk PACs by 3,959 acres. Alternatives 4 and 5 reduce habitat effectiveness within goshawk PACs on 1,650 and 2,640 acres, respectively. Of the action alternatives that add trails to the NFTS, Alternative 4 represents the least impact to goshawk PACs within the 400-meter zone of influence. Habitat effectiveness within goshawk PACs would not be affected by implementing Alternative 3, since to trails will be added under this alternative.

Table 25. Acres of Plumas 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
Direct and Indirect effects of proposed alternatives					
Acres of PNF Goshawk PACs within a 400 meter zone of influence.	14,188	3,959	0	1,650	2,640

Cumulative Effects within a 400-meter Zone of Influence

Error! Reference source not found.6 displays the cumulative effects of the alternatives of proposed trails and open unauthorized routes on NFS lands. When comparing the cumulative effects of routes of goshawk PACs within a 400-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 to goshawk PACs (15,838 acres) and poses the greatest risk to habitat connectivity and other cumulative impacts associated (including noise disturbance) with open routes within goshawk PACs. In addition, Alternative 1 would contribute to continued route proliferation because unmanaged cross-country motorized travel would allowed to continue into the future.

All the action alternatives significantly reduce cumulative effects to goshawk PACs as a result of two primary factors: 1) the prohibition of cross country travel, and 2) the significantly reduced amount of habitat affected within Goshawk PACs when compared to Alternative 1. Alternative 2 contributes to overall cumulative impacts within goshawk PACs on 5,609 acres, which represents a reduction from Alternative 1 of over 10,000 acres. Alternative 5 contributes to cumulative impacts on 4,290 acres, which represents a reduction of over 11,000 acres. Alternative 4 contributes to cumulative impacts on 3,300 acres which represents a reduction of over 12,000 acres. Alternative 3 contributes to cumulative effects on only 1,650 primarily due to existing trails.

Table 26. Cumulative Effects - Proportion of Goshawk 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
Direct and Indirect effects of proposed alternatives					
Unauthorized routes or proposed route additions [1]	14,188	3,959	0	1,650	2,640
Cumulative effects of past, present, and proposed actions					
Existing motorized routes - NFS lands	1,650	1,650	1,650	1,650	1,650
Total Cumulative Effects					
Overall Cumulative Effects	15,838	5,609	1,650	3,300	4,290

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

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

The cumulative effects appendix provides a list and description of past, present, and reasonably foreseeable projects within the Plumas NF boundary. Some, but not all, of these activities will contribute to impacts to the northern goshawk within the cumulative effects boundary.

Between 1990 and 2007, wildfires resulted in burning approximately 266,963 acres of various habitats across the Plumas NF. Some, but not all have resulted in impacts to spotted owl habitats. Since 2000, more than 73,345 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. These wildfires and vegetation treatment projects have resulted in a reduction in the amount and quality of spotted owl habitat on the Plumas NF since 1988.

Thinning projects designed to reduce hazardous fuels will continue to be the primary activity affecting goshawk habitat on the Plumas (see cumulative effects appendix). 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).

Sensitive Species Determinations

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the Northern Goshawk.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the Northern Goshawk. This determination is based on the rationale that cross country travel would continue in the future and lead to additional loss of habitat, an increase in habitat fragmentation, and result in high risk to Goshawk PACs and Activity Centers.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the Northern Goshawk within the planning area of the Plumas National Forest. This determination is based on the rationale that the action alternatives would prohibit current and future cross-country travel across the PNF, that risks to Northern Goshawk PACs and Activity Centers would be significantly reduced compared to Alternative 1 (No-action), and that a higher amount of nesting and foraging habitat would be maintained for the goshawk.

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. 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 Plumas NF developed a Draft Forest Carnivore Network in 1988 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 Draft 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 (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. 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 et al. 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 (Bisonette et al. 1997, *in* USDA Forest Service 2004).

Pacific Fisher

The Plumas 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. 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 Plumas NF. Roads can contribute to habitat fragmentation where the fisher generally avoids entering open areas that have no overstory or shrub cover; and 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 Plumas NF. Previous studies have reported a negative correlation between detections of fisher and roads (Dark 1997). 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, trails, or networks, and associated human activities
- Changes to habitat microclimate associated with the edge induced by roads or trails
- 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 or network of roads or trails

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.

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 (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 (Martin 1987). Marten road mortality on the Plumas NF, may be of concern since State highways 89 and 70 bissects their habitat. Collisions are much less likely to occur along the slower-speed native surface routes that are being evaluated for designation 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). 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 fishers from the central Sierra Nevada and its failure to recolonize 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 the implications to marten dispersal may be of concern. State highways 89 and 70 bisect marten habitat. If marten avoid these highways, then marten populations could become fragmented into small isolated populations.

Roads may decrease prey and food availability for marten and fisher 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.

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.

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 Rugerrio, 1994). The current absence of fisher on the Plumas 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 Plumas NF.

Environmental consequences for marten and fisher are analyzed at three different scales - within late-successional habitat (CWHR types 4M, 4D, 5M, 5D & 6), Old Forest Emphasis Areas (OFEAs), and Plumas NF Draft Forest Carnivore Network. Late-successional 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 Plumas NF Draft 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-successional 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

Zone of Influence: Studies indicate marten habitat use declines within a distance 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.

Direct and Indirect Effects – American Marten and Pacific Fisher 300-meter Zone of Influence within Carnivore Network, OFEAs, and Old Forest CWHR types (4M, 4D, 5M, 5D, & 6) , and Cumulative Effects

Direct and Indirect Effects

Table 27 displays the acres of the Draft Carnivore Network, OFEAs and Old Forest CWHR types (4M, 4D, 5M, 5D, and 6) that fall within a 300-meter Zone of Influence from open unauthorized routes and proposed trails.

When increasing the Zone of Influence to 300 meters, substantially higher amounts of marten and fisher habitat are influenced by proposed trails or open unauthorized routes. Based on open unauthorized routes 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-successional habitat and within OFEAs, where marten and fisher habitat suitability may be reduced. Alternative 1 results in a reduction in habitat connectivity within 71,346 acres of the Carnivore Network, a 155,023 acre reduction in habitat connectivity in Old Forest Emphasis Areas and a 137,257 acre reduction in habitat connectivity in Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6).

All the action alternatives (2-5) significantly reduce direct and indirect effects to habitat connectivity within the three habitat categories found in Table 28 when compared to Alternative 1. Based on proposed trails and their a 300-meter Zone of Influence, Alternative 2 would reduce habitat connectivity for marten and fisher by 16,465 acres in the Carnivore Network, 40,191 acres in the Old Forest Emphasis Areas and 71,374 acres in the Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6). Alternative 5 has slightly less impact to habitat connectivity for marten and fisher by having direct and indirect effects to 10,976 acres in the Carnivore Network, 28,708 acres in the Old Forest Emphasis Areas and 49,412 acres in the Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6). Alternative 4 further reduces impacts to habitat connectivity for marten and fisher by having direct and indirect effects to only 5,488 acres in the Carnivore Network, 17,225 acres in the Old Forest Emphasis Areas and 27,451 acres in the Old Forest habitat types (CWHR 4M, 4D, 5M, 5D, 6). Alternative 3 would not reduce habitat connectivity for marten or fisher from existing conditions, since no proposed trails will be added under this alternative.

Table 27. Percent of Draft Carnivore Network, OFEAs, and Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6) within a 300-meter "Zone of Influence" of Unauthorized Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Carnivore Network	71,346	16,465	0	5,488	10,976
Old Forest Emphasis Areas (SNFPA)	155,023	40,191	0	17,225	28,708
Old Forest Habitat (CWHR 4M, 4D, 5M, 5D, 6)	137,257	71,374	0	27,451	49,412

Cumulative Effects to Carnivore Network, OFEAs, and Old Forest CWHRs within 300-meter Zone of Influence

The acres of Carnivore Network, OFEAs and Old Forest CWHR occurring within a 300-meter Zone of Influence for open unauthorized routes, proposed trails and existing motorized trails on NFS lands for all five of the alternatives are shown in **Error! Reference source not found.**, **Error! Reference source not found.** and **Error! Reference source not found.**.

Based on the cumulative effects analysis, Alternative 1 would pose the highest risk to habitat fragmentation within the Carnivore Network, OFEAs and Old Forest habitat types, where considerable cumulative impacts would be added to existing cumulative effects to marten and fisher. 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 PNF. Alternative 1 would cumulatively affect 167,389 acres within the draft carnivore network, 338,754 acres within OFEAs, and 323,927 acres within Old Forest CHWR types.

All of the action alternatives (2-5) result in less cumulative effects to the draft carnivore network, OFEAs and Old Forest CWHR types. In addition, Alternatives 2-5 would prohibit cross country travel and reduce the risk of route proliferation adding routes to within these three key habitat categories. Compared to Alternative 1, Alternative 2 reduces acres impacted within the draft carnivore network by 55,000+ acres, within OFEAs by over 100,000+ acres and within Old Forest CWHR Types by over 60,000+ acres. Alternatives 5, 4 and 3 reduces cumulative effects to much lower levels (see the following three tables).

Table 28. Percent of Draft Carnivore Network within a 300-meter Zone of Influence of Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect Effects of Proposed Alternatives					
Unauthorized routes or proposed route additions (negative impact)[1]	71,346	16,465	0	5,488	10,976
Cumulative Effects of Past, Present, and Proposed Actions					
Existing motorized routes - NFS lands (negative impact)	96,043	96,043	96,043	96,043	96,043
Total Cumulative Effects					
Overall Relative Cumulative Impact Score = Sum Total of Open Routes (**Note**: Some overlap may occur where route	**167,389**	**112,507**	**96,043**	**101,531**	**107,019**

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
categories intersect)					

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

Table 29. Percent of Old Forest Emphasis Areas within a 300-meter Zone of Influence

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect Effects of proposed alternatives					
Unauthorized routes or proposed route additions (negative impact)[1]	155,023	40,191	0	17,225	28,708
Cumulative Effects of past, present, and proposed actions					
Existing motorized routes - NFS lands (negative impact)	183,731	183,731	183,731	183,731	183,731
Total Cumulative Effects					
Overall Relative Cumulative Impact Score (Percent of Plumas NF OFEA) = Sum Total of Open Routes (**Note**: Some overlap may occur where route categories intersect)	338,754	223,922	183,731	200,956	212,439

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

Table 30. Percent of Forest-wide Old Forest (CWHR 4, 5, 6) within 300-meter "Zone of Influence" of Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and indirect effects of proposed alternatives					
Unauthorized routes or proposed route additions (negative impact)[1]	137,257	71,374	0	27,451	49,412
Cumulative effects of past, present, and proposed actions					
Existing motorized routes - NFS lands (negative impact)	186,670	186,670	186,670	186,670	186,670
Total cumulative effects					
Overall Relative Cumulative Impact Score = Sum Total of Open Routes (negative impacts) (**Note**: Overlap occurs where route categories intersect, therefore percentages are only relative to each other and not actual amounts)	323,927	258,044	186,670	214,121	236,082

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

Cumulative Effects Summary

The cumulative effects appendix provides a list and description of past, present, and reasonably foreseeable vegetation and fuels management projects on NFS lands within the Plumas 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 and (2) the use of roads and associated human access.

On the Plumas 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 2000 and 2007, vegetation treatments (including timber harvest) and fuels treatments (including mastication) on NFS lands have occurred on approximately 73,345 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.

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, 3, 4 and 5, result in a lower adverse cumulative effects. The combined effects of the project alternatives and other factors affecting marten and fisher habitats could result in adverse cumulative effects, considering the proportion of marten and fisher habitat influenced by motorized routes, and projections for future increases in recreation uses and OHV activity. At present, however, there is no indication 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.

These alternatives do not result in a loss of habitat (no route construction), but may add to existing cumulative effects where between 25 and 27% of marten habitat may be influenced by proposed unauthorized routes under Alternative 1; between 6 to 13% under Alternatives 2, and the remaining action alternatives cumulatively affecting between 2% to 9% of marten habitat. The cumulative effects under Alternative 1 combined with fuels treatment and livestock grazing effects upon marten habitat, could be considerable. Adjacent wilderness areas may become increasingly important as the cumulative effect of vegetation treatment activities expand within other portions of marten and fisher habitat.

Sensitive Species Determinations

American Marten

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the American Marten.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the American Marten. This determination is based on the rationale that cross country travel would continue in the future and lead to additional loss of habitat, an increase in habitat fragmentation, and result in high risk to key habitat within the Draft Carnivore Network, OFEAs and Old Forest CWHR types.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the American Marten within the planning area of the Plumas National Forest. This determination is based on the rationale that the action alternatives would prohibit current and future cross-country travel across the PNF, that risks to Marten habitat within the Draft Carnivore Network, OFEAs and Old Forest CWHR types would be significantly reduced compared to Alternative 1 (No-action), and that a higher amounts of suitable habitat would be maintained for the Marten.

Pacific Fisher

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the Pacific Fisher.

Alternative 1 – This alternative will not affect the Pacific Fisher, since no Fisher have been found on the Plumas NF. However this alternative does present a risk to future Fisher reintroduction efforts on the PNF sine cross country travel would continue in the future and lead to additional loss of habitat, an increase in habitat fragmentation, and result in high risk to key habitat within the Draft Carnivore Network, OFEAs and Old Forest CWHR types.

Alternatives 2, 3, 4 and 5 - These alternatives will not affect the Pacific Fisher, since no Fisher have been found on the Plumas NF. However these alternatives would represent a low risk to future Fisher reintroduction efforts on the PNF since they would prohibit current and future cross-country travel across the PNF and that risks to suitable habitat within the Draft Carnivore Network, OFEAs and Old Forest CWHR types would be significantly reduced compared to Alternative 1 (No-action), and that a higher amounts of suitable habitat would be maintained.

Riparian Associated Species

The Riparian group includes both 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 Plumas 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 and greater sandhill crane and general riparian habitats that may be associated with this group.

Riparian Associated Bird Species

Effects Common to All Riparian Associated Bird Species

Changes in Class of Vehicles: Responses to motorized vehicle use varies by species and depends upon the type of vehicle, the intensity, timing, speeds, and amount motorized vehicle use. 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 effects to riparian associated bird species for all of the proposed alternatives.

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 Plumas National Forest, sixteen bald eagle breeding territories have been identified within the Plumas NF boundary including national forest system lands and private land in recent years (Table 31). Fourteen bald eagle territories with recent nesting activity are located on National Forest Service system lands. Two territories occur on private land at Round Valley Reservoir and Poe Powerhouse on the north fork of the Feather River.

Table 31. Known Bald Eagle Nest Territories on the Plumas NF

Territory Name	Ranger District	Ownership
Antelope Lake I	Mt. Hough Ranger District	Plumas NF
Antelope Lake II	Mt. Hough Ranger District	Plumas NF
Bucks lake	Mt. Hough Ranger District	Plumas NF
Butt II	Mt. Hough Ranger District	Plumas NF
Butt Valley Dam	Mt. Hough Ranger District	Plumas NF
Cool Springs	Mt. Hough Ranger District	Plumas NF
Rocky Point	Mt. Hough Ranger District	Plumas NF
Round Valley	Mt. Hough Ranger District	Private
Snake Lake	Mt. Hough Ranger District	Plumas NF
Cow Creek	Beckwourth Ranger District	Plumas NF
Frenchman	Beckwourth Ranger District	Plumas NF
Bagley Pass	Beckwourth Ranger District	Plumas NF
Mosquito Slough	Beckwourth Ranger District	Plumas NF
Little Grass Valley	Feather River Ranger District	Plumas NF
Poe Powerhouse	Feather River Ranger District	Private
Feather Falls	Feather River Ranger District	Plumas NF

The road and trail-associated factors that have been identified for the bald eagle include poaching, disturbance at specific site (nests and roost sites), and avoidance and displacement. 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 (, Fraser et al. 1985, Buehler et al. 1991, Grubb and King 1991).

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 site 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 et al. 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. 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). 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 have implemented measures to prevent the potential for nest failure and/or abandonment due to human disturbances (USFWS 1986). There is currently one seasonal area closure for bald eagle nest site protection at Little Grass Valley Reservoir on the Feather River Ranger District.

Roads and 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

Disturbance at a Specific Site (Motorized Route Miles): Motorized wheeled 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

Cross Country Travel: Cross country travel will be prohibited within bald eagle habitat for all action alternatives. The prohibition of cross country travel will prevent the proliferation of new unauthorized routes 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 closing all the unauthorized routes 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.

Additions to the National Forest System

Motorized Route Miles

Disturbance to bald eagle nest sites from project alternatives is analyzed by determining the number of miles of unauthorized motorized routes occurring between 0 and 400 meters, and between 400 and 800 meters for each bald eagle territory (Table 3.03-80). Factors associated with motorized routes at a distance between 0 to 400 meters of bald eagle nest sites will likely cause the greatest potential disturbance to nesting bald eagles during the nesting season. Disturbance from motorized routes between 400 and 800 meters away from nest sites will likely have a lesser effect since noise associated with wheeled vehicles diminishes at greater distances, but may still modify behavior of nesting eagles, particularly for foraging eagles.

Alternative 1 poses the greatest risk to nesting bald eagles on the Plumas NF. Alternative 1 would potentially impact two bald eagle territories where approximately ¾ of a mile of unauthorized routes would be open to motor vehicles within 400 meters of bald eagle nest sites. This ¾ mile impact would be split between 1/4 mile at Rocky Point and 1/2 mile at Snake Lake. These eagle territories would have open unauthorized routes within 400 meters of their nest site. An additional 2.7 miles would potentially affect bald eagle nest sites between 400 and 800 meters. The territories of Snake Lake, Rocky Point, and Butt II would receive the greatest amount of impacts at this distance.

Alternatives 2, 4, 5 are identical in the amount of direct and indirect impacts to nesting eagles, where only ¼ and ½ mile of motorized trails within 400 meter of nest sites at Snake Lake and Rocky Point, respectively, would be added.

Alternative 3 would pose the least impact, since it does not contain or add any proposed trails. All action alternatives (2-5) also prohibit cross-country travel within nesting and foraging Bald Eagle habitat which further reduces the risk to nesting bald eagles over Alternative 1.

Table 3.03-80. Miles of Unauthorized Routes within 0 and 400 meters and between 400 to 800 meters of Bald Eagle Nest Sites

Territory Name	Alt.1	Alt.2	Alt.3	Alt.4	Alt.5
Antelope Lake I					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Antelope Lake II					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Bagley Pass					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Bucks Lake					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Butt II					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.1	0.0	0.0	0.0	0.0
Butt Valley Dam					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Cool Springs					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Cow Creek					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Feather Falls					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Frenchman					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Little Grass Valley (LGV)					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Mosquito Slough					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Poe Powerhouse					

0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Rocky Point					
0 to 400 meters	0.2	0.2	0.0	0.2	0.2
400 to 800 metters	1.2	0.7	0.0	0.7	0.7
Round Valley					
0 to 400 meters	0.0	0.0	0.0	0.0	0.0
400 to 800 metters	0.0	0.0	0.0	0.0	0.0
Snake Lake					
0 to 400 meters	0.5	0.5	0.0	0.5	0.5
400 to 800 metters	1.4	0.7	0.0	0.7	0.7
Total Unauthorized Route Miles For Bald Eagle Nest Sites					
0 to 400 meters	0.7	0.7	0.0	0.7	0.7
400 to 800 metters	2.7	1.4	0.0	1.4	1.4
Total (0 to 800 meters)	3.4	2.1	0.0	2.1	2.1

Cumulative Effects to Nesting Bald Eagles

Cumulative effects to the bald eagle analyzes all motorized routes (Inventoried, proposed and existing) occurring on the Plumas 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 Plumas 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 Plumas 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.

Summary of 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, wheeled motorized vehicle use, and others. A seasonal closure at Little Grass Valley Reservoir has 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. 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 be retained. Forest thinning and fuels treatment projects are designed to prevent loss of bald eagle habitat over the long-term.

Miles of Open 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 ¾ of a mile of unauthorized routes within 400 meters of a bald eagle nest site, which would potentially result in direct disturbance to nesting bald eagles. 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. 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.

Action alternatives 2, 4 and 5 are expected to result in less cumulative effects to bald eagles than Alternative 1 since the cross country travel would be prohibited. Alternatives 2, 4 and 5 add about 2.1 miles of trails that would contribute to additional cumulative impacts to nesting bald eagles at Snake Lake and Rocky Point.

Alternative 3 would not add trails, however adverse impacts would continue from motorized use of approximately ¾ mile of existing NFS trail within 400 meters of bald eagle nest sites. However, since bald eagles have successfully reproduced at the Rocky Point territory, this amount of existing recreational use under alternative 3 does not appear to be affecting nesting success. The Snake Lake territory may be affected by past and existing recreational use under Alternative 3 due to the absence of nesting bald eagles since the late 1980s. Alternative 3 would also prohibit cross country travel which would benefit bald eagles by ultimately preventing additional disturbance to nesting bald eagles on the PNF.

Sensitive Species Determination

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the Bald Eagle.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the Bald Eagle. This determination is based on the rationale that cross country travel would continue in the future and lead to additional impacts to nesting bald eagles over time.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the Bald Eagle within the planning area of the Plumas National Forest. This determination is based on the rationale that the action alternatives would prohibit current and future cross-country travel across the PNF, that risks to Bald Eagles and eagle nest sites would be significantly reduced compared to Alternative 1 (No-action).

Willow Flycatcher: Affected Environment

On the Plumas 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 (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. Several grazing allotments on the Plumas NF overlap occupied and emphasis willow flycatcher sites.

Willow Flycatcher: Environmental Consequences

Analysis Measures

Number of Occupied and Emphasis Willow Flycatcher Sites with Routes: To evaluate the effects of motorized routes on willow flycatcher habitat, the number of willow flycatcher Occupied and Emphasis habitat sites intersected by 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 larger than 15 acres that have standing water on June 1 and a deciduous shrub component.

Direct and Indirect Effects

Direct and indirect effects of the project alternatives are evaluated by determining the number of proposed unauthorized routes that intersect delineated willow flycatcher habitat sites on the Plumas NF.

Under Alternative 1, open unauthorized routes (7.46 miles) would intersect 68 (25%) willow flycatcher habitat sites, resulting in both direct and indirect disturbance. Of these sites, 10 out of 28 habitats (36%) have been identified as “Occupied” willow flycatcher sites, where approximately 1.4 miles of unauthorized routes have the potential to adversely affect breeding willow flycatchers, including both direct disturbance to nesting willow flycatchers and indirect impacts to willow flycatcher habitat alteration and/or degradation where routes potentially affect vegetation and hydrology.

The action alternatives significantly reduce impacts to Occupied and Emphasis habitat sites compared to Alternative 1. Implementation of Alternatives 2, 4 and 5 would have no direct and indirect impacts to breeding willow flycatchers at “Occupied” sites. Within “Emphasis” habitat sites. Alternatives 2, 4 and 5 affect from 7 to 17 willow flycatcher “Emphasis” sites (3% and 8%). This represents a reduction of impacts from Alternative 1 that range from 41 to 51 less emphasis sites impacted by Alternatives 2, 4, and 5. Alternative 3 would not affect any willow flycatcher habitat sites. This alternative does not add any trails.

Table 33. Number of willow flycatcher habitat sites intersected by proposed unauthorized motorized routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Occupied Habitat (28) (Unauthorized route miles)	10 (1.40)	0	0	0	0
Emphasis Habitat (242) (Unauthorized route miles)	58 (6.06)	17 (1.20)	0	7 (0.46)	12 (0.82)
Total	**68 (7.46)**	**17 (1.20)**	**0**	**7 (0.46)**	**12 (0.82)**

Cumulative Effects

Cumulative Effects Boundary

The cumulative effects analysis geographic boundary for the willow flycatcher includes all willow flycatcher sites occurring within the Plumas NF boundary, within NFS lands. The temporal scale for analyzing cumulative effects to willow flycatcher is approximately 20 years into the past and 20 years out into the future.

General 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).

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 riparian habitat hydrology, specifically caused by roads (Green et al. 2003).

Table 34 displays the cumulative impacts of motorized routes within habitats 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 habitats are currently not occupied by breeding willow flycatcher, but are considered to be suitable willow flycatcher nesting habitat where dispersing willow flycatchers may nest in the 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

Alternative 1 poses the highest cumulative impact to breeding willow flycatchers. Alternative 1 directly and indirect affects 10 Occupied habitat sites with 1.4 miles of unauthorized routes, and an additional 0.45 miles of existing routes affect 2 additional Occupied habitat sites 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” habitat sites is potentially at risk and may ultimately affect willow flycatcher breeding success within “Occupied” habitats.

All of the action alternatives significantly reduce cumulative impacts to Occupied habitat sites. None of the remaining action alternatives (Alternatives 2 - 5) add direct or indirect impacts to “Occupied” willow flycatcher sites. However, existing trails under this alternatives will affect 2 Occupied habitat sites with 0.45 miles. The significant benefit to Occupied habitat under these alternatives is that cross country travel would be prohibited.

Emphasis Habitat

Alternative 1 poses the highest cumulative impact to the future colonization by willow flycatcher within "Emphasis" habitats, since unauthorized routes would intersect a total of 62 "Emphasis" sites for a total of about 6.7 miles.

All the remaining action alternatives (2-5) would result in substantially less cumulative impacts to willow flycatcher "Emphasis" habitats. The action alternatives (2-5) propose trail additions or have existing trails that would affect from 4 to 21 willow flycatcher "Emphasis" habitat sites with 0.60 to 1.8 miles of proposed and existing trails. The significant benefit to Emphasis habitat sites under these alternatives is that cross country travel would be prohibited.

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 open unauthorized motorized routes and existing motorized routes (NFS Lands only). Alternative 1 results in willow flycatcher habitat being intersected 74 times for a total of about 8.5 miles by routes of any category. Over 42% of habitat identified as Occupied are impacted by open unauthorized routes, which could substantially alter the willow flycatcher habitat 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 Plumas NF.

Alternatives 2 and 5 result in similar overall cumulative impacts where Occupied and Emphasis habitats combined is intersected by a motorized route 13 to 23 times for a total of between 0.97 and 2.25 miles. The proposed project alternative 4 adds 0.61 miles to existing cumulative impacts where 8 Emphasis habitat sites are affected. Alternative 3 would have the least cumulative impacts to willow flycatcher habitat, affecting 2 Occupied habitats and 4 Emphasis habitats through 1.05 miles of existing routes.

Table 34. Willow Flycatcher Habitat Sites - Number of Occupied and Emphasis Habitats Intersected by Routes

	Alt.1*	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Direct and Indirect effects of proposed alternatives					
# Occupied Sites	10	0	0	0	0
Miles within Occupied	1.40	0.00	0	0.00	0.00
# Emphasis Sites	58	17	0	7	12
Miles within Emphasis	6.06	1.20	0	0.46	0.82
Total Number of Willow Flycatcher Sites Intersected by Unauthorized routes or proposed route additions (negative impact)	68	17	0	7	12
Total Miles	7.46	1.20	0	0.46	0.82
Cumulative effects of past, present, and proposed actions					
# Occupied Sites	2	2	2	2	2

Miles within Occupied	0.45	0.45	0.45	0.45	0.45
# Emphasis Sites	4	4	4	4	4
Miles within Emphasis	0.60	0.60	0.60	0.60	0.60
Total Number of Willow Flycatcher Sites Intersected by Existing motorized routes (negative impact)	6	6	6	6	6
Total Miles	1.05	1.05	1.05	0.15	0.15
Grand Total Miles	**8.51**	**2.25**	**1.05**	**1.51**	**1.87**

*Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

Sensitive Species Determination

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the Willow Flycatcher.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the Willow Flycatcher. This determination is based on the rationale that cross country travel would continue in the future and lead to additional impacts to Occupied and Emphasis habitat sites, loss of habitat, and result in high risk to Willow Flycatcher viability.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the Willow Flycatcher within the planning area of the Plumas National Forest. This determination is based on the rationale that the action alternatives would prohibit current and future cross-country travel across the PNF, that risks to Flycatcher Occupied and Emphasis habitat sites would be significantly reduced compared to Alternative 1 (No-action), and that a higher amount of nesting and foraging habitat would be maintained for the flycatcher.

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). 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 several detections from 2004 to 2007 on the west side of Lake Davis on the Beckwourth Ranger District. A total of 45 great gray owl detections were recorded by contract survey crew Klamath Wildlife Resources, Inc. which included 14 pair detections. Despite significant efforts to verify nesting, including extensive meadow searches and follow-up visits, there has been no concrete evidence (pellets, feathers, active nests, duplication of pair detections in the same vicinity) found to verify nesting of great gray owls on the Plumas NF. There were also two adults found on the Feather River Ranger District of the Plumas (8/97).

Roads and 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

Analysis Measures

Number of Great Gray Owl Meadows Intersected by Miles of Unauthorized Routes: 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 unauthorized motorized routes. The number of great gray owl meadows intersected by proposed unauthorized motorized routes were assessed for the alternatives.

Direct and Indirect Effects

Addition of unauthorized routes

Currently, great gray owls are not known to breed on the Plumas 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 Plumas NF (see Affected Environment section above).

Potential great gray owl habitat has been identified on the PNF. A total of 200 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 direct and indirect effects to meadow vegetation and hydrology which may affect the suitability of potential great gray owl nesting/foraging habitat.

Alternative 1 poses the highest direct and indirect effects to potential great gray owl meadows where 38 meadows (19%) are intersected by unauthorized routes totaling approximately 8 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, and where the potential for future occupancy of these areas may be limited.

Under the action alternatives (2-5) the direct and indirect effects to meadows are significantly reduced. The number of meadows affected are reduced by over 30 when Alternatives 2-5 are compared to Alternative 1. In addition the number of proposed trail miles within Great Gray owl meadows fall significantly as well. Alternatives 2-5 have 7 to 8 miles less of trail intersecting meadows than Alternative 1.

Table 35. Number of Great Gray Owl Meadows Intersected by Unauthorized Motorized Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Number of Meadows *with* Intersections	38	7	0	3	5
Number of Meadows *without* Intersections	162	193	200	197	195
Proposed Unauthorized route miles	8.0	1.0	0	0.4	0.7

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 Plumas NF. Approximately 200 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 Plumas 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 Plumas NF, recent sightings on the Forest, indicate the potential for breeding great gray owls on the Plumas NF is a reasonable expectation. Project alternatives, do not currently pose adverse direct or indirect effects to known breeding great gray owls, and therefore, no cumulative impacts to great gray owls would occur. However, the project alternatives are analyzed for cumulative effects of proposed unauthorized motorized route additions to suitable great gray owl foraging habitat that may affect the ability for great gray owls to occupy these sites in the future.

Table 36 indicates that 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 proposed unauthorized motorized route additions on NFS lands 41 times for a total of 9 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. Considering the rate at which OHV activities on the Plumas NF and current rate of OHV sales, this alternative could adversely affect the potential for great gray owls to occupy these sites in the near and distant future.

Alternatives 2 add cumulative impacts to suitable great gray owl meadow sites, where these sites would be intersected by motorized routes 10 times for a total of about 2 miles.

Alternatives 4 and 5 add a small amount of cumulative impacts to great gray owl meadows where 6 and 8 meadows, respectively, are impacted by proposed motorized routes for 1.4 and 1.7 miles, respectively. This amount of impact to great gray owl foraging habitat could limit the distribution of great gray owls in the future. Alternative 3 would have no direct or indirect effects to great gray owl meadows as no unauthorized route additions are proposed. Alternative 3 would only impact great gray owl meadows with existing routes where 1 mile intersects 3 meadows. For all the action alternatives, cross-country motorized wheeled travel would be prohibited.

Table 36. Great Gray Owl Suitable Sites - Number of Meadows/Meadow Complexes Intersected by Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of proposed alternatives					
Unauthorized routes or proposed route additions (negative impact)[1]					
Number of Potential GGO Meadow Sites Intersected by Routes	38	7	0	3	5
Miles	8	1	0	0.4	0.7
Cumulative effects of past, present, and proposed actions					
Existing motorized routes - NFS lands (negative impact)					
Number of Potential GGO Meadow Sites Intersected by Routes	3	3	3	3	3
Miles	1	1	1	1	1
Total Cumulative Effects					
Number of Times GGO Meadows Intersected by Open Routes	**41**	**10**	**3**	**6**	**8**
Total Miles	**9**	**2**	**1**	**1.4**	**1.7**

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

Sensitive Species Determination

Based on the analysis of direct, indirect and cumulative effects, the Biological Evaluation for this EIS made a determination for the Great Gray Owl.

Alternative 1 – This alternative may adversely affect, and is likely to result in a trend toward federal listing and a loss of viability for the Great Gray Owl. This determination is based on the rationale that cross country travel would continue in the future and lead to additional impacts to owl meadow sites, loss of habitat, and result in high risk to owl occupancy.

Alternatives 2, 3, 4 and 5 - These alternatives may affect, but are not likely to adversely affect or result in a trend toward Federal listing or loss of viability for the Great Gray owl within the planning area of the Plumas National Forest. This determination is based on the rationale that the action alternatives would prohibit current and future cross-country travel across the PNF, that risks to meadow sites would be significantly reduced compared to Alternative 1 (No-action), and that a higher amounts of suitable meadow habitat would be maintained for the owl.

Greater Sandhill Crane: Affected Environment

Introduction: The greater sandhill crane is a California State Threatened species and is listed as Sensitive on the Region 5 Forester's Sensitive Species List (USDA Forest Service 1998). California pairs of sandhill cranes generally nest in wet meadow, shallow lacustrine, and fresh emergent wetland habitat, with nests constructed of large mounds of water plants over shallow water (Zeiner et al. 1990, California Department of Fish and Game 1994). Studies in California during 1988 showed water depths averaging 2.3 inches (California Department of Fish and Game 1994). Open meadow habitats are also used (Littlefield 1989). On dry sites, nests are scooped-out depressions lined with grasses (Zeiner et al. 1990).

In Plumas County, nesting cranes have been documented at several locations on private land in American Valley around Quincy, Indian Valley, and Sierra Valley. Cranes have also been documented in Red Clover Valley (within the Forest Boundary). There is one documented nesting attempt of sandhills on the Plumas NF near Little Summit Lake, on the Beckwourth Ranger District, in 1998. The majority of sightings within Plumas County consist of migrating flocks flying overhead in the Spring and Fall. The greater sandhill crane occurs on the Plumas National Forest during the summer breeding season and during migration. It is found in medium to large wetlands and short grass valley bottoms. The eastside of the Plumas has numerous meadows with suitable habitat and several sightings, but no documented nesting success. The potential for sandhill cranes to nest on the Plumas NF is likely given the fact that suitable habitat exists and sandhill cranes are present. Therefore, the analysis for this species assumes nesting is occurring.

Disturbance and/or Mortality from vehicles: Road and trail-associated factors can disrupt sandhill breeding activities which can ultimately cause a loss in productivity. Wheeled vehicle 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

Effects common to all alternatives

Class of Vehicles: Under all the alternatives, there will be no measurable effect to Sandhill cranes from changes in class in vehicle.

Analysis Measures

Potential Breeding Sites Intersected by Proposed Routes or Open Areas: Sandhill crane breeding sites were analyzed to determine the number of miles of proposed routes that intersect potential sandhill crane breeding sites (wet meadows).

Direct and Indirect Effects

Potential Breeding Sites (wet meadows) Intersected by Proposed Routes:

Direct and indirect effects to potential, unknown sandhill crane breeding/nesting sites from vehicular travel would occur if the intensity and duration of such activity would cause cranes to abandon their nests and expose incubating eggs or fledglings to environmental conditions and/or predation. Motorized vehicles could run over nests, crushing eggs or fledglings.

Table 37 displays the number of meadows intersected by unauthorized and existing motorized routes on the Plumas NF. Alternative 1 would have the greatest effect on potential sandhill crane breeding sites with 8 miles of unauthorized motor vehicle routes intersecting 38 meadows. Alternatives 2 intersects 7 meadows each with 1 miles of unauthorized routes. Alternatives 4 and 5 are similar in their potential impacts to meadows approximately 0.4 to 0.7 miles of unauthorized routes affecting 3 and 5 meadows respectively. Alternative 3 would not have an impact on potential sandhill crane breeding site with unauthorized route additions.

Table 37. Potential Greater Sandhill Crane (GSC) Breeding Sites - Number of Meadows/Meadow Complexes Intersected by Routes

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Direct and Indirect effects of proposed alternatives					
Unauthorized routes or proposed route additions (negative impact)[1]					
Number of Potential GSC Meadow Sites Intersected by Routes	38	7	0	3	5
Miles	8	1	0	0.4	0.7
Cumulative effects of past, present, and proposed actions					
Existing motorized routes - NFS lands (negative impact)					
Number of Potential GSC Meadow Sites Intersected by Routes	3	3	3	3	3
Miles	1	1	1	1	1
Total Cumulative Effects					
Number of Times GSC Meadows Intersected by Open Routes	**41**	**10**	**3**	**6**	**8**
Total Miles	**9**	**2**	**1**	**1.4**	**1.7**

[1]Alternative 1 includes the open existing unauthorized routes, while all action alternatives include proposed unauthorized routes.

Cumulative Effects

The geographic boundary for analyzing greater sandhill crane cumulative effects of proposed alternatives are the potential greater sandhill crane meadow breeding sites within the boundary of the Plumas NF. Approximately 200 meadow sites have been identified. These meadows encompass a wide geographic distribution from eastside to westside and encompasses a variety of vegetation diversity.

Table 37 indicates that alternative 1 poses the greatest cumulative risk to potential sandhill crane breeding sites where these suitable sandhill crane meadows are intersected by a motorized route on NFS lands 41 times for a total of 9 miles. The uncertainty of future motorized route proliferation could alter meadow vegetation and hydrology that would impact habitat conditions for sandhill crane prey species in the long term. Considering the rate at which OHV activities on the Plumas NF and current rate of OHV sales, this alternative could adversely affect the potential for sandhill cranes to occupy these sites in the near and distant future.

Alternative 2 adds cumulative impacts to potential greater sandhill crane meadow breeding sites, where these sites would be intersected by motorized routes 10 times for a total of about 2 miles.

Alternatives 4 and 5 add a small amount of cumulative impacts to potential greater sandhill crane meadow breeding sites where 6 and 8 meadows, respectively, are impacted by proposed motorized routes for 1.4 and 1.7 miles, respectively. This amount of impact to sandhill crane breeding habitat could limit the distribution of sandhill cranes in the future. Alternative 3 would have no direct or indirect effects to sandhill crane meadows as no unauthorized route additions are proposed. Alternative 3 would only impact sandhill crane meadows with existing routes where 1 mile intersects 3 meadows. For all the action alternatives, cross-country motorized wheeled travel would be prohibited.

Sensitive Species Determination

Currently, sandhill cranes have not been known to breed on the Plumas NF. Therefore, the addition of unauthorized motorized routes would not directly, indirectly or cumulative affect known breeding sandhill cranes. However, potential sandhill crane nesting habitat does occur on the Forest and sandhill cranes have been detected on the Plumas NF in recent years. Alternative 5, the preferred alternative results in 2 miles intersecting potential greater sandhill crane meadow breeding sites which represents 4% (8 of 200) potential greater sandhill crane meadow breeding sites across the Plumas NF. This amount of habitat affected by motorized routes would pose a relatively low risk to sandhill crane breeding habitat.

The action alternatives may affect greater sandhill cranes, 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 Plumas 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.

Swainson's Hawk: Affected Environment

Introduction: Swainson's hawks are long distance migrants predominantly wintering on grasslands in South America and breeding in North America. The species can be found in 19 states west of the Mississippi River and seven Canadian provinces. Swainson's hawk was widespread and abundant until the early twentieth century. Its distribution is now sparse and localized throughout a major portion of its range. They are considered an uncommon breeder, resident, and migrant in the California Central Valley, Klamath Basin, Northeastern Plateau, Lassen Co., and Mojave Desert (Zeiner et. al. 1990).

Nests are typically located in scattered trees within grassland, shrubland, or agricultural landscapes. Platform nests are bulky and constructed of sticks, sagebrush, thistle, brambles, and may be lined with green willow sprigs, green forbs, grass, and wool. Typically the nest is 6 to 30 feet above the ground, but sometimes up to 75 feet (Harrison 1979).

Typical nest site selection within Butte Valley of northeastern California is in isolated trees or clumps of three to six western junipers, 13-30 feet in height, and with 0.025-0.27 trees per acre. Nests in the Klamath basin were also found in juniper (97%), and in black locust and ponderosa pine (Bloom 1980). In the Central Valley, historical nests were in cottonwood, oak, sycamore, and willow (ibid.).

In Plumas County, Swainson's hawk sightings usually occur only in fall/winter migrations. Most of these sightings are in Sierra Valley. One known nesting attempt in Sierra Valley occurred in the mid-1980s near the town of Vinton. On the Plumas National Forest, there are no known nesting attempts. The Sierra Valley contains 4-8 summer resident pairs every year (including one pair that inhabits a territory on the boundary between private and government land) and nesting was documented within 1/2 mile of national forest land as late as 1997 (Hardy, personal comm. 1999).

Direct and Indirect Effects

It is highly unlikely that Swainson's hawk breed on the Plumas National Forest as there are no historic records of them nesting anywhere on the Forest. Direct or indirect affects would not occur as a result of implementing any of the alternatives associated with the Plumas NF Wheeled Motorized Travel Management Project EIS.

Cumulative Effects

With no direct or indirect effects from any of the alternatives, there would also be no cumulative effects to Swainson;s hawk.

Sensitive Species Determination

Implementation of any of the alternatives for the Plumas NF Wheeled Motorized Travel Management Project will have no effect on the Swainson's hawk.

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Project Management Indicator Species Report

Motorized Travel Management Project

Plumas National Forest

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1. Introduction

The purpose of this report is to evaluate and disclose the impacts of the Motorized Travel Management Project on the habitat of the thirteen (13) Management Indicator Species (MIS) identified in the Forest (NF) Land and Resource Management Plan (LRMP) (USDA 1988) as amended by the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (USDA Forest Service 2007a). This report documents the effects of the proposed action and alternatives on the habitat of selected project-level MIS. Detailed descriptions of the Motorized Travel Management Project alternatives are found in the Motorized Travel Management Project DEIS (USDA Forest Service 2008, Chapter 2, Alternatives).

MIS are animal species identified in the SNF MIS Amendment Record of Decision (ROD) signed December 14, 2007, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Guidance regarding MIS set forth in the Plumas 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 Plumas NF LRMP as amended.

1.a. Direction Regarding the Analysis of Project-Level Effects on MIS Habitat

Project-level effects on MIS habitat are analyzed and disclosed as part of environmental analysis under the National Environmental Policy Act (NEPA). This involves examining the impacts of the proposed project alternatives on MIS habitat by discussing how direct, indirect, and cumulative effects will change the habitat in the analysis area.

These project-level impacts to habitat are then related to broader scale (bioregional) population and/or habitat trends. The appropriate approach for relating project-level impacts to broader scale trends depends on the type of monitoring identified for MIS in the LRMP as amended by the SNF MIS Amendment ROD. Hence, where the Plumas NF LRMP as amended by the SNF MIS Amendment ROD identifies distribution population monitoring for an MIS, the project-level habitat effects analysis for that MIS is informed by available distribution population monitoring data, which are gathered at the bioregional scale. The bioregional scale monitoring identified in the Plumas NF LRMP, as amended, for MIS analyzed for the Motorized Travel Management Project is summarized in Section 3 of this report.

Adequately analyzing project effects to MIS generally involves the following steps:

- Identifying which habitat and associated MIS would be either directly or indirectly affected by the project alternatives; these MIS are potentially affected by the project.
- Summarizing the bioregional-level monitoring identified in the LRMP, as amended, for this subset of MIS.

- □ Analyzing project-level effects on MIS habitat for this subset of MIS.
- □ Discussing bioregional scale habitat and/or population trends for this subset of MIS.
- □ Relating project-level impacts on MIS habitat to habitat and/or population trends at the bioregional scale for this subset of MIS.

These steps are described in detail in the Pacific Southwest Region's draft document "MIS Analysis and Documentation in Project-Level NEPA, R5 Environmental Coordination" (May 25, 2006). This Management Indicator Species (MIS) Report documents application of the above steps to select project-level MIS and analyze project effects on MIS habitat for the Motorized Travel Management Project.

1.b. Direction Regarding Monitoring of MIS Population and Habitat Trends at the Bioregional Scale.

The bioregional scale monitoring strategy for the Plumas NF's MIS is found in the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (ROD) of 2007. Bioregional scale habitat monitoring is identified for all twelve of the terrestrial MIS. In addition, bioregional scale population monitoring, in the form of distribution population monitoring, is identified for all of the terrestrial MIS except for the greater sage-grouse. For aquatic macroinvertebrates, the bioregional scale monitoring identified is Index of Biological Integrity and Habitat. The current bioregional status and trend of populations and/or habitat for each of the MIS is discussed in the Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA Forest Service 2008).

- **MIS Habitat Status and Trend.**

All habitat monitoring data are collected and/or compiled at the bioregional scale, consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA Forest Service 2007a).

Habitats are the vegetation types (for example, early seral coniferous forest) or ecosystem components (for example, snags in green forest) required by an MIS for breeding, cover, and/or feeding. MIS for the Sierra Nevada National Forests represent 10 major habitats and 2 ecosystem components (USDA Forest Service 2007a), as listed in Table 1. These habitats are defined using the California Wildlife Habitat Relationship (CWHR) System (CDFG 2005). The CWHR System provides the most widely used habitat relationship models for California's terrestrial vertebrate species (ibid). It is described in detail in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Habitat status is the current amount of habitat on the Sierra Nevada Forests. Habitat trend is the direction of change in the amount or quality of habitat over time. The methodology for assessing habitat status and trend is described in detail in the SNF Bioregional MIS Report (USDA Forest Service 2008).

- **MIS Population Status and Trend.**

All population monitoring data are collected and/or compiled at the bioregional scale, consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA Forest Service

2007a). The information is presented in detail in the 2008 SNF Bioregional MIS Report (USDA Forest Service 2008).

Population monitoring strategies for MIS of the Plumas NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment ROD (USDA Forest Service 2007a). Population status is the current condition of the MIS related to the population monitoring data required in the 2007 SNF MIS Amendment ROD for that MIS. Population trend is the direction of change in that population measure over time.

There are a myriad of approaches for monitoring populations of MIS, from simply detecting presence to detailed tracking of population structure (USDA Forest Service 2001, Appendix E, page E-19). A distribution population monitoring approach is identified for all of the terrestrial MIS in the 2007 SNF MIS Amendment, except for the greater sage-grouse (USDA Forest Service 2007a). Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time. Presence data are collected using a number of direct and indirect methods, such as surveys (population surveys), bird point counts, tracking number of hunter kills, counts of species sign (such as deer pellets), and so forth. The specifics regarding how these presence data are assessed to track changes in distribution over time vary by species and the type of presence data collected, as described in the SNF Bioregional MIS Report (USDA Forest Service 2008).

- **Aquatic Macroinvertebrate Status and Trend.**

For aquatic macroinvertebrates, condition and trend is determined by analyzing macroinvertebrate data using the predictive, multivariate River Invertebrate Prediction And Classification System (RIVPACS) (Hawkins 2003) to determine whether the macroinvertebrate community has been impaired relative to reference condition within perennial water bodies. This monitoring consists of collecting aquatic macroinvertebrates and measuring stream habitat features according to the Stream Condition Inventory (SCI) manual (Frasier et al. 2005). Evaluation of the condition of the biological community is based upon the "observed to expected" (O/E) ratio, which is a reflection of the number of species observed at a site versus the number expected to occur there in the absence of impairment. Sites with a low O/E scores have lost many species predicted to occur there, which is an indication that the site has a lower than expected richness of sensitive species and is therefore impaired.

2. Selection of Project level MIS

Management Indicator Species (MIS) for the Plumas NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007a). The habitats and ecosystem components and associated MIS analyzed for the project were selected from this list of MIS, as indicated in Table 1. In addition to identifying the habitat or ecosystem components (1^{st} column), the CWHR type(s) defining each habitat/ecosystem component (2^{nd} column), and the associated MIS (3^{rd} column), the Table discloses whether or not the habitat of the MIS is potentially affected by the Motorized Travel Management Project (4^{th} column).

Table 1. Selection of MIS for Project-Level Habitat Analysis for the Motorized Travel Management Project.

Habitat or Ecosystem Component	CWHR Type(s) defining the habitat or ecosystem component[1]	Sierra Nevada Forests Management Indicator Species *Scientific Name*	Category for Project Analysis [2]
Riverine & Lacustrine	lacustrine (LAC) and riverine (RIV)	aquatic macroinvertebrates	3
Shrubland (west-slope chaparral types)	montane chaparral (MCP), mixed chaparral (MCH), chamise-redshank chaparral (CRC)	fox sparrow *Passerella iliaca*	3
Oak-associated Hardwood & Hardwood/conifer	montane hardwood (MHW), montane hardwood-conifer (MHC)	mule deer *Odocoileus hemionus*	3
Riparian	montane riparian (MRI), valley foothill riparian (VRI)	yellow warbler *Dendroica petechia*	3
Wet Meadow	Wet meadow (WTM), freshwater emergent wetland (FEW)	Pacific tree frog *Pseudacris regilla*	3
Early Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree sizes 1, 2, and 3, all canopy closures	Mountain quail *Oreortyx pictus*	3
Mid Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 4, all canopy closures	Mountain quail *Oreortyx pictus*	3
Late Seral Open Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P	Sooty (blue) grouse *Dendragapus obscurus*	3
Late Seral Closed Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6.	California spotted owl *Strix occidentalis occidentalis*	3
		northern flying squirrel *Glaucomys sabrinus*	3

Snags in Green Forest	Medium and large snags in green forest	hairy woodpecker *Picoides villosus*	2
Snags in Burned Forest	Medium and large snags in burned forest (stand-replacing fire)	black-backed woodpecker *Picoides arcticus*	2

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

[2] **Category 1:** MIS whose habitat is not in or adjacent to the project area and would not be affected by the project.
Category 2: MIS whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.
Category 3: MIS whose habitat would be either directly or indirectly affected by the project.

Black-backed Woodpecker (Category 2) – The Motorized Travel Management Project is within a burned forest or within a portion of recent wildland fire area, however no burnt snags will be affected as a part of the proposed action or alternatives. No removal of snags in burnt forests is proposed or planned. No effects to Black-backed Woodpecker habitat (burnt snags) as defined in Table 1 would occur as a result of the Motorized Travel Management Project.

Hairy Woodpecker (Category 2) – The Motorized Travel Management Project does contain snags in green forests, however this habitat or ecosystem component will not be affected as a part of the proposed action or alternatives. No removal of snags in green forests is proposed or planned. No effects to Hairy Woodpecker habitat as defined in Table 1 would occur as a result of the Motorized Travel Management Project.

The MIS whose habitat would be either directly or indirectly affected by the Motorized Travel Management Project, identified as Category 3 in Table 1, are carried forward in this analysis, which will evaluate the direct, indirect, and cumulative effects of the proposed action and alternatives on the habitat of these MIS. The MIS selected for project-level MIS analysis for the Motorized Travel Management Project are: Aquatic Macroinvertebrates, Fox Sparrow, Mule Deer, Yellow Warbler, Pacific Tree Frog, Mountain Quail, Sooty Grouse, California Spotted Owl and Northern Flying Squirrel.

3. Bioregional Monitoring Requirements for MIS Selected for Project-Level Analysis

3.a. MIS Monitoring Requirements.

The Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007a) identifies bioregional scale habitat and/or population monitoring for the Management Indicator Species for ten National Forests, including the Plumas NF (USDA Forest Service 2007a). The habitat and/or population monitoring requirements for Plumas NF's MIS are described in the Sierra Nevada Forests Bioregional Management Indicator Species (SNF

Bioregional MIS) Report (USDA Forest Service 2008) and are summarized below for the MIS being analyzed for the Motorized Travel Management Project. The applicable habitat and/or population monitoring results are described in the SNF Bioregional MIS Report (USDA Forest Service 2008) and are summarized in Section 5 below for the MIS being analyzed for the Motorized Travel Management Project.

Habitat monitoring at the bioregional scale is identified for all the habitats and ecosystem components, including the following analyzed for the Motorized Travel Management Project: shrubland; oak-associated hardwood & hardwood/conifer; riparian; wet meadow; early seral coniferous forest; mid seral coniferous forest; late seral open canopy coniferous forest; late seral closed canopy coniferous forest.

Bioregional Monitoring for aquatic macroinvertebrates: Index of Biological Integrity (IBI) and habitat condition and trend are measured by collecting aquatic macroinvertebrates, and analyzing the resulting data using the River Invertebrate Prediction and Classification System (RIVPACS) (Hawkins 2003) to determine whether the macroinvertebrate community has been impaired relative to reference condition within perennial water bodies. In addition, stream habitat features are measured according to the Stream Condition Inventory (SCI) manual (Frasier et al. 2005).

Population monitoring at the bioregional scale for fox sparrow, mule deer, yellow warbler, Pacific tree frog, mountain quail, Sooty grouse, California spotted owl, and northern flying squirrel: Distribution population monitoring. Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time (also see USDA Forest Service 2001, Appendix E).

3.b. How MIS Monitoring Requirements are Being Met.

Habitat and/or distribution population monitoring for all MIS is conducted at the Sierra Nevada scale. Refer to the SNF Bioregional MIS Report (USDA Forest Service 2008) for details by habitat and MIS.

4. Description of Proposed Project.

The proposed action of the Motorized Travel Management Project by the Plumas National Forest (PNF) is to 1) prohibit motorized vehicle travel off designated NFS roads, NFS trails and areas by the public except as allowed by permit or other authorization (excluding snowmobile use). 2) Add 367 miles of existing unauthorized routes to the current system of National Forest System (NFS) trails currently open to the public for motorized vehicle use. 3) Addition of 1 area, totaling 36 acres, where use of motorized vehicles by the public would be allowed anywhere within that area, and 4) Allow non-street legal vehicle use on approximately 12 miles of an existing NFS road where such use is currently prohibited. These actions are proposed in order to implement the 2005 Travel Management Rule (36 CFR Part 261) while providing for a diversity of motorized vehicle recreation opportunities, and providing motorized access to dispersed recreation opportunities on the Plumas NF. In addition to the proposed action, a no action alternative and 4 additional action alternatives were developed in response to issues raised by the public. Of the alternatives under consideration at this stage, Alternative 6 is preferred by the responsible official. The alternatives are summarized in Table 2 below and can be read in more detail in the DEIS (Chapter 2, Alternatives).

Table 2. Summary of Alternatives for the Motorized Travel Management Project

	Cross Country Travel	Miles of Route Added	OHV Use Area	NFS Road miles allowing OHV Use
Alternative 1 (No Action)^	Allowed	0	0	0
Alternative 2 (Proposed Action)	Prohibited	367	1+	12
Alternative 3*	Prohibited	0	0	0
Alternative 4 (Environmental)	Prohibited	141	1	12
Alternative 5	Prohibited	251	1	12

^ Although Alternative 1 does not add routes, this alternative includes all routes from the Forest-wide route inventory (1,190 miles).
* Although Alternative 3 does not add routes, the existing OHV routes on the forest will be analyzed for effects to MIS habitat.
+ The OHV use area is not analyzed in this document since it does not contain any of the MIS habitat types addressed in this document. The OHV use area is a barren borrow pit that was used for fill material for the Sly Creek reservoir dam.

5. Effects of Proposed Project on the Habitat for the Selected Project-Level MIS.

The following section documents the analysis for the following 'Category 3' species: Aquatic Macroinvertebrates, Fox Sparrow, Mule Deer, Yellow Warbler, Pacific Tree Frog, Mountain Quail, Sooty Grouse, California Spotted Owl and Northern Flying Squirrel. The analysis of the effects of the Motorized Travel Management Project on the MIS habitat for the selected project-level MIS is conducted at the project scale. The analysis used the following habitat data: Plumas NF GIS layer eeveg00_own. This data set is the Forest vegetation layer dated 2000 and clipped to forest ownership boundary/parcels. Detailed information on the MIS is documented in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Cumulative effects at the bioregional scale are tracked via the SNF MIS Bioregional monitoring, and detailed in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Lacustrine/Riverine Habitat (Aquatic Macroinvertebrates)

Habitat/Species Relationship.

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.

Project-level Effects Analysis – Lacustrine/Riverine Habitat

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 route crossings on streams and proximity of routes to lakes and ponds.

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 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: The Plumas NF currently contains 658 miles of perennial stream and 341 miles of intermittent stream, and approximately 14,200 acres of lakes, ponds and reservoirs. These miles of perennial and intermittent stream and acres of lakes and ponds make up the habitat for macroinvertebrates across the forest.

Sedimentation: The Plumas NF conducts Stream Condition Inventories (SCI) on approximately 10 stream reaches forest-wide as part of annual monitoring efforts. Data from those inventories indicate that pool tail fines in reference streams (no treatments) range between 1.1% and 18.4%. Data from streams with adjacent treatments (i.e. timber harvest, watershed restoration) indicate a range in pool tail fines of 5.0% to 32.9%. Pool tail fines are an indicator of sediment and are used to gauge sediment level changes within the SCI stream reaches.

Water surface shade: The Plumas NF conducts Stream Condition Inventories (SCI) on approximately 10 stream reaches forest-wide as part of annual monitoring efforts. SCI data from those inventories indicate that water surface shade in reference streams range from 47.8% to 72.4%. Data for water surface shade in streams adjacent to treatments indicates a range in water surface shade from 58.4% to 95.1%.

<u>Alternatives 1 - 5</u>

Direct and Indirect Effects to Habitat. All of the alternatives will result in some level of impact to Macroinvertebrate habitat. Table 3 below summarizes effects to the habitat factors outlined above.

Table 3. Summary of effects to Macroinvertebrate habitat factors from Alternatives 1-5 for the Motorized Travel Management Project.

	Changes in habitat quality in miles of Stream and Acres of Lakes/Ponds^	Changes in Sediment Levels	Changes in Water Surface Shade

Alternative 1 (No Action)	Low	Increase (927 stream crossings)	Decrease
Alternative 2 (Proposed Action)	Low	Increase (243 stream crossings)	Decrease
Alternative 3	Low	Existing condition (121 stream crossings)	Decrease
Alternative 4 (Environmental)	Low	Increase (81 stream crossings)	Decrease
Alternative 5	Low	Increase (146 stream crossings)	Decrease

^ Refer to Table 4 for a detailed analysis by alternative and an overall rank based on proportion of habitat affected.

None of the action alternatives are expected to change the amount of habitat within intermittent, perennial streams and lakes, ponds and reservoirs. Flows within intermittent and perennial streams are expected to remain in existing conditions. However, habitat quality will be affected from changes to sedimentation (column 3, Table 3) and water surface shade (column 4, Table 3) as a result of route crossings on streams and proximity of routes to lakes, ponds and reservoirs. Alternatives 1-5 will have an effect on sedimentation (increase) and water surface shade (decrease). Both these habitat factors will affect habitat quality for macroinvertebrates. Sedimentation will be increased in proportion to the number of OHV routes crossing a stream or their proximity to lakes and ponds (see Table 4). Water surface shade will be decreased where OHV routes cross streams and affect overhead canopy cover. Table 4 reflects the miles of stream (perennial and intermittent) habitat that will be affected by proposed routes under each of the five alternatives. For lakes, ponds and reservoirs, Table 4 reflects the acres of lacustrine habitat that fall within a 200 meter zone of influence from proposed routes and that will be affected or influenced through increases in sediment or decreases in water surface shade.

Table 4. Proportion of Aquatic Macroinvertebrate MIS riverine habitat intersected by proposed routes and within a 200-meter "Zone of Influence" of lacaustrine habitats on Proposed Routes.

Aquatic Macroinvertebrate MIS habitat	**Habitat Type**	**Stream Miles/Lake Acres**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
	RIV – Perennial (miles)	658	27.6	11.4	3.4	5.5	7.5
	RIV – Intermittent (miles)	341	88.2	34	11.7	19.7	25.8
	LAC –Lacustrine (acres)	14,200	84	104	71	84	101
	Proportion of Habitat	**RIV**	**11.6%**	**4.5%**	**1.5%**	**2.5%**	**3.3%**
		LAC	**0.6%**	**0.7%**	**0.5%**	**0.6%**	**0.7%**
	Overall Habitat Ranking		**Low**	**Low**	**Low**	**Low**	**Low**

As discussed above, habitat quality will be reduced as a result of increases in sediment and a decrease in water surface shade as a result of stream miles affected by route stream crossings and acres of lacustrine habitat that falls within a 200 meter zone of influence. Based on the analysis conducted, Alternative 1 has the highest level of impact to macroinvertebrate habitat. Alternative 1 affects habitat on 27.6 miles of perennial stream, 88.2 miles of intermittent stream, and 84 acres of lacustrine habitat within a 200 meter zone of influence of lakes, ponds and reservoirs. Alternatives 2 & 5 have similar effects to both riverine and lacustrine habitat, affecting 11.4 to 7.5 miles of perennial stream habitat, 34 to 25.8 miles of intermittent stream habitat and 104 to 101 acres of lacustrine habitat. Alternative 4 represents the second lowest scale of effects to riverine habitat by affecting 5.5 miles of perennial stream, and 19.7 miles of intermittent stream. Effects to lacustrine habitat under alternative 4 is equal to Alternative 1. Alternative 3 affects the least amount of riverine habitat with 3.4 miles of perennial stream and 11.7 miles of intermittent stream and the least amount of lacustrine habitat by affecting 71 acres of habitat within the 200 meter zone of influence.

Cumulative Effects to Habitat in the Analysis Area: Past and current cumulative effects to riverine and lacustrine habitats include current and historic livestock grazing; reduced suitability of habitat through catastrophic wildfires; mining activities; 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 cumulative affects Appendix in the EIS provides a list and description of past, present, and reasonably foreseeable projects on forest service and private lands within the Plumas NF boundary. Some, but not all, of these activities will contribute to impacts to riverine or lacustrine habitats within the Plumas NF boundary. Mining and dredging activities have occurred and continue to occur on the Forest. Mining and dredging activities result in sedimentation that affect macro-invertebrate habitat and decreases water quality. Between 1990 and 2007, approximately 266,963 acres burned on the Plumas NF, some of which have affected riverine and lacustrine habitat through increased levels of sedimentation.

The Plumas NF currently has 42 active livestock grazing allotments including both cattle and sheep. Plumas 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.

Currently, there is a high demand for recreational use on the Plumas NF due to its close proximity to urban centers (e.g. Oroville, Chico, Reno). The Plumas 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 Plumas 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 Plumas 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 Plumas NF has the potential to cause an increase in negative interactions between humans and riverine and lacustrine habitats since most of the recreational facilities are located adjacent to lakes, streams and rivers. Future increase in recreational use on the Plumas NF is expected, and therefore, increased disturbance to riverine and lacustrine habitat would be expected, particularly during the summer months.

Table 5 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit reissuances. Table 5 also summarizes cumulative impacts from reasonably foreseeable projects and a description of the potential impact to riverine and lacustrine habitat.

Table 5. Direct, Indirect, and Cumulative Impact to riverine and lacustrine habitat from Reasonably Foreseeable Future Projects.

Project type	Number of Projects	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Mining/Suction Dredging	5 (Cooper Penny, Moonlight, Dredger's delight, Phat Chance, Wnkeye	Impacts from increased sediment delivery, decrease in water quality.	Mining/sution dredging add to cumulative impacts by decreasing habitat quality, mainly in riverine systems.
Hazard tree removal	2 (Moonlight and Camp 14)	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	2 (Long Valley Creek, Road 22N85Y)	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor.
Watershed Restoration	1 (Sulphur Creek)	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor.
Range Allotment permit renewal	3 (Grizzly Valley, Grizzly Valley Commnity, Humbug	Stream bank trampling from livestock resulting in increases in sediment and decrease in water surface shade from browsing riparian shrubs.	Cumulative impacts from sediment and water surface shade are expected to be within forest plan standards (<20%).
Temporary OHV Forest Order	1 (Forest-wide)	Closed forest to cross-country travel. Lessened disturbance to habitat downstream of stream crossings	Overall benefit to macroinvertebrate habitat by eliminating effects to habitat quality.

Cumulative Effects Conclusion: 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 habitats on the Plumas NF. Alternative 2 poses the next highest level of effects to riverine habitat and pose a moderate risk when direct and indirect effects are considered with cumulative effects. Alternative 4 poses the second lowest level of risk to riverine habitat and Alternative 3 poses the least risk of all the Alternatives. For lacustrine habitat, alternative 3 poses the lowest risk when direct and indirect effects are considered with cumulative effects. Alternatives 1, 2, 4, and 5 are similar in effects and all pose a moderate level of risk to lacustrine habitats.

MIS Summary

Aquatic Macroinvertebrates. The Plumas 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 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, Table BMI-1). 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 Motorized Travel Management Project will affect 104 acres of lacustrine habitat (LAC) under Alternative 2 (high) and 71 acres under Alternative 3 (low). The Motorized Travel Management Project will affect 115.5 miles of riverine habitat (RIV) under Alternative 1 (high) and 15.1 miles of habitat under Alternative 3 (low). Based on the acres of lacustrine habitat affected and miles of riverine habitat affected, the Motorized Travel Management Project Area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of Macroinvertebrates across the Sierra Nevada bioregion.

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

Habitat/Species Relationship.
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). 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).

Project-level Effects Analysis - Shrubland (West-Slope Chaparral) Habitat: For shrubland habitat, the effects analysis was conducted within a 200 meter zone of influence from proposed routes.

Habitat Factor(s) for the Analysis: The habitat factor used in the analysis was the amount of shrubland habitat that fell within the 200 meter zone of influence of proposed routes. Each alternative was compared to determine the proportion of habitat affected by proposed routes in relation to the shrubland habitat at the Sierra Nevada scale.

Current Condition of the Habitat Factor(s) in the Project Area: The project area currently contains 68,985 acres of shrubland habitat. Habitat is composed of varying age classes that range from young shrubs, intermediate age classes and mature to decadent shrub classes.

Direct and Indirect Effects to Habitat. Direct and Indirect effects from proposed routes include a decrease in habitat quality from disturbance, displacement and/or avoidance of habitat as a result motor vehicle use. Based on the analysis conducted for Shrubland habitat, Alternative 1 would affect the most shrubland habitat within the 200 meter zone of influence. Approximately 21,214 acres of shrubland habitat or 2.3% of the habitat Sierra Nevada wide will be affected by proposed routes under Alternative 1. Alternative 2 has the second highest effect to Shrubland habitat, resulting in direct and indirect effects to habitat with 8,911 acres. Alternatives 4 & 5 have less affects on shrubland habitat that alternative 2 with 3,224 acres and 4,054 acres of shrubland habitat affected Sierra Nevada wide. Alternative 3 results in the least amount of acres affected with 2,249 acres or 0.2% of the available habitat Sierra Nevada wide.

Table 6. Proportion of Fox Sparrow MIS habitat within a 200-meter "Zone of Influence" of Proposed Routes.

Fox Sparrow MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Shrubland (west-slope chaparral types)	922,000	21,214	8,911	2,249	3,224	4,054
	Proportion of Habitat		**2.3%**	**0.9%**	**0.2%**	**0.3%**	**0.4%**
	Overall Habitat Ranking		**Low**	**Low**	**Low**	**Low**	**Low**

Cumulative Effects to Habitat in the Analysis Area. Past and current cumulative effects to shrubland habitat include current and historic livestock grazing; loss of habitat through catastrophic wildfires; timber and fuels management where shrubland habitat has been reduced or removed.

The cumulative affects Appendix in the EIS provides a list and description of past, present, and reasonably foreseeable projects on the forest and private lands within the Plumas NF boundary. Some, but not all, of these activities will contribute to impacts to shrubland habitat within the Plumas NF boundary.

The Plumas NF currently has 42 active livestock grazing allotments including both cattle and sheep. Plumas 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.

Between 2001 and 2007, over 73,345 acres of forest vegetation and fuels projects were completed, which primarily included group selection, thinning, mastication, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally affect shrubland habitat through prescribed burning of the DFPZ understory and mastication of shrubland for fuels reduction. With the exception of group selection, silviculture treatments do not usually result in an increase in shrubland habitat since canopy cover is not reduced below 40%. Group selection harvests are expected to increase shrubland habitat on a small scale across the landscape. These vegetation treatments may result in the short-term reduction in isolated pockets of shrubland, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk.

Between 1990 and 2007, approximately 266,963 acres burned on the Plumas NF, some of which removed shrubland habitat initially, but over time shrubland habitat is expected to increase as post fire succession progresses.

Table 7 lists all the reasonably foreseeable future actions, including fuels, vegetation, range allotment plans, and miscellaneous resource projects. Table 7 summarizes cumulative impacts from reasonably foreseeable projects and a description of the potential impact to shrubland habitat.

Table 7. Direct, Indirect, and Cumulative Impact to Fox Sparrow habitat from Reasonably Foreseeable Future Projects.

Project type	Number of Projects	Fox Sparrow Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	17 (Empire, Slapjack, Basin, Grizz, Freeman, Mabie, Clarks, Jackson, Ingalls, Big Hill, Watdog, Flea, Sugarberry, Meadow Valley, Canyon Dam, Corridor, Keddie)	Short-term disturbance from harvest activities (mastication, rx burning), and future development of habitat from Group Selection.	• Short-term adverse impacts during masitication, rx burning. • Creation of habitat from Group Selection units that are not re-planted. • Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2 (Moonlight, Camp 14)	Minimal impact, limited to disturbance during harvest.	None to minimal cumulative impact
Temporary OHV Forest Order	1 (Forest-wide)	Closed forest to cross-country travel. Lessened disturbance to habitat and displacement of fox sparrows.	Overall benefit to shrubland habitat by eliminating effects to habitat quality.
Range Allotment Permit Renewal	3 (Grizzly Valley, Grizzly Valley Commnity, Humbug)	Impacts from incidental browsing of Shrubland by livestock.	Miminal cumulative impact from incidental browsing

Cumulative Effects Conclusion: When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from grazing, vegetation/fuels projects, wildfires, and miscellaneous resource projects, Alternative 1 poses the greatest risk to shrubland habitat on the Plumas NF, when the 21,214 acres of shrubland habitat being affected are weighed with cumulative effects. Alternatives 4 and 5 are all similar in their effects to shrubland habitat and pose a low to moderate risk when direct and indirect effects are weighed with cumulative effects. Alternatives 2 poses a moderate risk to shrubland habitat and Alternative 3 poses the least risk to shrubland habitat when cumulative effects are weighed with direct and indirect effects.

MIS Summary

Fox Sparrow. The Plumas 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 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 rangewide, 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 Motorized Travel Management Project will affect 21,214 acres of shrubland habitat under Alternative 1 (high) and 2,249 acres under Alternative 3 (low). Based on the acres affected, which range from 0.2% to 2.3% of the total habitat Sierra Nevada wide, the Motorized Travel Management Project Area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of Fox Sparrow across the Sierra Nevada bioregion.

Oak-Associated Hardwoods and Hardwood/Conifer Habitat (Mule deer)

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

Project-level Effects Analysis - Oak-Associated Hardwoods and Hardwood/Conifer Habitat. For Oak-associated hardwoods and hardwood/conifer habitat, the effects analysis was conducted within a 200 meter zone of influence from proposed routes.

Habitat Factor(s) for the Analysis: The habitat factor used in the analysis was the amount of oak-associated hardwood and hardwood/conifer habitat that fell within the 200 meter zone of influence of proposed routes. Each alternative was compared to determine the proportion of habitat affected by proposed routes in relation to the oak-associated hardwood and hardwood/conifer habitat at the Sierra Nevada scale.

Current Condition of the Habitat Factor(s) in the Project Area: The project area currently contains 83,745 acres of oak-associated hardwood and hardwood/conifer habitat. Habitat is composed of varying age classes that range from sapling size with sparse canopy cover (2S) to multi-layered stands with dense canopy cover (6D).

Direct and Indirect Effects to Habitat. Mule deer were found to respond to disturbance associated with secondary motorized roads and trails within a 200 meter distance. Because deer may respond differently, depending on the type of 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 route, the intensity of use, and the degree to which motorized activities overlap with deer use of habitat, in this case oak-associated hardwoods and hardwood/conifer. A zone of influence within 200 meters of motorized routes was used to compare differences in the direct and indirect impacts between alternatives for Oak associated hardwood and hardwood/conifer habitat used by deer as represented by CWHR types MHW and MHC. Habitat affected was then compared to the amount of habitat available Sierra Nevada wide. 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 to 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 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 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 MHW and MHC habitat affected was ranked as a low level of road or trail influence, 25 to 50 percent of MHW and MHC habitat affected was ranked as a moderate level of influence, and greater than 50 percent of MHW and MHC habitat affected was ranked as a high level of influence. Using this ranking system, all alternatives ranked low in the level of motorized route influence on deer's use of MHW and MHC habitat, where the effectiveness MHW and MHC habitat would be minimally affected. The section below describes how the alternatives rank in their influence on MHW and MHC habitats.

Alternative 1 poses the greatest risk to MHW and MHC habitats by affecting 2% (17,279 acres) of the habitat type Sierra Nevada wide (Table 8). These 17, 279 acres will result in reduced habitat effectiveness from potential disturbance or avoidance behavior as a result of factors associated with proposed motorized routes. Proposed routes under Alternatives 3, 4 & 5 are similar in the level of influence on MHW and MHC habitats for deer. Within the 200 meter zone of influence, MHW and MHC habitat are affected from a range of 0.4% (2,980 acres) to 0.6% (4,890 acres). The effects from Alternatives 3, 4 & 5 represent almost 2/3 less of an impact on MHW and MHC habitat than Alternative 1. Alternative 3 poses the least effect on MHW and MHC habitats affecting only 2,980 acres. Alternative 3 represent the second highest level of impact to MHW and MHC habitats and half the impact of Alternative 1.

Table 8. Proportion of Oak-associated hardwood & hardwood/conifer habitat within a 200-meter "Zone of Influence" of Proposed Routes.

Mule Deer MIS Habitat	**Habitat Type**	**SN Acres**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
	Oak-associated Harwood & Hardwood/Conifer	809,000	17,279	8,864	2,980	3,972	4,890
	Proportion of Habitat		2.0%	1.0%	0.4%	0.5%	0.6%
	Overall Habitat Ranking		**Low**	**Low**	**Low**	**Low**	**Low**

Cumulative Effects to Habitat in the Analysis Area. 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; 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 cumulative affects Appendix in the EIS provides a list and description of present and reasonably foreseeable projects on the forest and private lands within the Plumas NF boundary. Some, but not all, of these activities will contribute to impacts to the mule deer within the Plumas NF boundary. Table 9 lists those projects from the cumulative affects section of the EIS that affect deer habitat.

The Plumas NF currently has 42 active livestock grazing allotments including both cattle and sheep. Plumas 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.

Between 2000 and 2007, over 73,345 acres of forest vegetation and fuels projects were completed, which consisted primarily of thinning, group selection, mastication, and/or burned vegetation to reduce the potential for catastrophic wildfires. The 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. 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 Forest. Group selection harvests are expected to increase foraging habitat for mule deer. Many recent, current, and future vegetation and fuels reduction projects are emphasizing habitat improvement for deer by removing competing conifers within oak and aspen habitats which are designed to enhance mule deer foraging condition.

Between 1990 and 2007, approximately 266,963 acres burned on the Plumas NF, some of which have removed mule deer habitat initially, but in the long term habitat will be created for deer as natural succession progresses post fire.

Currently, there is a high demand for recreational use on the Plumas NF due to its close proximity to urban centers (e.g. Oroville, Chico, Reno). The Plumas 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 Plumas 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 Plumas 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 Plumas NF has the potential to cause an increase in negative interactions between humans and mule deer. Future increase in recreational use on the Plumas NF is expected, and therefore, increased disturbance to mule deer would be expected, particularly during the summer months. Table 9 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit reissuances. Table 9 summarizes cumulative impacts from present and reasonably foreseeable projects and a description of the potential impact to mule deer and their habitat.

Table 9. Direct, Indirect, and Cumulative Impact to Mule Deer from Present and 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, aspen enhancement	17 (Empire, Slapjack, Basin, Grizz, Freeman, Mabie, Clarks, Jackson, Ingalls, Big Hill, Watdog, Flea, Sugarberry, Meadow Valley, Canyon Dam, Corridor, Keddie)	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. • Beneficial cumulative effects from Group selection (increase in foraging habitat). • Improved Oak and Aspen habitat for Deer.
Hazard tree removal	2 (Moonlight, Camp 14)	Minimal impact. Short-term disturbance/displacement during harvest.	None to minimal cumulative impact
Watershed Restoration	1 (Sulphur Creek)	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.
Range Allotment permit renewal	3 (Grizzly Valley, Grizzly Valley Commnity, Humbug	Impacts from incidental browsing of oak/hardwoods by livestock	Cumulative impact restricted to browsing of no more than 20% of annual growth of hardwood seedlings and advanced regeneration.
Temporary OHV Forest Order	1 (Forest-wide)	Closed forest to cross-country travel. Lessened disturbance and displacement of deer.	Overall benefitted deer by reducing level of disturbance from OHV, and preventing impacts to deer habitat within summer, winter, and fawning fawning habitats
Plumas-Sierra Rural Electric Co-op	1 (Forest-wide)	Reduction of deer habitat from access road construction.	Reduction of deer habitat on 3 miles of road and disturbance/displacement of deer from road use.
Fire Recovery/Restoration	1 (Moonlight Wheeler)	Temporary disturbance/displacement during project implementation.	None to minimal. Project will result in temporary displacement and disturbance. Overall restoration will be beneficial in accelerating cover for deer.

Cumulative Effects Conclusion: 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 Plumas NF, where impacts to oak-associated hardwood and hardwood/conifer are the greatest. Alternative 2 represents the second highest level of impact and poses a moderate risk to deer as a result of adding cumulative effects to the impacts on oak-associated hardwood and hardwood conifer. Alternatives 3, 4 and 5 pose the lowest risk to deer as a result of adding cumulative effects to the effects of route densities, route miles and impacts to oak-associated hardwood and hardwood conifer.

Summary of Mule Deer Status and Trend at the Bioregional Scale
The Plumas NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for mule deer; hence, the oak-associated hardwood and hardwood/conifer effects analysis for the 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. The range of habitat affected consists of a low of 2,980 acres (Alternative 3) to high of 17,279 acres (Alternative 1) of oak-associated hardwood and hardwood/conifer habitat. The other three alternatives fall within this range. This amount of habitat affected equals 0.4% to 2.0% of the habitat available Sierra Nevada wide. Based on the small percentage of habitat affected, the Motorized Travel Management Project Area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of mule deer across the Sierra Nevada bioregion.

Riparian Habitat (Yellow warbler)

Habitat/Species Relationship.
The yellow warbler was selected as the MIS for riparian habitat in the Sierra Nevada. This species is usually found in riparian deciduous habitats in summer (cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland) (CDFG 2005). Yellow warbler is dependent on both meadow and non-meadow riparian habitat in the Sierra Nevada (Siegel and DeSante 1999).

Project-level Effects Analysis – Riparian Habitat: For riparian habitat, the effects analysis was conducted within a 200 meter zone of influence from proposed routes.

Habitat Factor(s) for the Analysis: The habitat factor used in the analysis was the amount of riparian habitat that fell within the 200 meter zone of influence of proposed routes. Each alternative was compared to determine the proportion of habitat affected by proposed routes in relation to the riparian habitat at the Sierra Nevada scale.

Current Condition of the Habitat Factor(s) in the Project Area: The project area currently contains 4,294 acres of riparian habitat. Habitat is composed of varying age classes that range from sapling size with sparse canopy cover (2S) to medium and large size trees with dense canopy cover (5D).

Direct and Indirect Effects to Habitat. Based on the analysis conducted of Riparian habitat and the amount of habitat affected directly and indirectly as a result of habitat disturbance, displacement and/or reduced habitat quality, Alternative 1 affects 1,325 acres of riparian habitat or 4.6% of the habitat available Sierra Nevada wide. Alternatives 2, 4 and 5 are similar in their effects to riparian habitat, were direct and indirect effects range from 363 acres (1.2%) to 554 acres (1.9%). Alternative 3 represents the least amount of riparian acres affected with 266 acres (0.9 %).

Table 10. Proportion of Yellow Warbler MIS habitat within a 200-meter "Zone of Influence" on Proposed Routes.

Yellow Warbler MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Riparian	29,000	1,325	554	266	363	414
	Proportion of Habitat		**4.6%**	**1.9%**	**0.9%**	**1.2%**	**1.4%**
	Overall Habitat Ranking		**Low**	**Low**	**Low**	**Low**	**Low**

Cumulative Effects to Habitat in the Analysis Area. Past and current cumulative effects to yellow warbler habitat include current and historic livestock grazing; loss of habitat through catastrophic wildfires; recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The cumulative affects Appendix in the EIS provides a list and description of past, present, and reasonably foreseeable projects on the forest and private lands within the Plumas NF boundary. Some, but not all, of these activities will contribute to impacts to riparian habitat within the Plumas NF boundary.

The Plumas NF currently has 42 active livestock grazing allotments including both cattle and sheep. Plumas 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.

Between 1990 and 2007, approximately 266,963 acres burned on the Plumas NF, some of which have temporarily removed riparian habitat.

Currently, there is a high demand for recreational use on the Plumas NF due to its close proximity to urban centers (e.g. Oroville, Chico, Reno). The Plumas 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 Plumas 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 Plumas 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 Plumas NF has the potential to cause an increase in negative interactions between humans and riparian habitats. Future increase in recreational use on the Plumas NF is expected, and therefore, increased disturbance to riparian habitat would be expected, particularly during the summer months.

Table 11 lists all the reasonably foreseeable future actions, including recreation, range allotment plans, and miscellaneous resource projects. Table 11 summarizes cumulative impacts from reasonably foreseeable projects and a description of the potential impact to the yellow warbler and riparian habitat.

Table 11. Direct, Indirect, and Cumulative Impact to Yellow Warbler Riparian habitat from Reasonably Foreseeable Future Projects

Project type	Number of Projects	Yellow Warbler Riparian Habitat Direct and Indirect Impact	Overall Cumulative Impact
Fish passage construction project	2 (Long Valley Creek, Road 22N85Y)	Short-term disturbance during project implementation.	No cumulative impact, effects will be mitigated through riparian plantings of willows, sedges and rushes.
Watershed Restoration	1 (Sulphur Creek)	Short-term disturbance during implementation. Improved riparian and meadow habitat quality.	Beneficial cumulative impact by improving long-term riparian habitat quality.
Range Allotment permit renewal	3 (Grizzly Valley, Grizzly Valley Commnity, Humbug	Impacts to riparian shrubs and seedlings from livestock browsing. Reduction in available habitat.	Cumulative impact from livestock grazing on riparian shrubs and seedlings up to 20% (2004 SNFPA Standard & Guideline)
Temporary OHV Forest Order	1 (Forest-wide)	Closed forest to cross-country travel. Lessened disturbance and displacement of Yellow Warblers.	Overall benefit to riparian habitat by eliminating effects to habitat quality.

Cumulative Effects Conclusion: When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from grazing, wildfires, recreation and watershed/stream projects, Alternative 1 poses the greatest risk to riparian habitat where 1,325 acres are directly and indirectly affected. Alternatives 2, 4 and 5 are all similar in impacts when direct, indirect and cumulative effects are considered. Alternative 3 represents the least risk to riparian habitats when direct, indirect and cumulative effects are considered.

Summary of Yellow Warbler Status and Trend at the Bioregional Scale

The Plumas 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 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 rangewide, 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. The Motorized Travel Management Project will affect 1,325 acres of riparian habitat under Alternative 1 (high) and 266 acres under Alternative 3 (low). Based on the acres affected, which range from 0.9% to 4.6% of the total habitat Sierra Nevada wide, the Motorized Travel Management Project Area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of Yellow Warbler across the Sierra Nevada bioregion.

Wet Meadow Habitat (Pacific tree frog)

Habitat/Species Relationship.
The Pacific tree frog was selected as an MIS for wet meadow habitat in the Sierra Nevada. This broadly distributed species requires standing water for breeding; tadpoles require standing water for periods long enough to complete aquatic development, which can be as long as 3 or more months at high elevations in the Sierra Nevada (CDFG 2005). During the day during the breeding season, adults take cover under clumps of vegetation and surface objects near water; during the remainder of the year, they leave their breeding sites and seek cover in moist niches in buildings, wells, rotting logs or burrows (ibid).

Project-level Effects Analysis – Wet Meadow Habitat: For wet meadow habitat, the effects analysis was conducted within a 200 meter zone of influence from proposed routes.

Habitat Factor(s) for the Analysis: The habitat factor used in the analysis was the amount of wet meadow habitat that fell within the 200 meter zone of influence of proposed routes. Each alternative was compared to determine the proportion of habitat affected by proposed routes in relation to the wet meadow habitat at the Sierra Nevada scale.

Current Condition of the Habitat Factor(s) in the Project Area: The project area currently contains 2,520 acres of wet meadow habitat. Habitat is composed primarily of wet meadow that is in the short grass height class (<12 inches).

Direct and Indirect Effects to Habitat: Based on the analysis conducted, direct and indirect effects in the form of disturbance, displacement and/or decrease in habitat quality based on the proximity of proposed routes is greatest under Alternative 1, which results in effects to 1,249 acres of wet meadow or 2.0% of the habitat Sierra Nevada wide. Alternatives 2, 3, 4 and 5 all pose a similar level of effects to wet meadow habitat by affecting 940 acres (1.4%) to 1,106 acres (1.7%) of wet meadow habitat available Sierra Nevada wide.

Table 12. Proportion of Pacific Tree Frog MIS habitat within a 200-meter "Zone of Influence" on proposed routes.

Pacific Tree Frog MIS habitat	**Habitat Type**	**SN Acres**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
	Wet Meadow	66,000	1,249	1,106	940	968	1,030
	Proportion of Habitat		**2.0%**	**1.7%**	**1.4%**	**1.4%**	**1.5%**
	Overall Habitat Ranking		**Low**	**Low**	**Low**	**Low**	**Low**

Cumulative Effects to Habitat in the Analysis Area: Past and current cumulative effects to pacific tree frog habitat include current and historic livestock grazing; watershed/stream restoration projects, 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 cumulative affects Appendix in the EIS provides a list and description of past, present, and reasonably foreseeable projects on the forest and private lands within the Plumas NF boundary. Some, but not all, of these activities will contribute to impacts to wet meadows within the Plumas NF boundary. Miscellaneous resource projects, such as watershed restoration or fish passage projects have a beneficial impact to wet meadow habitat and pacific tree frogs.

The Plumas NF currently has 42 active livestock grazing allotments including both cattle and sheep. Plumas 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. Wet meadows that are grazed are often maintained in the lower herbaceous height levels (i.e. 4-6 inches) affecting habitat quality in wet meadows.

Currently, there is a high demand for recreational use on the Plumas NF due to its close proximity to urban centers (e.g. Oroville, Chico, Reno). The Plumas 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 Plumas 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 Plumas NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. This increase is expected to affect wet meadows through encroachment of recreational use, dispersed camping and general public use.

Table 13 lists all the reasonably foreseeable future actions, including recreation, range allotment plans, and miscellaneous resource projects. Table 13 summarizes cumulative impacts from reasonably foreseeable projects and a description of the potential impact to wet meadow habitat.

Table 13. Direct, Indirect, and Cumulative Impact to wet meadow habitat from Reasonably Foreseeable Future Projects

Project type	Number of Projects	Pacific Tree Frog Direct and Indirect Impact	Overall Cumulative Impact
Fish passage construction project	2 (Long Valley Creek, Road 22N85Y)	Short-term disturbance during project implementation.	Beneficial watershed benefits and aquatic species passage.
Watershed Restoration	1 (Sulphur Creek)	Short-term disturbance during implementation. Improved riparian and meadow habitat quality.	Beneficial watershed and habitat quality.
Range Allotment permit renewal	3 (Grizzly Valley, Grizzly Valley Commnity, Humbug	Maintenance of lower herbaceous height levels (4-6 inches)	Wet meadow habitat maintained at lower habitat quality.
Temporary OHV Forest Order	1 (Forest-wide)	Closed forest to cross-country travel. Lessened disturbance and displacement of pacific tree frogs.	Overall benefit to wet meadow habitat by eliminating effects to habitat quality.

Cumulative Effects Conclusion: When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from grazing, recreation and miscellaneous resource projects and adding those effects to direct and indirect effects, Alternative 1 poses the greatest risk to wet meadow habitats. Alternative 3 when direct, indirect and cumulative effects are combined pose the least risk to wet meadow habitat. Alternatives 2, 4 and 5 are very similar to Alternative 3, with the difference being that they affect a slightly higher amount of wet meadow acres.

Summary of Pacific Tree Frog Status and Trend at the Bioregional Scale

The Plumas NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the Pacific tree frog; hence, the wet meadow effects analysis for the 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 Pacific tree frog. 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 66,000 acres of wet meadow habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. Since 2002, the Pacific tree frog has been monitored on the Sierra Nevada forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA Forest Service 2006, 2007b; Brown 2008). These data indicate that Pacific tree frog continues to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of Pacific tree frog populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Pacific Tree Frog Trend. The Motorized Travel Management Project will affect 1,249 of wet meadow habitat (WTM and FEW) under Alternative 1 (high) and 940 acres under Alternative 3 (low). Based on the acres affected, which range between 1.4% and 2.0% of the total habitat Sierra Nevada wide, the Motorized Travel Management Project Area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of Pacific Tree Frogs across the Sierra Nevada bioregion.

Early and Mid Seral Coniferous Forest Habitat (Mountain Quail)

Habitat/Species Relationship.
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 in the Sierra Nevada. 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).

Project-level Effects Analysis – Early and Mid Seral Coniferous Forest Habitat: For early and mid seral coniferous forest habitat, the effects analysis was conducted within a 200 meter zone of influence from proposed routes.

Habitat Factor(s) for the Analysis: The habitat factor used in this analysis was the amount of early and mid seral coniferous forest habitat that fell within the 200 meter zone of influence of proposed routes. Each alternative was compared to determine the proportion of habitat affected by proposed routes in relation to the early and mid seral coniferous forest habitat at the Sierra Nevada scale.

Current Condition of the Habitat Factor(s) in the Project Area: The project area currently contains 65,924 acres of early seral coniferous forest habitat, and 379,399 acres of mid seral coniferous forest habitat. Habitat is composed of varying age classes that range from sparse seedling 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.

Direct and Indirect Effects to Habitat. Based on the amount of habitat affected within the 200 meter zone of influence, Alternative 1 affects the most habitat for both early seral (21,665 acres) and mid seral (147,206 acres) coniferous forest. For early seral coniferous forest habitat, Alternative 2 affects 9,161 acres, the second most of all the action alternatives. Alternatives 4 and 5 all have a similar level of effects to early seral coniferous forest that range from 2,701 acres (0.5%) to 4,162 acres (0.8%). Alternative 3 has the least effect on this habitat type since only 458 acres (0.1%) are affected. For Mid Seral Coniferous forest, Alternative 2 has the second highest effect on this habitat type with 51,786 acres (1.9%). Alternatives 4 and 5 have less of an effect to mid seral habitats than alternative 2 and range from 19,113 acres (0.7%) to 24,238 acres (0.9%). Alternative 3 has the least affect on mid seral habitat, with 11,008 acres (0.4%) being affected.

Table 14. Proportion of Mountain Quail MIS habitat (early seral) within a 200-meter "Zone of Influence" of Unauthorized Routes

Mountain Quail MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Early Seral Coniferous Forest	546,000	21,665	9,619	458	2,701	4,162
	Proportion of Habitat		**4.0%**	**2.1%**	**0.1%**	**0.5%**	**0.8%**
	Overall Habitat Ranking		**Low**	**Low**	**Low**	**Low**	**Low**

Table 15. Proportion of Mountain Quail MIS habitat (mid seral) within a 200-meter "Zone of Influence" of Unauthorized Routes

Mountain Quail MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Mid Seral Coniferous Forest	2,766,000	147,206	51,786	11,008	19,113	24,438
	Proportion of Habitat		**5.0%**	**1.9%**	**0.4%**	**0.7%**	**0.9%**
	Overall Habitat Ranking		**Low**	**Low**	**Low**	**Low**	**Low**

Cumulative Effects to Habitat in the Analysis Area. Past and current cumulative effects to early and mid seral coniferous forest includes loss of habitat through catastrophic wildfires; timber and fuels management where habitat has been reduced or removed.

The cumulative affects Appendix in the EIS provides a list and description of past, present, and reasonably foreseeable projects on the forest and private lands within the Plumas NF boundary. Between 2001 and 2007, over 73,345 acres of forest vegetation and fuels projects were completed, which consisted of group selection, thinning, mastication, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally modified some early or mid seral habitat for quail either through group selection or thinning. Group selection harvests generally increase the early seral habitat for quail. After group selection, the units or acres harvested result in a tree size 1 condition (early seral). Thinning treatments overall, modify some size class 4 stands to size class 3 stands, essentially moving mid seral habitat to early seral habitat. The burning and mastication treatments may result in the short-term reduction in cover for quail, though it is expected that in the longer term, early seral habitat will be created and protected by reducing wildfire risk. Between 1990 and 2007, approximately 266,963 acres burned on the Plumas NF, most of which has created early seral conditions that have benefited quail.

Table 16 lists all the reasonably foreseeable future actions, including fuels, vegetation, and miscellaneous resource projects. Table 16 summarizes cumulative impacts from reasonably foreseeable projects and a description of the potential impact to quail habitat.

Table 16. Direct, Indirect, and Cumulative Impact to Mountain Quail from Reasonably Foreseeable Future Projects.

Project type	Number of Projects	Mountain Quail Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	17 (Empire, Slapjack, Basin, Grizz, Freeman, Mabie, Clarks, Jackson, Ingalls, Big Hill, Watdog, Flea, Sugarberry, Meadow Valley, Canyon Dam, Corridor, Keddie))	Short-term disturbance from harvest activities, increases in early seral habitat from group selection harvest, and shifts in mid seral habitat toward early seral.	• 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 (Moonlight & camp 14)	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Temporary OHV Forest Order	1 (Forest-wide)	Closed forest to cross-country travel. Lessened disturbance and displacement of quail.	Overall benefit to early and mid seral coniferous forest by eliminating effects to habitat quality.
UC Berkeley Forestry Camp Permit Amendment	1	Loss of 25 trees from 4-25 inch DBH	None to minimal cumulative impact

Cumulative Effects Conclusion: When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires, and miscellaneous resource projects, Alternative 1 poses the greatest risk to early and mid seral coniferous forest habitat, where between 4% and 5% of early and mid seral coniferous forest habitat is affected and added with cumulative effects. Alternatives 2, 4, and 5 are similar in their effects to early and mid seral coniferous forest habitat when direct, indirect and cumulative effects are combined. Alternative 3 poses the least risk to early and mid seral habitat when direct, indirect and cumulative effects are combined.

Summary of Mountain Quail Status and Trend at the Bioregional Scale

The Plumas 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 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 Motorized Travel Management Project will affect 168,871 acres of early and mid seral coniferous forest habitat under Alternative 1 (high) and 13,047 acres under Alternative 3 (low). Based on the acres affected, which range from 0.5% to 9% of the total early and mid seral habitat Sierra Nevada wide, the Motorized Travel Management Project Area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of Mountain Quail across the Sierra Nevada bioregion.

Late Seral Open Canopy Coniferous Forest Habitat [Sooty (blue) Grouse]

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).

Project-level Effects Analysis - Late Seral Open Canopy Coniferous Forest Habitat: For late seral open canopy coniferous forest habitat, the effects analysis was conducted within a 200 meter zone of influence from proposed routes.

Habitat Factor(s) for the Analysis: The habitat factor used in the analysis was the amount of late seral open canopy coniferous forest habitat that fell within the 200 meter zone of influence of proposed routes. Each alternative was compared to determine the proportion of habitat affected by proposed routes in relation to the late seral open canopy coniferous forest habitat at the Sierra Nevada scale.

Current Condition of the Habitat Factor(s) in the Project Area: The project area currently contains 15,431 acres of late seral open canopy coniferous forest habitat. Habitat is composed of age classes 5S (medium/large trees with sparse canopy cover) and 5 (medium/large trees with open canopy cover).

Direct and Indirect Effects to Habitat. Based on the analysis conducted, alternative 1 affects the most late seral open canopy coniferous forest within the 200 meter zone of influence. Alternative 1 affects approximately 4,486 acres or 6.0% of the habitat available Sierra Nevada wide. Effects will be displayed in the form of disturbance, displacement or through avoidance of available late seral open canopy coniferous forest. Alternatives 2 has the second highest effect with 2,040 acres (2.7%) of late seral open canopy coniferous forest being influenced by motorized routes. Alternatives 4 and 5 appear to have similar effects that range from 846 acres (1.1%) to 1,033 acres (1.4%). Alternative 3 affects late seral open canopy coniferous forest habitat the least with only 458 acres or 0.6% of the available habitat Sierra Nevada wide affected.

Table 17. Proportion of Sooty Grouse MIS habitat within a 200-meter "Zone of Influence" of Proposed Routes

Sooty Grouse MIS habitat	Habitat Type	SN Acres	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
	Late Seral Open Canopy Coniferous Forest	75,000	4,486	2,040	458	846	1,033
	Proportion of Habitat		**6.0%**	**2.7%**	**0.6%**	**1.1%**	**1.4%**
	Overall Habitat Ranking		**Low**	**Low**	**Low**	**Low**	**Low**

Cumulative Effects to Habitat in the Analysis Area: Past and current cumulative effects to Sooty Grouse include loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed.

The cumulative affects Appendix in the EIS provides a list and description of past, present, and reasonably foreseeable projects on the forest and private lands within the Plumas NF boundary. Some, but not all, of these activities will contribute to impacts to Sooty Grouse within the Plumas NF boundary. Between 2001 and 2007, over 73,345 acres of forest vegetation and fuels projects were completed, which consisted of group selection, thinning, mastication, and/or burned vegetation to reduce the potential for catastrophic wildfires. These vegetation treatments may have resulted in some limited increases in late seral open canopy coniferous forest since canopy cover is generally not reduced below 40%, except in group selection units where at least 10 canopy cover has been retained. However, these treatments are expected in the longer term to benefit this habitat type by reducing wildfire risk and loss of habitat. Between 1990 and 2007, approximately 266,963 acres burned on the Plumas NF, some of which has removed late seral open canopy coniferous forest.

Table 17 lists all the reasonably foreseeable future actions, including fuels, vegetation, and miscellaneous resource projects. Table 17 summarizes cumulative impacts from reasonably foreseeable projects and a description of the potential impact to late seral open canopy coniferous forest.

Table 17. Direct, Indirect, and Cumulative Impact to Sooty Grouse from Reasonably Foreseeable Future Projects

Project type	Number of Projects	Sooty Grouse Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels	17	Direct and Indirect impacts limited due to treatments not	• Short-term adverse impacts

Project type	Number of Projects	Sooty Grouse Direct and Indirect Impact	Overall Cumulative Impact
reduction – thinning, group select, and aspen enhancement	(Empire, Slapjack, Basin, Grizz, Freeman, Mabie, Clarks, Jackson, Ingalls, Big Hill, Watdog, Flea, Sugarberry, Meadow Valley, Canyon Dam, Corridor, Keddie)	reducing habitat below 40% canopy cover.	during harvest. • Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2 (Moonlight & camp 14)	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Temporary OHV Forest Order	1 (Forest-wide)	Closed forest to cross-country travel. Lessened disturbance and displacement of Grouse.	Overall benefit to late seral open canopy coniferous forest by eliminating effects to habitat quality.

Cumulative Effects Conclusion: When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires, and miscellaneous resource projects, Alternative 1 poses the greatest risk to late seral open canopy coniferous forest habitat on the Plumas NF, when direct, indirect and cumulative effects are considered. Alternative 2 poses a slightly higher risk than alternatives 4 and 5 to late seral open canopy coniferous forest, but all three are considered to pose a moderate risk when direct, indirect and cumulative effects are considered. Alternative 3 has the least risk to this habitat type when direct, indirect and cumulative effects are considered.

Summary of Sooty Grouse Status and Trend at the Bioregional Scale
The Plumas 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 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 rangewide, 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. The Motorized Travel Management Project will affect 4,486 acres of late seral open canopy coniferous forest habitat under Alternative 1 (high) and 458 acres under Alternative 3 (low). Based on the acres affected, which range from 0.6% to 6% of the total habitat Sierra Nevada wide, the Motorized Travel Management Project Area 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 Coniferous Forest Habitat (California spotted owl and northern flying squirrel)

Habitat/Species Relationship.
California spotted owl. The California spotted owl 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. The California spotted owl is strongly associated with forests that have a complex multi-layered structure, large-diameter trees, and high canopy closure (CDFG 2005, USFWS 2006). It uses dense, multi-layered canopy cover for roost seclusion; roost selection appears to be related closely to thermoregulatory needs, and the species appears to be intolerant of high temperatures (CDFG 2005). Mature, multi-layered forest stands are required for breeding (Ibid). The mixed-conifer forest type is the predominant type used by spotted owls in the Sierra Nevada: about 80 percent of known sites are found in mixed-conifer forest, with 10 percent in red fir forest (USDA Forest Service 2001).

Northern flying squirrel. The northern flying squirrel 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. The northern flying squirrel occurs primarily in mature, dense conifer habitats intermixed with various riparian habitats, using cavities in mature trees, snags, or logs for cover (CDFG 2005).

Project-level Effects Analysis – Late Seral Closed Canopy Coniferous Forest Habitat: For Late Seral Closed Canopy Coniferous Forest habitat, the effects analysis was conducted within a 200 meter zone of influence from proposed routes.

Habitat Factor(s) for the Analysis: The habitat factor used in the analysis was the amount of Late Seral Closed Canopy Coniferous Forest habitat that fell within the 200 meter zone of influence of proposed routes. Each alternative was compared to determine the proportion of habitat affected by proposed routes in relation to the Late Seral Closed Canopy Coniferous Forest habitat at the Sierra Nevada scale.

Current Condition of the Habitat Factor(s) in the Project Area: The project area currently contains 334,986 acres of Late Seral Closed Canopy Coniferous Forest habitat. Habitat is composed of 5M (Medium/Large Trees with moderate canopy cover), 5D (medium/large trees with dense canopy cover) and 6 (multilayered stand with greater than 60% canopy cover).

Direct and Indirect Effects to Habitat: Late seral closed canopy coniferous forest does occur in close proximity to proposed motorized routes. Of the six alternatives analyzed for impacts to this MIS habitat type, Alternative 1 posed the highest level of impact affecting approximately 13% of the habitat Sierra Nevada wide. Under this alternative, 130,322 acres of late seral closed canopy coniferous forest habitat occurs within 200 meters of proposed motorized routes. The quality and use of this habitat type by spotted owls and flying squirrels will be affected through increased noise levels, disturbance, and displacement. Alternative 2 has the second highest level of effects (6.2%) to late seral closed canopy coniferous forest habitat. Alternative 4 poses the lesser risk than alternatives 2 and 5 by affecting only 2.5% of the habitat. Alternatives 3 poses the least risk to late seral closed canopy coniferous forest habitat by affecting only 1.8% of the habitat.

Table 18. Proportion of CSO MIS habitat within a 200-meter "Zone of Influence" of Proposed Routes

California Spotted Owl MIS habitat	**Habitat Type**	**SN Acres**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
	Late Seral Closed Canopy Coniferous Forest	994,000	130,322	61,484	18,472	24,695	29,505
	Proportion of Habitat		13.0%	6.2%	1.8%	2.5%	3.0%
	Overall Habitat Ranking		**Low**	**Low**	**Low**	**Low**	**Low**

Cumulative Effects to Habitat in the Analysis Area: Past and current cumulative effects to late seral closed canopy coniferous forests include loss of habitat through catastrophic wildfires; timber and fuels management where canopy cover and nesting and foraging habitat has been reduced or removed.

The cumulative affects Appendix in the EIS provides a list and description of present and reasonably foreseeable projects on the forest and private lands within the Plumas NF boundary. Some, but not all, of these activities will contribute to impacts to late seral closed canopy coniferous forests within the Plumas NF boundary. Between 2001 and 2007, over 73,345 acres of forest vegetation and fuels projects were completed, which consisted of group selection, understory thinning, mastication, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments affect less than 10% of late seral closed canopy coniferous forest. These thinning treatments may result in the short-term reduction in late seral closed canopy coniferous forest, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk and loss of habitat. Between 1990 and 2007, approximately 266,963 acres have burned on the Plumas NF, some of which has removed late seral closed canopy coniferous forest for the next 50-70 years.

Table 19 lists all the present and reasonably foreseeable future actions, including fuels, vegetation, and miscellaneous resource projects. Table 19 summarizes cumulative impacts from present and reasonably foreseeable projects and a description of the potential impact to late seral closed canopy coniferous forests.

Table 19. Direct, Indirect, and Cumulative Impact to Spotted Owls from Reasonably Foreseeable Future Projects

Project type	Number of Projects	Spotted Owl Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select	17 (Empire, Slapjack, Basin, Grizz, Freeman, Mabie, Clarks, Jackson, Ingalls, Big Hill, Watdog, Flea, Sugarberry, Meadow Valley, Canyon Dam, Corridor, Keddie	Small decreases (<10%) in late seral closed canopy coniferous forest outside of PACs/SOHAs.	• 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 (Moonlight, Camp 14)	Minimal impact or disturbance during harvest.	No impact to late seral closed canopy coniferous forest
Temporary OHV Forest Order	1 (Forest-wide)	Closed forest to cross-country travel. Lessened disturbance and displacement of owls.	Overall benefit to late seral closed canopy coniferous forest by eliminating effects to habitat quality.

Cumulative Effects Conclusion: When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from vegetation/fuels projects, wildfires, and miscellaneous projects, Alternative 1 poses the greatest risk to late seral closed canopy coniferous forest (PPN, SMC, WFR, RFR, 5M, 5D and 6) by affecting more of this habitat type within the 200 meter zone of influence. Alternative 3 poses the least risk when cumulative effects are considered and added to the effects of this alternative to late seral closed canopy coniferous forest. All other action alternatives (2, 4 & 5) pose a moderate risk to late seral closed canopy coniferous forest.

Summary of Status and Trend at the Bioregional Scale

The Plumas 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 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. 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 rangewide, 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.

Population Status and Trend – northern flying squirrel. The northern flying squirrel has been monitored in the Sierra Nevada at various sample locations by live-trapping, ear-tagging, camera surveys, snap-trapping, and radiotelemetry: 2002-present on the Plumas and Lassen National Forests (Sierra Nevada Research Center 2007), and 1958-2004 throughout the Sierra Nevada in various monitoring efforts and studies (see USDA Forest Service 2008, Table NOFLS-IV-1). These data indicate that northern flying squirrels continue to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of northern flying squirrel populations in the Sierra Nevada is stable.

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

California spotted owl. The Motorized Travel Management Project will affect 130,322 acres of late seral closed canopy coniferous forest habitat under Alternative 1 (high) and 18,472 acres under Alternative 3 (low). Based on the acres affected within the 200 meter zone of influence, which range from 1.8% to 13% of the total habitat Sierra Nevada wide, the Motorized Travel Management Project Area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of California spotted owl across the Sierra Nevada bioregion.

Northern flying squirrel. The Motorized Travel Management Project will affect 130,322 acres of late seral closed canopy coniferous forest habitat under Alternative 1 (high) and 18,472 acres under Alternative 3 (low). Based on the acres affected within the 200 meter zone of influence, which range from 1.8% to 13% of the total habitat Sierra Nevada wide, the Motorized Travel Management Project Area will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of Northern flying squirrels across the Sierra Nevada bioregion.

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AQUATIC BIOLOGICAL ASSESSMENT

Plumas National Forest
Public Wheeled Motorized Travel Management Plan

Plumas National Forest
Pacific Southwest Region
December 2008

Prepared by /s/ Kristina Van Stone Hopkins **Date:** **December 17, 2008**
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I. INTRODUCTION

The purpose of this Biological Assessment (BA) is to review the United States Forest Service (USFS) preferred alternative in sufficient detail to determine if the Plumas National Forest (PNF) Public Wheeled Motor Vehicle Travel Management Plan, effects on Proposed species to determine if conferencing is required, and to document effects on Threatened and Endangered species to determine if consultation is required.

Threatened and Endangered species — those species listed under the federal Endangered Species Act. Threatened species are likely to become Endangered throughout all or a significant portion of their range (16 United States Code [USC] 1532).

Proposed species — a Proposed species is any species that is proposed in the Federal Register to be listed as a Threatened or Endangered species under the Endangered Species Act (50 Code of Federal Regulations [CFR] 402.03). Although the Mountain Yellow-legged Frog is a Region 5 Sensitive Species, this Biological Assessment treats the MYLF as a proposed species for the purposes of Section 7 Conferencing with the Service on the Plumas NF Travel Management Plan.

The Biological Assessment (BA) is prepared to determine the effects of proposed projects on species listed by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service as Endangered, Threatened or Proposed for listing. It is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (19 U.S.C. 1536 {c}), 50 CFR 402, and standards established in Forest Service Manual (FSM) direction (FSM 2672.42).

The following **Table 1** lists Threatened, Endangered, Proposed, for which habitat availability and suitability was considered for this project:

Table 1. Status of Aquatic Threatened, Endangered, Proposed, Candidate, Species of Concern, FS Sensitive animal species that potentially occur on the Plumas National Forest.

SPECIES	CATEGORY[1]
INVERTEBRATES	
Conservancy fairy shrimp (*Branchinecta conservation*)	Endangered
FISH	
Winter-run Chinook salmon (*Oncorhynchus tshawytscha*)	Endangered
Central Valley steelhead (*Oncorhynchus mykiss*)	Threatened
Delta smelt (*Hypomesus transpacificus*)	Threatened
Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*)	Threatened
Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*)	Threatened

AMPHIBIANS	
California red-legged frog (*Rana aurora draytonii*)	Threatened
Mountain yellow-legged frog (*Rana muscosa*)	Proposed

[1]Refer to Appendix A for species listed by USFWS; SOC = Federal "Species Of Concern"
[2]Bald and Golden Eagle Protection Act

The following species are not known to be located on the Plumas National Forest (table 2). There is no known habitat for the following fish species on the Plumas National Forest; therefore they will not be discussed further in this document. The Winter-run Chinook salmon spawns in the Sacramento River downstream of Keswick Dam near Redding. Designated critical habitat extends from Keswick Dam to the Golden Gate Bridge in the San Francisco Bay area (Federal Register, June 16, 1993, Vol. 58, No. 114, 33212-33219). The Central Valley spring-run Chinook salmon does not spawn in the Plumas National Forest. Their spawning areas include the Sacramento River below Keswick Dam and some Sacramento River tributaries. The Delta smelt occurs only in Suisun Bay and the Sacramento-San Joaquin estuary near San Francisco Bay (Federal Register, March 5, 1993, Vol. 58, 12854-12864). The Central Valley steelhead is native to the Sacramento-San Joaquin drainage including the Feather River, but the Oroville Dam blocks upstream migration at Oroville, prior to entering the Plumas National Forest. The Lahontan cutthroat trout is found within eastside drainages only, on the Tahoe National Forest and in the Lake Tahoe Basin Management Unit. The Conservancy shrimp are located in the lower Feather River in Yuba and Butte County and there are no detections on the Plumas National Forest (CNDDB database, 6/2008).

This document will analyze the potential effects of alternative 5 (preferred alternative) of the Draft Environmental Impact Statement for Public Wheeled Motorized Travel Management Plan, upon Aquatic species that are federally listed (or proposed for listing) as threatened or endangered on the Plumas National Forest. The Plumas NF aquatic species and their habitat considered include Regional Forester's Sensitive Mountain yellow-legged frogs (Federally Proposed Species) and the federally threatened California red-legged frog.

Trail associated factors will be discussed here for Threatened and Proposed amphibians. Generally, site-specific studies on the species interaction with trail-associated factors is lacking in the literature. Where site-specific information or literature on trail associated factors to aquatic species is available, general information on potential impacts will be presented in this section.

II. CONSULTATION TO DATE

In consultation with the United States Fish and Wildlife Services (USFWS), Region 5 of the FS developed a Programmatic Agreement and adopted Route Designation Project Design Criteria. The USFWS has determined that the implementation of Travel Management activities as described in the Design Criteria will have no effect on or are "not likely to adversely affect" the 25 federally listed species addressed by the criteria (USFWS memo dated Dec. 27, 2006).

The Forest started early involvement with the United States Fish and Wildlife Service (USFWS) as of February of 2008, and continues to communicate with the Service on an ongoing basis (pers. comm. A. Fesnock). Discussions to date have included the USFWS recommendation to include incorporating the six design criteria specific to the CRLF into Alternative 4. Alternative 4 meets all the criteria to lead to a "May affect, not likely to adversely affect" determination for the CRLF. Currently the Forest is in "Early Involvement" with the US Fish and Wildlife Service.

The Forest Service has selected Alternative 5 as the agency Preferred Alternative (Alternative 5). Currently, Alternative 5 does not meet all six design criteria under the programmatic agreement as described below. The Forest is pursuing consultation with the USFWS because there is the potential for direct and indirect effect to the CRLF by the preferred alternative. Mitigations have been developed (in consultation with the USFWS) to reduce impacts to CRLF and its habitat, and the Forest Service will comply with any terms and conditions set forth by the Service in its Biological Opinion.

Pursuant to Section 7(c) of the Endangered Species Act of 1973 as amended, the USFWS has been contacted to obtain a current list of threatened, endangered, proposed, and candidate species that may be present on the Plumas National Forest (PNF). The most recent quarterly species list for the Plumas National Forest was dated June 20, 2008 and obtained from the USFWS (http://sacramento.fws.gov/es/spp_lists/NFFormPage.htm) .

This consultation is to evaluate and mitigate the effects of alternative 5, the preferred agency alternative. In addition the Forest has elected to conduct early conferencing with the USFWS on the Mountain yellow-legged frog (Federal Candidate Species). USFWS biologist Amy Fesnock indicated that the MYLF will be listed by the USFWS in 2009 and conferencing on this species is a proactive way to develop management practices and mitigations that will protect the species and it's habitat.

This Biological Assessment is prepared to evaluate Alternative 5 of the DEIS, the preferred alternative, as described below. This BA finds that Alternative 5 does not fully implement the six Route Designation Project Design Criteria for the California red-legged frog (July 2, 2007).

The California red legged frog is the only listed species which occurs, or has potential habitat occurring, within the project area.

Project Design Criteria

To improve the efficiency of the consultation process, Region 5 of the Forest Service in conjunction with the USFWS developed programmatic Project Design Criteria (PDC) for designation of unauthorized roads and trails for public wheeled motorized vehicle use. On December 27, 2006 the USFWS concurred with a list of programmatic project design criteria for a number of listed species. The USFWS has agreed that, by using the following PDC within suitable habitat for the valley elderberry longhorn beetle, the California red-legged frog, the bald eagle, and the Layne's butterweed, designation of unauthorized routes will meet “No effect” or “May Affect Not Likely to Adversely Affect” determinations. “System roads, trails, and areas are not subject to these criteria or to consultation” (Regional Forester memo dated July 2, 2007). This BA only addresses the California red-legged frog in regards to the PDC. The following is a list of these criteria and how alternative 5 meets or does not meet the criteria:

California Red-legged Frog

USFWS Programmatic Project Design Criteria

1. Routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream associated with California red-legged frog.
   - All trails have been field verified by hydrological technicians and the District Hydrologist and reviewed by a biologist. The trails were placed into one of three categories (table 1a). Routes were found to have no affect to resources required no mitigation (category 1). Routes found to have impacts to resources will be mitigated prior to use of the trail (category 2), and routes found to have adverse effects to resources were dropped (category 3). CRLF site assessments (USFWS) have been completed on 100% of the French Creek watershed potential CRLF habitat within 500’ of proposed system trails. In general, all proposed system trails will be closed on category 2 and 3 trails until all best management practices (BMP’s), trail standards and mitigations are completed). In addition the assumption is that the recreational user groups are responsible to maintain these proposed trails and thus maintenance will occur. Therefore, the proposed trails in alternative 5 will have a minimal potential to deliver sediment into streams. Based on mitigations for stream crossings, water quality and implementation of best management practices, we feel alternative 5 will meet criteria 1.

Table 1a

OHV Route Condition Catagories	Description
Category 1	Trails is not adverse to soil and water resources.
Category 2	Mitigation will be prescribed to reduce biological and soil and water resource effects to less than adverse.
Category 3	Adverse, trail dropped from proposed action.

2. In suitable California red-legged frog habitat, trails avoid Riparian Reserve and 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.
   - This criterion will be built into the standards required prior to opening the proposed system trail to the public and thus this criterion will be met by alternative 5.

3. Routes or areas do not cross any stream or waterbody within 500 feet of known occupied sites of California red-legged frog; and route or area is not within a distance of 500 feet from wetlands (i.e. springs, wet meadows, ponds, marshes).
   - Proposed system trails do not cross any stream or waterbody within 500 feet of the Hughes Pond (known occupied site). There are no proposed system trails near the Little Oregon Creek population. The first part of this criteria is met. There are 33 perennial and 113 intermittent stream crossings in potential CRLF habitat. The second part of this criterion will not be met.
4. In habitat occupied by California red-legged frog, routes or areas do not have the potential to capture or divert stream flow. The approaches to stream crossings are down-sloped toward the stream on both sides.
   - Proposed system trails do not cross any stream or waterbody within 500 feet of the Hughes Pond (known occupied site). There are no proposed system trails near the Little Oregon Creek population. This criterion is met by alternative 5.
5. If within California red-legged frog habitat, areas are located outside of Riparian Reserve, Riparian Conservation Areas, meadows, and wetlands.
   - This criterion will not be met (see attached map of routes) 20.3 miles of proposed system trails are within Riparian Reserve, Riparian Conservation Areas, meadows, and wetlands.
6. No trails or areas are within Critical Aquatic Refuges for California red-legged frog.
   - This criteria will not be met, 25.0 miles of proposed system trails are within the Jack's CAR in alternative 5.

III. CURRENT MANAGEMENT DIRECTION

Direction to maintain the viability of Region 5 endangered, threatened, and proposed species is provided by the National Forest Management Act, the Code of Federal Regulations (CFR 219.19), the Forest Service Manual, FSM 2672 (USDA Forest Service 1990), and the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (EIS) (USDA Forest Service 2004a). This Amendment guides the management of the Sierra Nevada National Forests until their forest plans are revised.

Current Forest Service policy (FSM 2670 [USDA Forest Service 1990]) is to manage National Forest System lands so that the special protection measures provided under the Endangered Species Act will no longer be necessary, and threatened or endangered species populations will recover. The Plumas National Forest Land and Resource Management Plan (USDA 1988) directs that the forest utilize administrative measures to protect and improve endangered, threatened, rare, and proposed wildlife species habitats and populations.

Management of aquatic dependent species and/or their 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. Management decisions related to motorized travel can affect aquatic species by increasing human-caused mortality, causing changes in behavior due to disturbance, and habitat modification (Gaines et al. 2003, Trombulek and Frissell 2000, USDA Forest Service 2000). It is Forest Service policy to minimize damage to vegetation, avoid harassment to wildlife, and avoid significant disruption of wildlife habitat while providing for motorized public use on NFS lands (FSM 2353.03(2)). Therefore, management decisions related to motorized travel on NFS lands must consider effects (and) to wildlife and their habitat.

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

Direction relevant to the proposed action as it affects 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.

The effects of each alternative on listed species and designated critical habitat requires that the effects of each alternative be assessed and a determination must be made; this is documented in a Biological Assessment, and summarized in this Chapter. If the “Trail Designation Project Design Criteria for ‘No effect’ or ‘May Affect Not Likely to Adversely Affect’ determinations” (October 2006) are used, a ‘No effect’ or ‘May Affect Not Likely to Adversely Affect’ determination can be made. Otherwise, project-specific consultation with USFWS and/or NMFS should be conducted and documented prior to selecting an alternative.

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 aquatic resources, which will be considered during the analysis process: The following is a summary of key Standards and Guidelines (SNFPA ROD, 2004) applicable to travel management.

- ***Hydrologic Connectivity*** (Management Standard & Guideline 100): Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity.
- ***Riparian Habitat*** (Management Standard & Guideline 92): Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with riparian conservation objectives and 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.
- ***Aquatic and riparian dependent assemblages*** (Management Standard & Guideline 96) Ensure that management activities do not adversely affect water temperatures necessary for local aquatic and riparian dependent species assemblages
- ***Assess and Document Aquatic Conditions*** (Management Standard & Guideline 114). As appropriate, assess and document aquatic conditions following the Regional Stream Condition Inventory protocol prior to implementing ground disturbing activities within suitable habitat for California red-legged frog, Cascades frog, Yosemite toad, foothill and mountain yellow-legged frogs, and northern leopard frog
- ***Bog and Fen Habitat*** (Management Standard and Guideline 118) Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles.

The Aquatic Management Strategy (AMS) uses Riparian Reserves has a set of land allocations, specifically riparian conservation areas (RCA's) and critical aquatic refuges (CAR's) that delineate aquatic, riparian, and meadow habitats, which are to be managed consistent with riparian conservation objectives (RCOs) and associated standards and guidelines (SNFPA-ROD 2004).

Key Watersheds and watershed analysis: Riparian Reserves (11 % of land base) maintain riparian-dependent aquatic and terrestrial processes around running and still waters, and could function as corridors for movement of upland species. Riparian Reserves are built around stream buffers that vary in width with the nature of the stream. Perennial streams and lakes have 300 foot buffer or top of Inner Gorge[a], whichever is greater, on each side of the stream. Seasonally flowing streams (intermittent and ephemeral streams) have a 150 foot buffer on each side of the stream[b], measured for the bank full edge of the stream. In addition, Special Aquatic Features[c] or Perennial Streams with Riparian Conditions

[a] Inner gorge is defined by stream adjacent slopes greater than 70 percent gradient
[b] Measured from the bank full edge of the stream.
[c] Special Aquatic Features include: lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs.

extending more than 150 feet from edge of streambank or Seasonally Flowing streams with riparian conditions extending more than 50 feet from edge of streambank have a 300 foot buffer from the edge of the feature or riparian vegetation, whichever width is greater. Key watersheds are the existing refugia for at-risk species, or are areas with high water quality. Key watersheds can have a mix of reserve, riparian buffer, and matrix allocations.

IV. 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 existing 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-successional forests is another commonly identified impact of roads.

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

1. Increased terrestrial species mortality from collision with vehicles
2. Alteration of the terrestrial and aquatic habitat

Mortality from collision with wheeled 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. Trail associated mortally generally increases as traffic volume and speed increases. Amphibians may be especially vulnerable to trail 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).

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 motorized trails, though some mortality from use of forest motorized trails is to be expected depending on the type of trail and the amount of use a trail receives.

Indirect mortality along trails is associated with human access. Wildlife populations of hunted and trapped species are subject to increased mortality due to better access by humans.

Alteration of the terrestrial and aquatic wildlife habitat

Forest roads and trails change the biological and physical conditions on and adjacent to it, creating edge effects with influences beyond the extent of the road prism (Trombulak and Frisell 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 in discontinued. Soil density on decommissioned roads can persists 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.

Road crossings may fragment stream habitat by acting as barriers to movement of fish and amphibians. Long term barriers can cause 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 and cause, 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 downcutting, gully formation or headcuts may result when high concentration of runoff on hillslopes 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, increasing turbidity, reducing productivity and survival or growth of fishes.

Bury (1980) reported that motorized vehicles crossing creeks poses some risk of gas and oil leaks into the creek. Oil and gas have been shown to have negative affects to the growth and survival in several frog species (Pollet and Bendell-Young 2000; Irwin et al. 1998, Lefcorte et al. 1996).

V. PROJECT DESCRIPTION

Detailed descriptions and maps of alternative 5 is provided with this Biological Assessment and Evaluation

Alternative 5: Alternative 5, as proposed would add 251 miles of motorized proposed system trails to the National Forest Transportation System (NFTS); would add one 36-acre area open to OHV use; and would change vehicle class on 11.3 miles of NFS Roads from motorized trials to non-motorized trails, and prohibits cross country motorized travel. In addition, this alternative would retain 130 miles of existing system trails originally approved under the 1988 Plumas NF Land Management Plan.

Under Alternative 5, the process for management of proposed system trails would include the following:

- Motorized System trials would only be added to the NFTS after the implementation of standard and guidelines, best management practices and mitigations.
- Maintenance of system trails will be completed by recreational user groups.

VI. Analysis Methodology

Impacts relevant to aquatic biota include

Vehicle use on and off established trails has affected or has the potential to affect aquatic species, including threatened, endangered, and sensitive species, by increasing human-caused mortality, causing changes in behavior due to disturbance, and habitat modification.

Assumptions specific to the aquatic biota analysis:

1. All vehicle types result in the same amount of disturbance effect on aquatic dependent species (unless there is local information enabling a separate analysis by vehicle type).
2. Aquatic or aquatic-dependent species spend all or significant portions of their life cycles either in the water or moving through riparian habitats.
3. Habitat is already impacted in the short-term. In the long-term, habitat will remain the same on added trails, but will increase to at least some degree on non-added trails with ban of cross-country travel and subsequent passive restoration.
4. All proposed system trails will be closed to the Public until all required standard and guidelines, BMP's, and mitigations are completed.
5. All proposed system trails will be maintained by the Recreational User Groups.
6. Occupancy is assumed in all non-surveyed suitable habitat.

Data Sources:

1. GIS layers of the following information: trails; habitats; and 'designated' or important aquatic areas (e.g., RCAs, CARs).
2. Site-specific surveys/assessment of any localized sensitive aquatic habitats with trails proposed to be added to the NFTS (e.g., wet meadows, stream crossings, riparian corridors)

Aquatic biota Indicators:

Each indicator is designed to be calculated using the sources of information above, using GIS queries. They are focused on assessing the effects of adding facilities to the NFTS. The effects of prohibition of cross country travel and adding proposed designated trails to the NFTS are assessed quantitatively and qualitatively as described below. Baseline conditions include all designated trails on the Plumas National Forest. The Effects analysis includes baseline (130 miles of designated trails) plus all proposed system trails (251 miles), one 36 acre OHV use area, and converts 11.3 miles of motorized system trails to non-motorized system trails. Forest-wide Riparian Conservation Areas (RCAs), and zone of influence (ZOI's) to amphibians were determined by buffering all perennial streams and perennial water-bodies by 300 and 500[d] feet, and then breaking these RCA's and ZOI's by elevation for species.

- For California red-legged frogs; RCA's and ZOI's from 4,500[e] feet and below is identified as the potential biologically sensitive habitat.
- For Mountain yellow-legged frogs (var. Sierrae); RCA's and ZOI's 3,500 foot and above elevation was identified as potential biologically sensitive habitat.

GIS queries include these biologically sensitive areas intersected with the preferred alternative's proposed system trail locations. In addition, Critical Aquatic Refuges (CAR's) across the Forest were analyzed to determine miles of proposed system trails within each CAR on the Forest.

Analysis biota indicators are described as follows:

Proposed System Trail Miles within Riparian Conservation Areas (RCAs, 300'), "larger" (500') Zone of Influence (ZOI's), and Critical Aquatic Refuges (CAR's): Trail miles of native surfaced trails within RCAs, ZOI's, and CAR's were evaluated to compare the overall effects of all motorized trails (proposed system trails) for the preferred alternative across the Plumas NF. Based on Soil and Watershed Resource Analysis; native surfaced roads and trails have the greatest potential for off-site sediment delivery into streams and lakes. Trail miles provide a relative index to measure the potential indirect effects to T & P amphibians. Proposed system trail miles provide a relative way to show the effects of the preferred alternative.

Number of Stream Crossings within RCAs: The number of proposed trail road crossings in perennial and intermittent streams; to disclose the direct and indirect effects of motorized trails for the preferred alternative. The number of road crossings, provides a way to measure the potential direct and indirect effects on CRLF and MYLF. Direct effects include potential TEP aquatic species mortality as a result of motorized use at stream crossings. Indirect effects include changes to channel and streambank characteristics and changes in vegetation structure. Sediment delivery from motorized trails also is a potential indirect effect of stream crossings. Trail/stream crossings density provides a relative way to disclose the effects of the preferred alternative.

Aquatic Biota Indicators:

Miles of proposed system trails within or adjacent to TEP occurrences and CARs at a Forest Scale

- Indicators:
  - Miles of proposed trails within 500 feet of TEP Amphibian occurrences

[d] 500' is identified as the buffer width in the Regional Route Designation Project Design Criteria (USFSW, 2006).
[e] The Northwestern pond turtle is found from sea level to 4,500 feet (1375 m) in elevation (zoo.org/factsheet, 2008)

- Miles of proposed trails within Critical Aquatic Refuges (CARs), Plumas NF

Aquatic Biota Methodology by Action:

1. **Direct/Indirect effects of the prohibition of cross-country motorized vehicle travel.**

Considerations: General discussion of direct/indirect effects if no action is taken, and cross-country travel continues (with continued concentrated use of existing unauthorized trails and continued trail proliferation in the long-term). This includes likely degradation of riparian vegetation, increased bank erosion, nutrient loading, sedimentation, hydrocarbon pollution which in turn increases metabolic rate, respiration crushing, and oxygen demand of amphibians (Jennings 1996).

Benefits of stopping cross-country travel and future trail proliferation includes the assumption that a passive recovery will occur and there will be an increase~~d~~ in habitat quality for CRLF and MYLF.

2. **Direct/Indirect Effects of adding facilities (presently unauthorized trails, and/or areas) to the NFTS, including identifying seasons of use and vehicle class.**

Analysis Time Periods: For aquatic dependent species, the direct, indirect, and cumulative effects of each alternative are analyzed. Direct and Indirect effects can be assessed together and should be assessed in both the short-term (within 1 year) and the long-term (approximately 20 years). Cumulative effects are assessed only in the long-term (approximately 20 years) and incorporate past/present (the current situation) & reasonably foreseeable future trails (quantitatively as much as possible), as well as a qualitative discussion of other past/present & reasonably foreseeable future actions potentially affecting these species (eg., timber sales, grazing, other recreational uses, etc.). The spatial boundary of these analyses is the Plumas National Forest. Findings and Determinations for TEP species are summarized below.

Analysis Process: Existing information and knowledge about the distribution of the aquatic species on the Plumas NF were used to develop the list of species and to develop species groups. Forest Service Sensitive Species were selected and placed into species groups based on the potential for these species or their habitats to be affected by motorized wheeled vehicle use on the Plumas NF. Local knowledge and sources included corporate databases including distribution of Forest Endangered and Threatened Species, Forest Service Region 5 Sensitive Species, stream, lake, and spring layers and HUC 6 sub-watersheds was used to develop species or habitat groups.

Short-term timeframe: 1 year.
Long-term timeframe: 20 years.
Spatial boundary: dependent on indicator.
Indicator(s): (1) Miles of trails/areas open for motor vehicle use within or adjacent to aquatic resources; (2) Miles of trails/areas open for motor vehicle use with documented disturbances from motor vehicles that resulted in damage to aquatic resources; (3) Miles of trails/areas open for motor vehicle use within

riparian habitat, including meadows and streambanks; (4) Number of trails/areas open for motor vehicle use within habitats of known or historically occupied by TES herptofauna.
Methodology: GIS analysis of added trails in relation to habitat and important/sensitive aquatic areas.
Rationale: Literature indicates that placement of trails in relation to habitat can affect aquatic species through mortality, disturbance, and habitat modification (Moyle and Randall 1996, Trombulek and Frissell 2000, USDA Forest Service 2000).

3. Cumulative Effects

Considerations: Cumulative effects discussion for preferred alternative will combine all direct/indirect effects of the alternatives with past/present, and reasonably foreseeable future actions.
Short-term timeframe: not applicable; cumulative effects analysis will be done only for the long-term time frame.
Long-term timeframe: 20 years.
Spatial boundary: Forest.
Indicator(s): (1) Miles of trails/areas open for motor vehicle use within or adjacent to aquatic resources; (2) Miles of trails/areas open for motor vehicle use with documented disturbances from motor vehicles that resulted in damage to aquatic resources; (3) Miles of trails/areas open for motor vehicle use within riparian habitat, including meadows and streambanks; (4) Number of trails/areas open for motor vehicle use within habitats of known or historically occupied by TEP herptofauna.
Methodology: GIS analysis of past/current, added, and future trails in relation to habitat and important/sensitive aquatic areas and in context of other past/current and future management actions affecting aquatic habitat.
Rationale: Literature indicates that placement of trails in relation to habitat can affect aquatic species through mortality, disturbance, and habitat modification (Trombulek and Frissell 2000, USDA Forest Service 2000).

Road and trail-associated factors: Several studies have identified a classification or conceptual model for responses of wildlife to road and trail-associated activities *(*Knight and Cole 1991*, 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 Plumas NF, these three broad disturbance classifications were used for this assessment. **Table 5** lists the road and trail-associated factors along with their disturbance type, activity type effects, and affected wildlife groups.

Table 5. Road and trail-associated factors with disturbance and activity type, and affected wildlife group

Road and trail – associated factors[1]	Activity Type[2]	Definition of Associated factors	Wildlife group affected
Collisions	Harvest	Mortality or injury resulting from a motorized vehicle running over or colliding with an animal	Wide-ranging carnivores Late successional species Riparian species Ungulates
Habitat loss and fragmentation	Habitat modification	Loss and resulting fragmentation of habitat due to the establishment of roads, trails, or networks, and associated human activities	Wide-ranging carnivores Late successional species Riparian species Ungulates
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 Riparian species
Trail for competitors and predators	Habitat modification	A physical human-induced change in the environment that provides access for competitors or predators that would not have existed otherwise	Wide-ranging carnivores Late successional Riparian species
Disturbance at a specific site	Disturbance	Displacement of individual animals from a specific location that is being used for reproduction and rearing of young	Wide-ranging carnivores Late successional Aquatic-Riparian associated Ungulates
Physiological response	Disturbance	Increase in heart rate or stress hormones when near a road or trail or network of roads or trails	Ungulates Late successional Riparian associated Wide-ranging 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

Processes and models: The assessment process to analyze the effects of wheeled motorized travel routes (road and trails) on the Plumas NF was done in two primary steps: 1) the cumulative effects of travel routes to species groups were assessed based on a similar process completed by Gaines et al. 2003, and 2) the relative environmental risk of trails to riparian habitats was determined.

Analysis of effects: The information generated was used to analyze the direct, indirect and cumulative effects of the proposed alternatives on TEP herptofauna . The analysis of the project alternatives focuses on the effects of two actions: (1) the prohibition of cross-country wheeled motorized vehicle travel, and (2) adding facilities (trails, and/or areas) to the National Forest Transportation System (NFTS).

VII. AFFECTED ENVIRONMENT and ENVIRONMENTAL CONSEQUENCES

Affected Environment

Existing information and knowledge about the distribution of the terrestrial and aquatic species on the Plumas NF were used to develop the list of species and to develop species groups. Federally listed species and Forest Service Sensitive Species were selected and placed into species groups based on the potential for these species or their habitats to be affected by motorized wheeled vehicle use on the Plumas NF. Local knowledge and sources included corporate databases including distribution of TEP aquatic species, stream, pond, lake and spring layers, watershed boundaries, etc., which were used to develop species GIS maps to query for indicators. **Table 6**. provides a list of all the TEP aquatic species described by status, habitat indicator, and distribution on the Plumas NF.

Table 6. List of Plumas NF Special Status Aquatic Species by Habitat Indicator and Distribution

Species	Federally Listed Threatened	Federally Proposed	Habitat Indicator	Distribution on Plumas 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 Westside on PNF below 4,500 ft; two known populations occur on the PNF.
Mountain yellow-legged frog		X	Low gradient (up to 4%) perennial streams and lakes above 4500 feet elevation	154 known occurrences above 3500 ft. on the PNF on the Feather River and Mt. Hough Districts

Environmental Consequences

Environmental Consequences Description

Direct and Indirect Effects Boundary

Direct and indirect effects of alternative 5 is analyzed on National Forest System (NFS) lands, 1,204,225 acres, within the boundary of the Plumas National Forest (PNF). The analysis area includes wheeled motorized trails, collectively referred to as trails. Trails including existing system trails and proposed system trails.

Cumulative Effects Boundary

The cumulative effects analysis includes all wheeled motorized trails that occur within the boundary of the PNF on National Forest System lands. This cumulative effects geographic boundary pertains to the CRLF and MYLF.

National Forest System lands encompasses 1,204,225 acres and non-NFS lands encompasses 273,308 acres within the boundary of the Plumas NF. The total NFS and non-NFS lands within the boundary of the PNF comprises 1,477,533 acres. All Forest Service System lands within the boundary of the PNF is an appropriate scale to analyze cumulative effects of aquatic species for activities associated with wheeled motorized roads and trails, since this area is sufficiently large to encompass amphibian habitat, movement patterns, and home ranges for 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 are analyzed on the accumulation of all past, present, and future actions including existing system trails, existing unauthorized trails, and any future trails.

General Effects of OHV travel

Aquatic Riparian

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.
-

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 (erodibil), the steepness of slope below the road, and vehicle usage (Chin and others 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.

Herptofauna (CRLF and MYLF)

Potential trail associated risk factors to the suitable habitat for frogs, particularly California red-legged frogs (CRLF) and mountain yellow-legged frogs (MYLF), 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 within aquatic habitats. 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 affect frogs and their habitat depends on many factors such as road density, road type, and traffic intensity. No studies have identified the impacts of wheeled vehicle use of roads or trails on California red-legged frogs or Mountain yellow-legged frogs. Most studies on road and trail associated factors address other amphibians (e.g., Fahrig et al. 1995, Mazerolle 2003). 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 California red-legged frogs, and mountain yellow-legged frogs because roads are common over the areas encompassing their historical range on the Plumas NF, many of the roads presently have at least moderate traffic levels; and some observations suggest upslope seasonal movements by frogs likely intersect roads (USDA, 2008).

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 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 in USDA, 2008).

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, macro invertebrates, 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). 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 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 has been shown to have a sublethal effects on growth and behavior the northern leopard frog larvae (Chen et al. 2006). No data exist that specifically addresses the effects of road associated chemicals on CRLF or MYLF (USDA, 2008).

SPECIES-SPECIFIC EFFECTS

California Red-legged Frog

Rana aurora draytonii

SPECIES AND HABITAT ACCOUNT

The California red-legged frog (*Rana aurora draytonii*) is currently listed by the USDI Fish and Wildlife Service as threatened. The species and habitat account for the California red-legged frog can be found at the Plumas National Forest Supervisor’s Office.

HABITAT STATUS

There are four Primary Constituent[20] Elements required for self-sustaining California red-legged frog populations. They are aquatic breeding habitat, non-breeding aquatic habitat, upland habitat, and dispersal habitat.

Aquatic breeding habitats are standing bodies of fresh water (with salinities less than 7.0 parts per thousand (ppt), including: natural and manmade (e.g., stock) ponds, slow moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter

[20] The verbiage presented here is taken from US Fish and Wildlife Service notice published April 13, 2006 in Federal Register; Vol. 71, No. 71.

rains and hold water for a minimum of 20 weeks in all but the driest of years (US Fish and Wildlife Service 2006a).

Non-breeding aquatic habitats consist of the fresh water habitats described above, that may or may not hold water long enough for the subspecies to hatch and complete its aquatic life cycle, but that do provide for shelter, foraging, predator avoidance, and aquatic dispersal for juvenile and adult California red-legged frogs (US Fish and Wildlife Service 2006a). Other wetland habitats that would be considered to meet these elements include, but are not limited to, plunge pools within intermittent creeks, seeps, quiet water refugia during high water flows, and springs of sufficient flow to withstand the summer dry period.

Upland habitats are areas within 60 m (200 ft) of the edge of the riparian vegetation or dripline surrounding aquatic and riparian habitat and comprised of various vegetational series such as grasslands, woodlands, and/or wetland/riparian plant species that provides the frog shelter, forage, and predator avoidance (US Fish and Wildlife Service 2006a)[21] . Upland features are also essential in that they are needed to maintain the hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the wetland or riparian habitat. These upland features contribute to the filling and drying of the wetland or riparian habitat and are responsible for maintaining suitable periods of pool inundation for larval frogs and their food sources, and provide breeding, non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat can include structural features such as boulders, rocks and organic debris (e.g. downed trees, logs), as well as small mammal burrows and moist leaf litter.

Affected Environment

Current Status

The California Red-legged frog is federally listed as Threatened by the USFWS on the Plumas NF. Currently, there are two known breeding populations of CRLF on the Plumas NF. One in the French Creek watershed and one in the Dobbins Creek watershed. There are no OHV trails proposed within the Dobbins Creek watershed and therefore no direct or indirect effects to the CRLF or it's habitat is expected at that site. Habitat site assessments (USFWS) have been completed within the French Creek watershed. All known and potential CRLF habitat was not surveyed to USFWS protocol (pers. comm., USFWS, 2008), and therefore occupancy was assumed.

The life history for California red-legged frog (CRLF) dispersal habitats and distances can be found in the Federal Register: May 23, 1996 [Volume 61, Number 101)] [Rules and Regulations] [Pages 25813-25833] Department of the Interior, 50CFR Part 17, RIN 1018-AC 34. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Red-legged Frog, Agency: Fish and Wildlife Service, Interior. Action: Final rule.

The historical range of the CRLF was limited to the coastal ranges, central valley, and the western slopes of the Sierra Nevada in California (Jennings 1996, Jennings and Hayes 1994). This proposed project is

[21] For the purposes of this analysis to compensate for differences distances of riparian vegetation from the stream, the Sierra Nevada Forest Plan Amendment Riparian Conservation Area distance of 91 m (300 ft) was used.

within this historical range. The current range of the CRLF extends into Butte County, but does not include Plumas County (USFWS 2000a, USDA-SNFPA, 2001). The Plumas National Forest is not within critical habitat as designated in the Final Rule for CRLF Critical Habitat (Federal Register 50CFR17, Volume 71, No. 71, dated April 13, 2006). All federal land was excluded for critical habitat designation because it was determined that the standard and guidelines from the Sierra Nevada Framework protected the CRLF (SNF, pg. 19527).

Starting in 1995 to present the Plumas conducted amphibian surveys using "A Standardized Protocol for Surveying Aquatic Amphibians (Fellers and Freel 1995)". The Plumas conducted formal amphibian surveys in 1996, and red-legged frogs were not located. Surveys conducted from 1997-1999 used the USFWS's protocol, as described in U.S. Fish and Wildlife Service's Guidance on Site Assessment and Field Surveys for California Red-legged Frogs (USFWS 1997), which requires two daytime and two night-time visits, as well as the Fellers protocol. These surveys occurred in areas identified as having the highest potentially suitable habitat attributes. Formal amphibian surveys were conducted for a land exchange in 1997 and a major breeding population of California red-legged frogs was located in the French Creek watershed (Butte County). This was the first known breeding population in the Sierra Nevada. Formal amphibian surveys were conducted, within portions of the French Creek watershed, in 1998 & 1999 by California Academy of Science across the Forest (Vindum and Koo 1999) and there were no confirmed sightings.

The emphasis for Herptofauna surveys on the Plumas were for "key" projects: Inventories have occurred for Hydropower relicensing (~50-60 miles of streams and lakes), cooperative agreements with California Academy of Sciences (~85 miles) and a museum record search across the country for herptofauna records, inventories for vegetation management and stream restoration projects, range allotments (~100 miles), and inventories for HFQLGFRA monitoring. Approximately 300 miles of stream and lake habitat has been surveyed for herpetofauna on the Plumas NF, resulting in only two confirmed reproducing population of CRLF's in the French Creek watershed and the Dobbin's Watershed. In 2000, CRLF's were found in the Dobbins Creek watershed (Yuba County) on the Feather River District of the Plumas NF. Suspected occurrences have been reported in Pinkard Creek, Woodleaf, Howland Flat area, Slate Creek, and East Branch Slate Creek, all of which are located on the Feather River Ranger District. The abundance and distribution of this species is not fully known, but there appears to be little optimally suitable breeding habitat across the Forest. The Forest Fisheries Crew has completed CRLF site assessments in the French Creek watershed and all suitable CRLF habitat not surveyed to USFWS protocol is assumed occupied.

DIRECT AND INDIRECT EFFECTS UNIQUE TO THIS SPECIES

Trail locations and area locations[22] of specific concern for the California red-legged frog are:

1. Trails or areas that have the potential to capture surface flow and then deliver sediment into a stream associated[23] with California red-legged frog.

[22] "Area" as defined by the US Fish and Wildlife Service is a wheeled motorized vehicle use area. A "Route" is defined as a wheeled motorized vehicle road or trail.

2. In suitable California red-legged frog habitat, trails that are located in Riparian Conservation Areas , and does not meet criteria 2 of the USFWS programmatic agreement.
3. 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.
4. Trails or areas that cross any stream or waterbody within 150 m (500 ft) of known occupied site of California red-legged frog; and trail or area that is within a distance of 150 m (500 ft) from wetlands (i.e. springs, wet meadows, ponds, marshes).
5. In habitat occupied by California red-legged frog, trails or areas that have the potential to capture or divert stream flow. Approaches to stream crossings need to be downsloped toward the stream on both sides.
6. Use area is located inside of Riparian Reserve, Riparian Conservation Areas, meadows, and wetlands within California red-legged frog habitat.
7. Trails or areas within Critical Aquatic Refuges for the California red-legged frog.

Alternative 5 – Preferred Alternative.

Direct and Indirect Effects[24]

Trail Miles within Riparian Conservation Areas and Zone of Influence:

4.25 miles of system trails are proposed with alternatives **5** within the 300'buffer and 8.5 miles within the 500'buffer. Trail miles are used as a relative index to measure the potential indirect effects to aquatic species including the California red-legged frog. As discussed above in the general effects section that OHV travel may have a direct effect on the CRLF by the potentially crushing a frog, tadpole, or eggs by a vehicle. Indirectly, the loss of riparian cover, soil compaction, increased access by predators due to lack of cover and habitat degradation are direct and indirect effect of the implementation of alternative 5. Moderate to low direct and indirect effects to California red-legged frog potential habitat are expected within RCA's

There is minimal impact to lakes and ponds by alternative 5 within the Plumas NF (See tables 7 & 8) and therefore there will be no further analysis.

The proportion of a species habitat that is affected by motorized trails (including the trails plus a biologically meaningful 'zone of influence' (e.g., 300 ft RCA, 500' ZOI)

[23] Associated assumed to be occupied.
[24] Comparison between alternatives is important to determine the relative effect of alternative 6 in relation to all action alternatives.and the no action alternatives (alternative 1).

Table 7. Miles of proposed trails within Aquatic Habitat at 300' of perennial streams, ponds & lakes below 4,500 elevation.

Habitat	Acres	Alt 5
Perennial Streams	**152,929**	**4.25**
Ponds Lakes	**15,029**	**0.02**

Table 8. Miles of proposed trails within Aquatic Habitat at 500' of perennial streams, ponds & lakes below 4,500' elevation.

Habitat	Acres	Alt 5
Perennial Streams	**346,459**	**8.3**
Ponds Lakes	**18,130**	**0.2**

Trail Miles within Critical Aquatic Refuges:

There are four Critical Aquatic Refuges (table 9) that were developed for known and potential populations of California red legged frogs; Woodleaf, Pinkard, Oregon, and Jacks. Known populations of California red-legged frogs are within Jacks and Oregon CAR's. The Oregon CAR is the location of one of the two known breeding populations (to date) of CRLF on the Plumas NF. There is no proposed designated OHV trails in the Oregon CAR and thus no direct or indirect effect to the CRLF will occur. There are no miles of motorized trails are proposed in the Woodleaf CAR and therefore no direct or indirect effect to the CRLF. The Pinkard CAR was developed for a CRLF detection, and since only FYLF and one MYLF has been detected within this Critical Aquatic Refuge. 1/2 mile of motorized trails are proposed in alternative 5. There will be a potential moderate direct or indirect effect to CRLF within the Pinkard CAR. Jack's CAR is the location of one of the two breeding CRLF populations. This is the Critical Aquatic Refuge of concern. There are 17.2 miles of motorized trails proposed within the Jack's CAR in alternative 5 with a potential high to moderate direct and indirect effect. With the known population and suitable habitat scattered throughout the French creek watershed (e.g. Jack's CAR) there is a high likelihood that an OHV may crush a CRLF adult or metamorph resulting in direct affects to the species. There is a moderate to high potential for a direct effect to CRLF within the Jack's CAR, and a moderate to low potential for a direct effect to CRLF within all other CAR's at or below 4,500' elevation.

Alternative 5 will not meet the USFWS criteria (#2, 3, 5, & 6 pg.26) developed to minimize effects to a no effect or a may affect not likely to adversely affect. The Forest is currently in early consultation with USFWS and there is the potential to develop mitigations to reduce the potential effects to CRLF and their habitat. Site assessment surveys were completed in the Jack's CAR with low to moderate quality habitat found for CRLF. Areas surveyed to USFWS Protocol for CRLF include all projects for Herger Feinstein Quincy Library Group Vegetation Management projects and restoration projects. The assumption is that all habitat not surveyed to USFWS protocol at 4,500 feet and below is occupied. This would include habitat within the Woodleaf and Pinkard CAR's. Proposed mitigations at stream crossings include the construction of small bridges or box culverts, seasonal closures and the implementation of extensive BMP's[25].

Table 9. Miles of proposed trails within Critical Aquatic Refuges (CARs), Plumas NF.

CAR	Acres	Alt 5
Pinkard	12,035	**0.5**
Woodleaf	20,756	**0**
Oregon	26,443	**0**
Jacks	26,743	**17.2**

Number of Stream Crossings within RCAs:

Alternative 5 has a potential for a moderate impact on CRLF and habitat with 33 perennial stream crossings proposed across the Forest. Direct mortality of animals from vehicle collisions has been documented primarily in relation to paved roads and highways, therefore, it is assumed that all life stages of amphibians are vulnerable to being crushed by OHV at these crossings at unsurveyed habitat.

Table 10 - Number of stream crossings created by proposed trails on the Plumas NF.

STREAM TYPE	Alt 5
Perennial	33
Intermittent	113
Total Crossings	**146**

Miles of proposed motorized trails within TEP herptofauna occurrences

A 500 foot buffer was placed around every occurrence of TEP herptofauna on the Forest and table 11 displays the miles of trail that is within or adjacent. Alternative 5 has no proposed trails within 500 feet of known CRLF and their habitat.

Miles of proposed unauthorized trails within or adjacent to TEP aquatic biota habitat at a Forest Scale

Table 11. Miles of proposed trails within 500 feet of CRLF occurrences.

Species	Number of Known/Confirmed Occurrences	Alt 5
California Red-legged Frog	2	0

[25] Currently the Forest is in early consultation with the USFWS biologist Amy Fresnock and in the process of identifying mitigations to reduce the potential negative effect to the CRLF in French creek and other potential CRLF occupied sites.

The Forest currently has 1109 miles of existing unauthorized OHV routes, with alternative 5 this figure will be reduced by 858 miles to the proposed 251 miles plus the designated 130 miles of motorized trails. In the short term; Alternative 5 will have a reduced potential for a direct effect to individual CRLF's, yet a minimal change in the short term for recovery of the 858 miles of existing unauthorized OHV routes. In the long term (20 years); these 858 miles of existing unauthorized OHV routes will have time to recover naturally and with OHV grants some could be manually restored by putting the trail back to the natural contour of the land, mulching, and seeding.

[15] miles that are currently designated. All other alternatives include these miles plus additional

Cumulative Effects:

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

Past and current cumulative effects to riverine and lacustrine habitats include current and historic livestock grazing; reduced suitability of habitat through catastrophic wildfires; mining activities; 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 Plumas NF currently has 42 active livestock grazing allotments including both cattle and sheep. Plumas 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. There are only *three grazing allotments* on the west side of the Plumas National Forest two are active. Suitable CRLF habitat occur within these allotments and grazing activities can lead to habitat degradation and has the potential to contribute to cumulative effects to suitable CRLF habitat.

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 Plumas 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 such as timber removal, fuels reduction projects, and road construction on private land has the potential for a significant adverse affect on CRLF populations on the Plumas NF and will continue to affect the species.

Although mining activities have the potential to adversely affect this species, suitable habitat has been created for this species (i.e. Little Oregon Creek mining tailings).

Mining and dredging activities have occurred and continue to occur on the Forest. Mining and dredging activities result in sedimentation that affect CRLF habitat and decreases water quality. Between 1990 and 2007, approximately 266,963 acres burned on the Plumas NF, some of which have affected riverine and lacustrine habitat through increased levels of sedimentation.

Currently, there is a high demand for recreational use on the Plumas NF due to its close proximity to urban centers (e.g. Oroville, Chico, Reno). The Plumas 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 Plumas 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 Plumas 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 Plumas NF has the potential to cause an increase in negative interactions between humans and riverine and lacustrine habitats since most of the recreational facilities are located adjacent to lakes, streams and rivers. Future increase in recreational use on the Plumas NF is expected, and therefore, increased disturbance to riverine and lacustrine habitat would be expected, particularly during the summer months.

Table 12 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit re-issuances. Table 12 summarizes cumulative impacts from reasonably foreseeable projects and a description of the potential impact to riverine and lacustrine habitat.

Table 12. Direct, Indirect, and Cumulative Impact to riverine and lacustrine habitat from Reasonably Foreseeable Future Projects.

Project type	Number of Projects	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Mining/Suction Dredging	4 (Cooper Penny, Dredger's delight, Phat Chance, Wnkeye	Impacts from increased sediment delivery, decrease in water quality.	Mining/sution dredging add to cumulative impacts by decreasing habitat quality, mainly in riverine systems.
Hazard tree removal	Ongoing Forest wide	Minimal impact. Short-term disturbance during harvest. Reduction of LWD within riverine habitats	None to minimal cumulative impact
Fish passage construction project	Ongoing , proposals, throughout Forest	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor.
Watershed Restoration	Ongoing , proposals, throughout Forest	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor.
Range Allotment permit renewal	1 (Strawberry Valley Allotment)	Stream bank trampling from livestock resulting in increases in sediment and decrease in water surface shade from browsing riparian shrubs.	Cumulative impacts from sediment and water surface shade are expected to be within forest plan standards (<20%).
Temporary OHV Forest Order	1 (Forest-wide)	Closed forest to cross-country travel. Lessened disturbance to habitat downstream of stream crossings	Overall benefit to macroinvertebrate habitat by eliminating effects to habitat quality.
Backcountry Discovery Trail	Forest-wide	Harrassment, collection, human disturbance, site degradation	Short and long term cumulative impacts on individuals and their habitat.
Integrated Noxious Weed Control Program	Forest-wide	Toxicity and potentially reduced water quality. Individual frogs could be killed.	Short term direct and indirect effects to individual CRLF, long term enhancement of habitat by maintenance of native plant species.

Project type	Number of Projects	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Basin Group Selection	20 miles SE of Quincy, CA	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction
Slapjack Project	Southwest of Quincy, CA in the vicinity of Challenge, Clipper Mills, Feather Falls, Forbestwon, and Dobbins, CA	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction
Watdog	Southwest of Quincy, CA in the Fall River and South Branch Middle Fork Feather River watersheds	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction
Sugarberry Project	South and east of Little Grass Valley Reservoir, from Gibsonville Ridge in the north to the North Yuba River in the south	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction
Flea Hazardous Fuels Reduction Project	South and east of Little Grass Valley Reservoir, from Gibsonville Ridge in the north to the North Yuba River in the south	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction
Lower Middle Fork Feather River Water Quality Improvement Projects	South Fork of the Feather River	Meadow improvement, stream stabilization, and road improvments	Sedimentation and reduced water quality. Longterm imroved waterquality and aquatic species habitat

Summary of Effects: with analysis of trail miles within RCA's , ZOI's, and CAR's, stream crossings, trail miles within 500' of CRLF occurrences; Alternative 5 has a moderate to high potential for direct and indirect effects to CRLF's. Again, past and current cumulative effects to riverine and lacustrine habitats include current and historic livestock grazing; reduced suitability of habitat through catastrophic wildfires; mining activities; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use, including 4 wheeled drive vehicles, ATVs, and motorcycles. These activities along with others described above will add to the direct and indirect effects of the preferred alternative as described above.

Determinations:

It is my determination that Alternatives ~~s~~ 5, may affect and is likely to adversely affect individual California red-legged frogs or their habitat. This determination is based on 1) individual CRLF may be harmed in unsurveyed suitable habitat 4,500 foot elevation and below; 2) Existing known CRLF populations will not be harmed since Alternative 5 contains zero miles of proposed routes within 500 feet of the Hughes Pond CRLF population, and zero miles of proposed routes are within the watershed with the Little Oregon Creek population. 3) Suitable habitat will be impacted since alternative 5 has 17.2 miles of proposed system trails within Jacks Critical Aquatic Refuge that supports Hughes Pond CRLF population and contains suitable CRLF habitat. However, the potential for harm to CRLF in unsurveyed suitable habitat in the Jack's CAR is expected to be minor due to the findings of low to moderate suitable habitat from the USFWS site assessments completed within this CAR. 4) Upland and dispersal habitat will be impacted since alternative 5 has 4.25 miles of proposed system trails within the 300 foot RHCA of potential CRLF habitat in perennial streams, ponds, and lakes, in addition to the 8.3 miles of proposed system trails within the 500 foot RHCA of potential CRLF habitat in perennial streams, ponds, and lakes; 6) CRLF may also be harmed since alternative 5 proposes 33 stream crossings by proposed system trails in unsurveyed potential CRLF suitable habitat in perennial streams with the potential of crushing all life stages of CRLF by OHV's.

Mountain Yellow-legged Frog

Rana muscosa

SPECIES AND HABITAT ACCOUNT

The non-site specific species and habitat account for the mountain yellow-legged frog can be found at the Plumas National Forest Supervisor's Office.

EXISTING SURVEYS AND SIGHTINGS

Between 1996 and 2008 in and adjacent to the Plumas National Forest, there have been 154 detections of mountain yellow-legged frogs. Numerous individuals in various life stages[24] have been observed; each observation can represent multiple frogs and tadpoles.

HABITAT STATUS

In the Sierra Nevada, mountain yellow-legged frogs are found from approximately 1,525 m (5,000 ft) to over 3,655 m (12,000 ft) in elevation. The historic range of this species frog extends from Plumas County to Tulare County (Jennings and Hayes 1994); however, it has disappeared from 70-90 percent of its historic range in the Sierra Nevada (US Fish and Wildlife Service 2000). This frog is seldom far from water and prefers well illuminated, sloping banks of meadow streams, riverbanks, isolated pools, and lake borders with vegetation that are continuous to the water's edge (Zeiner and others 1988). Mountain yellow-legged frogs have also been observed using a variety of habitats, including grassy streambanks, large boulders adjacent to deep stream pools, fallen trees extending into lakes, and along rocky lake shorelines adjacent to deeper water (Elliott pers. comm. 2000). Shallows along stream and lake margins are used by tadpoles to absorb heat to enhance metabolic rate (Jennings and Hayes 1994).

In the Sierra Nevada, mountain yellow-legged frogs generally breed from early spring through mid-summer, depending on when suitable breeding habitats (ponds, lakes, and streams) are ice-free (AmphibiaWeb 2007). Unlike the foothill yellow-legged frog, mountain yellow-legged frog tadpoles take two or more years[26] to metamorphose, generally overwintering in deeper water. Therefore, first and second year tadpoles maybe found in the same waterbody.

Affected Environment

Mountain yellow-legged frogs in the Sierra Nevada occupy aquatic habitats for almost all their seasonal life history; they breed, rear, and overwinter in aquatic habitat. The northern species, R. sierrae, appears to occupy stream habitats more frequently, whereas the southern species, R. muscosa, often occupies lake habitats. Because mountain yellow-legged frog larvae overwinter at least one year, perennial aquatic habitats that do not freeze in the winter are needed for breeding and rearing. The species' generally are thought to use perennial aquatic sites for overwintering, though this is not well-studied. Larvae and metamorphs to some level support a segment of the high-elevation food web: for example between invertebrates and garter snakes (Thamnophis spp.). Benthic invertebrates appear to be the primary food source of postmetamorphic life stages (juveniles and adults) in lake-dwelling populations. Postmetamorphic stages, known to move among aquatic sites seasonally, can rapidly colonize unoccupied habitat. Such movements may maintain proximate clusters of occupied sites that may function as metapopulations.

Prior to 1980

Historical mountain yellow-legged frog data for the Plumas National Forest and vicinity are sparse. Prior to 1980, mountain yellow-legged frogs have been recorded from 6 general localities.

No data exist prior to the 1940s. In 1943, Margaret Storey collected mountain yellow-legged frogs from 3 localities in Sierra County: At the bridge over Slate Creek [CAS-SU 8602-8604]; 1 km north of Scales [CAS-SU 8611]; and Howland's Flat [CAS-SU 8612]). In 1947, D. V. Brown collected a juvenile mountain yellow-legged frog at Camp La Porte, the Boy Scouts of America camp at La Porte (CAS-SU 9528).

One collection dates from the 1950s; Walter Howard and Ed Jameson, Jr. collected a juvenile mountain yellow-legged frog 11.2 km north of Quincy in 1950 (CAS 218482).

The only other pre-1980 records from the vicinity of the Plumas National Forest date from the 1960s. In 1960, 8 mountain yellow-legged frogs were collected from near LaPorte (CSUC 1115, 1253-1259). In

[26]Studies have indicated on the Plumas NF that tadpoles metamorphose in one year, possibly due to lower elevations and longer spring/summer seasons (PSW, 2002).

1961, 5 mountain yellow-legged frogs were collected from Big Grizzly Creek (CSUC 1107-1111; Koo and Vindum 1999).

1980 to Present

Based on re-surveys of historically occupied sites, Jennings and Hayes (1994) indicated that the species appeared extirpated from several localities. Plumas National Forest surveys conducted from 1990 through 2004 have generally followed the Fellers and Freel (1995) protocol, but significant variation in survey effort has been applied. A handful of these surveys have recorded mountain yellow-legged frogs at 1-3 locations, and most observations have been of individual frogs; sites with even 2 or 3 individuals are rare (Twedt and Evans 1993; USFS 1994, 2000a; Fellers and Freel 1995; Fellers 1997b; Koo and Vindum 1999, 2002; Foster Wheeler 2001; Williams 2004). A number of surveys within the appropriate elevation range and habitat have failed to detect mountain yellow-legged frogs (Fellers 1996; Ganda 2001a, 2001b, 2001c, 2001d, 2001e; Ecosystems West 2001, NSR 2001, Klamath WR 2003, M&A 2004).

Based on surveys during the 1990s, analysis of amphibian survey data, and collected positive sightings from the Plumas National Forest, 54 known sites at the time had mountain yellow-legged frogs, but data on numbers of individuals are largely lacking (C. Davidson, pers. comm., 2001). Nine of these sites, all in Plumas County, are specimen-documented: meadow on Pinkard Creek (CAS 203170); tributary to Rock Creek (CAS 206093); small pond north of Pine Grove Cemetery (CAS 209668); Faggs Reservoir (CAS 209370-209377); Silver Lake (CAS 209386); Rock Lake (209404) and its effluent (CAS 227668); outlet of Gold Lake (CAS 227259); upper Lone Rock Creek (CAS 227639); and Boulder Creek at Lowe Flat (CAS 227640).

Based on the most recent entries into the Plumas National Forest Amphibian Database, between 2000 and 2003, of over 80 surveys were conducted that included mountain yellow-legged frog as a target species, 34 surveys across 26 different sites recorded the species. Except for 1 site at which ca. 100 mountain yellow-legged frog larvae were found, 1 to 12 mountain yellow-legged frogs (various life stages) were recorded across remaining sites. The species appears to have disappeared from some of the relatively few historical sites on the Plumas National Forest and species abundance now seems low.

From 2003 to 2006, the USFS SNAMP surveyed 9 watersheds on the Plumas National Forest containing 50 sites. No sites had evidence of mountain yellow-legged frog breeding, and adults or juveniles were located at 2 (4 percent) of the sites surveyed. Only 1-2 mountain yellow-legged frogs were found on a given survey.

Also over the interval 2003-2006, CDFG conducted 86 surveys (see detail of survey approach in Status section) of 78 different sites with potential mountain yellow-legged frog habitat. Mountain yellow-legged frogs were detected at 16.7 percent (n = 13) of surveyed sites. The collective recent data indicate that mountain yellow-legged frogs are sparsely distributed on the Plumas National Forest.

A three-year MYLF telemetry study began in July 2003 and ended in September of 2007. The objective of the study is to determine the dispersal behavior of the MYLF in relation to streams and adjacent terrestrial habitat. From this telemetry study, current findings include that the frogs are only associated directly within the drainage or just adjacent (a single movement of 23 meters away from stream was recorded over the study period); in the summer months each adult frog has been located very close to the same pool/territory; and in the fall, as temperatures decline, female frogs have been found to be moving downstream within the stream channel towards male frogs (Vance, personal com. 2004).

Current Status

Mountain yellow-legged frogs in the Sierra Nevada occur on both sides of the mountain axis between the headwaters of the Feather River and the headwaters of the Kern River between 1,100 m (3,609 ft) and 3,810 m (12,500 ft), but their eastside distribution appears to be restricted to the Tahoe Basin southward. Rana sierrae occupies the northern and central Sierra Nevada south to the vicinity of Mather Pass (Fresno County), whereas R. muscosa occupies the Sierra Nevada south of this area.

Alternative 5

Direct/Indirect Effects

Trail Miles within Riparian Conservation Areas and Biologically Sensitive Areas:

A moderate to high number of proposed system trails are proposed with alternative **5.** Fourteen (14) miles of proposed system trail lie within the 300' RCA buffer and 25.5 miles lie within the 500' ZOI buffer resulting in a moderate to high direct and indirect effect to the Mountain yellow-legged frog and its habitat.

Trail miles are used as a relative index to measure the potential indirect effects to aquatic species including the MYLF. OHV travel may have a direct effect on the MYLF by potentially crushing frogs, tadpoles or eggs by a motorized vehicle. Indirectly, the loss of riparian cover, soil compaction, increased access by predators due to lack of cover and habitat degradation are direct and indirect effects of the implementation of alternative 5.

There is minimal impact to lakes and ponds by alternative 5 within the Plumas NF (see Tables 13 & 14). Again, there will be no further analysis of effect to ponds.

The proportion of a species habitat that is affected by proposed system trails (including the trails plus a biologically meaningful 'zone of influence' of 300 ft for RCA's, 500 ft for ZOI's) is actually very low. When trail miles within RCAs and ZOI's are converted to acres (using a mean width of 50 inches) the amount of habitat affected is less than 0.003% [{14 miles x (50" = 4.2' = .0008 miles) = .0112 Sq Mi = 7.2 acres} 7.2 acres / 219,792 acres = .003%]. A similar proportion of habitat affected results when trail miles are converted to acres within ZOI's.

Table 13. Miles of proposed trails within Amphibian Habitat at 300' of perennial streams, ponds & lakes above 3,500' elevation.

Habitat	Acres	Alt 5
Perennial Streams	219,792	14.0
Ponds Lakes	5,565	0.2

Table 14. Miles of proposed trails within Amphibian Habitat at 500' of perennial streams, ponds & lakes above 3,500' elevation.

Habitat	Acres	Alt 5
Perennial Streams	488,617	25.5
Ponds Lakes	8,388	0.2

Trail Miles within Critical Aquatic Refuges:

Alternative 5 has a range of 0- 13 miles of proposed system trails in Critical Aquatic Refuges ([CAR's] (table 15). CAR's in which MYLF occur or have the potential to occur are Lone Rock, Boulder/Lowe, Rowland, Lakes Basin, Pinegrove, Pinkard, Willlow, Rock and Buck's. The largest known populations of MYLF occur in Lone Rock, Boulder/Lowe, Lakes Basin, Rock, and Buck's CAR's.

In the Lone Rock CAR there are 2.75 miles of proposed system trails in alternative 5 with a predicted moderate to low direct and indirect effect. In the Rowland CAR, 5.2 miles of proposed system trails are proposed with a predicted high to moderate direct and indirect effect to MYLF and it's habitat In the Boulder/Lowe CAR; 2.6 miles of trails are proposed with a moderate to low direct and indirect effect to MYLF and it's habitat In the Lake Basin CAR; 2.7 miles of proposed system trails are proposed with a predicted moderate to low direct and indirect effect to MYLF and it's habitat. In the Pinegrove CAR: 13 miles of proposed system trails are available for use with a predicted high direct and indirect effect to MYLF and it's habitat In the Pinkard CAR; 0 miles of proposed system trails are proposed for a low direct and indirect effect. The Willow CAR; 0.5 miles of proposed system trails are proposed for a predicted low direct and indirect effect to MYLF and it's habitat. In the Rock CAR; 10 miles of proposed system trails are proposed for a predicted high direct and indirect effect to MYLF and its habitat. In the Buck's CAR; 3.6 miles of proposed system trails are proposed for a predicted moderate direct and indirect effect to MYLF and its habitat. The Pinegrove and Rock CAR's are of concern, with such a high density of proposed designated motorized trails. Pinegrove and Rock CAR's have the potential to have a high to very high direct and indirect effect with the implementation of alternatives 5 because of the high density of proposed routes (10-13 miles). Rowland and Buck's CAR are of some concern with a moderate to high direct and indirect effects by the implementation of alternatives 5.

Table 15. Miles of proposed trails within Critical Aquatic Refuges (CARs), Plumas NF.

CARs	Acres	Alt 5
Lone Rock	21,450	2.75
Boulder/Lowe	18,317	2.6
Rowland	39,833	5.2
Lakes Basin	37,783	2.7
Pinegrove	28,483	13.0
Pinkard	12,035	0
Willow	8,828	.5
Rock	36,860	10.0
Bucks	58,138	3.6

Number of Stream Crossings within RCAs:

Alternative 5 has 33 proposed motorized trail stream crossings, with a potential for a moderate to high impact on MYLF and habitat by having a direct effect by potentially crushing a MYLF, tadpole or egg masses (Table 16).

Table 16 - Number of stream crossings created by proposed trails on the Plumas NF.

Stream Type	Alt 5
Perennial	**33**
Intermittent	**113**
Total Crossings	146

A 500 foot buffer was placed around every occurrence of TES herptofauna on the Forest and table 17 displays the miles of trail that is within the 500 foot buffer. There are 154 known occurrences (Table 17 [single and multiple frog sitings per occurrence]) Alternative 5 has the potential for a low direct or indirect effect to MYLF with 0.55 miles proposed system trails within 500 feet of known occurrence[27] of MYLF.

Miles of proposed system trails within or adjacent to TES aquatic biota habitat at a Forest Scale

Table 17. Miles of proposed trails within 500 feet of MYLF occurrences.

Species	Number of Known/Confirmed Occurrences	Alt 5
Mountain Yellow Legged Frog	**154**	**0.55**

Proposed mitigations at stream crossings include the construction of small bridges or box culverts, seasonal closures and the implementation of extensive BMP's . There will be an immediate reduced direct effect by mitigating any trails within 500 feet of MYLF occurrence to reduce the chance of crushing any life stage of the MYLF. Again, the Forest currently has 1109 miles of existing unauthorized OHV routes, with alternative 5 this figure will be reduced by 858 miles to the proposed 251 miles plus the designated 130 miles of motorized trails. In the short term; Alternative 5 will have a reduced potential for a direct effect to individual MYLF's, yet a minimal change in the short term for recovery of the 858 miles of existing unauthorized OHV routes. In the long term (20 years); these 858 miles of existing unauthorized routes will have time to recover naturally and with OHV grants some could be manually restored by putting the trail back to the natural contour of the land, mulching, and seeding.

[27] The Forest has completed MYLF amphibian surveys (Fellers & Freel,1995) from 2000-2007 for HFQLG vegetation management projects across the Forest at 3500 foot elevation and above and all unsurveyed potential habitat within 500 feet was surveyed (Fellers & Freel, 1005) in the summer of 2008.

Cumulative Effects:

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

General discussion for the past and current cumulative effects to riverine and lacustrine habitats are described above in the CRLF section. Specific actions that effect the MYLF are described in Table 18 below.

Table 18 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit re-issuances. Table 18 summarizes cumulative impacts from reasonably foreseeable projects and a description of the potential impact to riverine and lacustrine habitat.

Table 18. Direct, Indirect, and Cumulative Impact to riverine and lacustrine habitat from Reasonably Foreseeable Future Projects

Project type	Location	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Mining/Suction Dredging	(Cooper Penny, Dredger's delight, Phat Chance, Wnkeye	Impacts from increased sediment delivery, decrease in water quality.	Mining/sution dredging add to cumulative impacts by decreasing habitat quality, mainly in riverine systems.
Hazard tree removal	Ongoing Forest wide	Minimal impact. Short-term disturbance during harvest. Reduction of LWD within riverine habitats	None to minimal cumulative impact
Fish passage construction project	Ongoing , proposals, throughout Forest	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor.
Watershed Restoration	Ongoing , proposals, throughout Forest	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Range Allotment permit renewal	(Strawberry Valley Allotment)	Stream bank trampling from livestock resulting in increases in sediment and decrease in water surface shade from browsing riparian shrubs.	Cumulative impacts from sediment and water surface shade are expected to be within forest plan standards (<20%).
Temporary OHV Forest Order	(Forest-wide)	Closed forest to cross-country travel. Lessened disturbance to habitat downstream of stream crossings	Overall benefit to macroinvertebrate habitat by eliminating effects to habitat quality.
Backcountry Discovery Trail	Forest-wide	Harrassment, collection, human disturbance, site degradation	Short and long term cumulative impacts on individuals and their habitat.
Integrated Noxious Weed Control Program	Forest-wide	Toxicity and potentially reduced water quality. Individual frogs could be killed. Potential loss of individuals during Rx burn.	Short term direct and indirect effects to individual CRLF, long term enhancement of habitat by maintenance of native plant species.
Basin Group Selection	20 miles SE of Quincy, CA	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction
Slapjack Project	Southwest of	Potential sedimentation into	Short term sedimentation, long

Project type	Location	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
	Quincy, CA in the vicinity of Challenge, Clipper Mills, Feather Falls, Forbestwon, and Dobbins, CA	riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	term protection from wildfire through fuel reduction
Watdog	Southwest of Quincy, CA in the Fall River and South Branch Middle Fork Feather River watersheds	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction
Sugarberry Project	South and east of Little Grass Valley Reservoir, from Gibsonville Ridge in the north to the North Yuba River in the south	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Flea Hazardous Fuels Reduction Project	South and east of Little Grass Valley Reservoir, from Gibsonville Ridge in the north to the North Yuba River in the south	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Short term sedimentation, long term protection from wildfire through fuel reduction
Lower Middle Fork Feather River Water Quality Improvement Projects	South Fork of the Feather River	Meadow improvement, stream stabilization, and road improvments	Sedimentation and reduced water quality. Longterm imroved waterquality and aquatic species habitat
Mabie DFPZ	South of Highway 70 and west of highway 89 near the communities of Graeagle, Portola, Clio, and Blairsden.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Freeman Project	West of Lake Davis up to Grizzly Ridge	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Camp 14 Salvage and Reforestation Project	The project is located approximately 12 miles northeast of Taylorsville, CA, about 2 miles east of Antelope Lake	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Sulphur - Barry Stream Restoration Project	Middle Middle Fork Feather River HUC 5 Watershed	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Clark's Creek Aspen Restoration and Ecosystem Enhancement	Situated in Clark's Creek, a 10,000 acre tributary watershed to Last	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.

Project type	Location	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Project	Chance Creek, which flows to the North Fork of the Feather River.		
Mills Peak Trail	Lakes Basin Recreation Area Beckwourth Ranger District Plumas National Forest	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water quality
Smith Lake & Mt Elwell trails retrails	Lakes Basin Recreation Area	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water quality
Grizz Project	Along Grizzly Ridge, approximately 5 miles from Spring Garden and 3.5 miles from Cromberg	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Jackson Project (old name Happy Jack Project)	Approximately 4-11 miles northwest of Portola and 1-7 miles north of Graeagle.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Ingalls DFPZ		Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Last Chance Water Quality Improvement Projects	Last Chance watershed, Roads 25N66, 25N72, 25N78, 25N08, 25N65, 25N65A, 25N03	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Red Clover Water Quality Improvement Projects	Red Clover watershed, Roads 24N03Y, 22N22Y, 25N05	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Frenchman Water Quality Improvement Projects	Frenchman watershed	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Lake Davis Water Quality Improvement Projects	Lake Davis watershed	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Nelson-Onion Water Quality Improvement Projects	Nelson-Onion watershed	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Sulphur Creek and Barry Creek Meadow Restoration	Sulphur and Barry Creek at their confluence	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Red Clover and Poco Creeks Meadow	Red Clover and Poco Creeks	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage

Project type	Location	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
Restoration			capasity and improved waterquality
Dotta Canyon Meadow Restoration	Dotta Canyon	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Last Chance (Meadowview) and Little Last Chance (Rowland Creek)	Meadowview and Rowland Creeks	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Middle Fork Whitetop Project	Middle Fork Feather River	Toxicity and potentially reduced water quality. Individual frogs could be killed. Potential loss of individuals during Rx burn.	Short term direct and indirect effects to individual CRLF, long term enhancement of habitat by maintenance of native plant species.
Phat Chance Mining Claim	Near Haskins Valley	Impacts from increased sediment delivery, decrease in water quality.	Mining decreases habitat quality, mainly in riverine systems.
Winkeye Mining Claims	Six miles northeast of LaPorte, CA in the Howland Flat area	Impacts from increased sediment delivery, decrease in water quality.	Mining decreases habitat quality, mainly in riverine systems.
South Fork Feather River Water Quality Improvement Projects	South Fork Feather River	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Empire Vegetation Management Project	North of Quincy, California	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Meadow Valley Defensible Fuel Profile Zone and Group Selection	Surrounding the community of Meadow Valley, CA	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Moonlight Road Relocation Project	The project is located about 10 miles north of Taylorsville, California on Forest Service Road 28N03	Potential sedimentation into riverine and lacustrine habitats	Short term cumulative impacts from sediment are minor. Longterm improvement to waterquality
Moonlight Project Amendment	Proposed operations are in the area of Moonlight Valley	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Dredger's Delight and High Grade Placer Claims	Quincy Highway, on Thompson Creek		
Corridor Wildland Urban Interface (WUI) Fuels Reduction Project	The project is located adjacent to the community of Quincy within the ¼ mile WUI of Chandler Road and Highway 89.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Keddie Hazardous Fuels Reduction Project	Keddie Project is within the vicinity of Keddie Ridge,	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change,	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change,

Project type	Location	Riverine and lacustrine Direct and Indirect Impact	Overall Cumulative Impact
	Round Valley Reservoir, and Mt. Jura. Communities within include Greenville, Crescent Mills, and Taylorsville, California.	long term reduction of fuels.	long term reduction of fuels.
Moonlight and Wheeler Fires Recovery and Restoration Project	The project area is located northeast of Greenville and north of Taylorsville in the Lights Creek and surrounding drainages.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Upper Indian Creek Water Quality Improvement Projects	Upper Indian Creek watershed, Roads 27N25Y, 27N19Y, 27N20Y, 27N22Y, 29N43	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Ingalls DFPZ		Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Dixie Valley and Little Dixie Sheep Allotments	10 to 14 miles north-northeast of the city of Portola, California	Stream bank trampling from livestock resulting in increases in sediment and decrease in water surface shade from browsing riparian shrubs.	Cumulative impacts from sediment and water surface shade are expected to be within forest plan standards (<20%).
Red Clover and Poco Creeks Meadow Restoration	Red Clover and Poco Creeks	Short-term sediment disturbance during project implementation.	Short term cumulative impacts from sediment are minor. Longterm improvement to water storage capasity and improved waterquality
Canyon Dam Fuel Treatment Project	8—10 miles North of Greenville, California	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.	Potential sedimentation into riverine and lacustrine habitats, short term micro-climate change, long term reduction of fuels.
Copper Penny & Two Penny mining Plan of Operation	On or near Lights Creek, on the Mt. Hough Ranger District; the nearest town is Greenville	Impacts from increased sediment delivery, decrease in water quality.	Mining/sution dredging add to cumulative impacts by decreasing habitat quality,

Summary of Effects: with analysis of trail miles within RCA's, ZOI's, and CAR's, stream crossings, trail miles within 500' of MYLF occurrences; Alternative 5 has a moderate to high potential for direct and indirect effects to MYLF's. Again, past and current cumulative effects to riverine and lacustrine habitats include current and historic livestock grazing; reduced suitability of habitat through catastrophic wildfires; mining activities; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use, including 4 wheeled drive vehicles, ATVs, and motorcycles. These activities along with others described above will add to the direct and indirect effects of each alternative as described above.

Determinations

It is my determination that Alternatives 5, may affect, and is likely to adversely affect individual Mountain yellow-legged frogs or their habitat. This determination is based on 1) individual MYLF may be harmed within unsurveyed suitable[28] 3,500 foot elevation and above; 2) Alternative 5 contains 0.55 miles of route within 500 feet of known occurrences, where MYLF may be harmed; 3) alternative 5 has a range of 10-13 miles of proposed system trails within Rock and Pinegrove CAR's, and a range of 2-5 miles within the Lone Rock, Boulder Lowe, Rowland, and Buck's Critical Aquatic Refuge that supports low to high populations of MYLF, and where suitable habitat will be impacted; 4) Upland and dispersal habitat will be impacted since alternative 5 has 14 miles of proposed system trails within the 300 foot RCA of potential MYLF habitat in perennial streams, ponds, and lakes and 25.5 miles of proposed system trails within the 500 feet ZOI of potential MYLF habitat in perennial streams, ponds, and lakes. This density of trails within RCA's and ZOI's have the potential for OHV's to crush metamorphs and adult MYLF's. Alternative 5 proposes 33 stream crossings by proposed system trails in potential MYLF habitat in perennial streams. Again, all life stages of MYLF have the potential to be crushed by OHV's at stream crossings, but the potential for this harm will be reduced by bridge and culvert mitigations.

[28] Surveys were completed to protocol during the summer of FY08 yet due to a low water year the confidence of these surveys is low.

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