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3.11 WILDLIFE: TERRESTRIAL AND AQUATIC SPECIES

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

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

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

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 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 United States Fish and Wildlife Service (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 and referenced in this Chapter.

Forest Service Manual and Handbooks (FSM/H 2670): Forest Service Sensitive species are species identified by the Regional Forester for which population viability is a concern. The Forest Service develops and implements management practices to ensure that rare plants and animals do not become threatened or endangered and to ensure their continued viability on National Forests. It is Forest Service policy to analyze impacts to sensitive species to ensure management activities do not create a significant trend toward federal listing or loss of viability. This assessment is documented in a Biological Evaluation (BE) and is summarized or referenced in this Chapter.

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

- Wetland and Meadow Habitat (Standard and Guideline [S&G] 70): see Section 3.10, Water Resources.
- 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 (S&G 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 (S&Gs 87 and 89).

- Riparian Habitat (S&G 92): See Section 3.10, Water Resources.
- Bog and Fen Habitat (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.
- Water Temperatures (S&G 96): Ensure that management activities do not adversely affect water temperatures necessary for local aquatic and riparian dependent species assemblages.
- Vegetative Management (S&G 114): Ensure that vegetative management activities including fuels reduction actions within Riparian Conservation Areas (RCAs) and Critical Aquatic Refuges (CARs) enhance or maintain physical and biological characteristics associated with aquatic/riparian dependent species. 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.

Applicable direction from the Forest Plan is identified in Appendix C and species-specific S&Gs are identified under the species-specific effects analysis. Compliance with Forest Plan direction is discussed in the Compliance section. Furthermore, a detailed analysis of project alternatives' compliance with the Riparian Conservation Objectives (RCOs) is provided in the project record and is herein incorporated by reference.

Effects Analysis Methodology

The use of a variety of motorized wheeled vehicles has become an increasingly popular form of recreation on National Forest lands. As it has become more popular, vast improvements in technology have also been incorporated into the sport, resulting in more powerful vehicles that are capable of cross country travel in more areas. Large increases in the number of users and improved vehicles have resulted in the proliferation of routes throughout many National Forests, including the Stanislaus. Route proliferation and the use of motorized wheeled vehicles have a broad range of direct and indirect effects on terrestrial and aquatic wildlife. The direct and indirect effects of motorized use on wildlife can be placed in three general categories: (1) human-caused mortality, (2) changes in behavior, and (3) habitat modification (Gaines et al. 2003). These categories were further broken down into specific effects that were documented in the literature (Table 3.11-1).

Human-caused Mortality: Death or injury from a vehicle hitting or running over an animal is well documented and affects the vast majority of species, though to varying degrees (Trombulak and Frissell 2000). In general, road mortality increases with traffic volume and speed. Road mortality on native surface forest roads is generally not significant for large mammals (USDA 1998). Small mammals and herpetofauna (reptiles and amphibians) are more vulnerable because individuals are inconspicuous and slow-moving. Amphibians may be especially vulnerable to road mortality because their life histories often involve migration between wetland and upland habitats (Trombulak and Frissel 2000, USDA 1998). Raptors may also be vulnerable to collisions on forest roads due to their foraging behaviors. However, the most substantial documented mortality has been along highways.

Changes in Behavior (displacement or avoidance, impacts on breeding behavior, and physiological impacts): Frid and Dill (2002) cite the assumption that wildlife exhibit a predator avoidance response when they become non-lethally disturbed by humans. When a motorized vehicle or human triggers a predator avoidance response in an individual, it may directly or indirectly affect that individual's fitness. Direct effects of disturbance to an individual's fitness are commonly measured through increases in stress hormone levels. Significant increases in stress hormone levels have been found to reduce reproductive success of individuals of some species. The indirect effects of disturbance are commonly displayed through changes in an individual's time and energy budget. As a vehicle or

human approaches an individual, the most obvious and common disturbance response is for that individual to avoid the threat and seek cover. After an individual exhibits the disturbance response, a period of time will elapse until that individual resumes pre-disturbance behavior. Since this change in an individual's time budget may result in less time feeding or resting (fitness-enhancing activities), the disturbance may result in changes to the individual's energy budget and potentially impact their fitness. If an individual is repeatedly disturbed in an area, they may eventually avoid the area, essentially being displaced from the habitat.

Table 3.11-1 Road and Trail Factors with Documented Effects on Wildlife Species and Group

	Road and Trail Associated Factors	Effects of the Factors	Wildlife Group Affected
Human-Caused Mortality	Collisions	Mortality or injury from a motorized vehicle running over or hitting an animal.	Wide-ranging Carnivores Late-successional Riparian Ungulates
Changes in Behavior	Displacement or Avoidance	Spatial shifts in individuals or populations of animals away from human activities on or near roads or trails.	Wide-ranging Carnivore Late-successional Riparian Ungulates
	Disturbance at a Specific Location	Displacement of individual animals from a specific location that is being used for reproduction and rearing of young.	Wide-ranging Carnivores Late-successional Riparian Ungulates
	Physiological Response	Increase in heart rate or stress hormones (which may decrease survivorship or productivity) when near a road or trail.	Ungulates Late-successional
Habitat Modification	Habitat Loss and Fragmentation	Loss and resulting fragmentation of habitat due to the establishment or use of roads or trails and associated human activities.	Wide-ranging Carnivores Late-successional Riparian Ungulates Cavity Dependent
	Edge Effects	Changes to habitat microclimates associated with the edge induced by roads or trails.	Late-successional
	Snag or Down Log Reduction	Reduction in density of large snags and downed logs owing to their removal near roads to remove hazards and as fuel wood.	Cavity Dependent Late-successional Riparian
	Route for Competitors and Predators	Providing access or greater hunting success for competitors or predators than would otherwise have existed.	Wide-ranging Carnivores Late-successional Riparian Cavity Dependent
	Movement Barrier	Interference with dispersal or other movements due to either the road itself or by human activities on or near roads or trails.	Wide-ranging Carnivores Late-successional Riparian Ungulates

Gaines et al. (2003) reviewed literature on road- and trail-associated effects upon wildlife and found that alteration of use of habitats in response to roads or road networks was the most common interaction reported. Fifty to sixty percent of the 29 focal species reviewed were impacted in this manner (Gaines et al. 2003). Studies have documented shifts in an animal's home range area, shifts in foraging patterns, and disturbance of nesting or breeding behaviors caused by motorized road or trail use and its associated increased human recreation activity facilitated by motorized access (Foppen and Reijnen 1994, Johnson et al. 2000, Rost and Bailey 1979). Recreation activities (hiking, camping, fishing, shooting, etc.) associated with the access provided by motorized routes result in indirect disturbance and displacement effects that often exceed the direct influence of the roads and trails. Many species avoid areas in proximity to roads or trails, or exhibit flight behavior within a certain

distance of route use, though studies documenting the magnitude and duration of behavioral responses are limited. Road usage by vehicles has a significant role in determining animal's road avoidance behavior. Black bear, for example, crossed roads with low traffic volume more frequently than roads with high traffic volume, and almost never crossed interstate highways (Brody and Pelton 1989). Perry and Overly (1977) documented displacement of deer up to 800 meters (approximately 2,620 feet, or ½ mile) from major roads, and from 200 to 400 meters ($^1/_8$ to ¼ mile) from secondary and primitive roads. Van Dyke et al. (1986) documented that mountain lions avoided improved native surface roads and surfaced roads, and selected home range areas with lower road densities than the study area average. Activities that create elevated sound levels or result in close visual proximity of human activities at sensitive locations (e.g., nest trees) have the potential to disrupt normal behavior patterns. Studies of the effects of human disturbance upon wildlife have revealed that the immediate postnatal period in mammals and the breeding period in birds are time periods when individuals are most vulnerable to disturbance.

Intrusion-induced behaviors such as nest abandonment and decreased nest attentiveness have led to reduced reproduction and survival in species that are intolerant of intrusion (Knight and Gutzwiller 1995). Foppen and Reijnen (1994), for example, found that the reproductive success of forest bird species declined in areas fragmented by roads. Anthony and Isaacs (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. Wasser et al. (1997) found that stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located less than 0.25 miles from a major logging road compared to spotted owls in areas greater than 0.25 miles from a major logging road. Chronic high levels of stress hormones may have negative consequences on reproduction or physical condition of birds, though these effects are not well understood.

Habitat Modification (habitat loss, fragmentation, edge effects, snag and down log reduction, routes for competitors, movement barriers): Road and trail networks remove habitat but also have a broader effect than just the conversion of a small area of land to route surfaces. Andren (1994) suggested that as landscapes become fragmented the combination of increasing isolation and decreasing patch size of suitable habitat is negatively synergistic, compounding the effects of simple habitat loss. In particular, species associated with old forest habitats may be impacted by such effects. One study determined that the total landscape area affected by roads was 2.5 to 3.5 times the actual area occupied by the road feature, assuming a 50-meter (approximately 165–foot) influence along the road's edge (Reed et al. 1996). A decrease in interior forest patch size results in habitat loss and greater distance between suitable interior forest patches for sensitive species like the California spotted owl and American marten. As roads and trails break up forest patches, increased exposure may increase nest predation and parasitism rates by species such as jays or cowbirds (Miller et al. 1998), or provide increased access for generalist competitors or predators, such as coyotes (Buskirk and Ruggiero 1994).

Additional habitat modification occurs as an indirect effect of managing roads or trails for public wheeled motor vehicle use. Trees posing a potential safety hazard ("hazard trees") are removed along roads. These trees are typically snags that are within a tree-height distance from the road. This safety policy results in a "snag free" zone of 200 to 300 feet from a road's edge, also affecting the recruitment of large down wood within this zone. Few hazard trees are removed along trails.

Major highways are known to create movement barriers for a number of wildlife species, particularly wide-ranging carnivores and ungulates, and are suspected of being a major factor in the decline of some forest carnivores, such as fisher and marten (Brody and Pelton 1989, USDA 2001). The slower speed and lower traffic volume roads and trails that are being evaluated in the project alternatives are

less likely to create barriers to movement. However, the extent to which denser networks of roads and trails might result in barriers to movement for some wildlife species is unknown (USDA 2001).

The project alternatives may result in the above listed effects through six types of actions:

- The prohibition of cross country travel,
- Adding facilities (presently unauthorized roads, trails, and/or areas) to the National Forest transportation System (NFTS),
- Changing the type of use on an existing NFTS route,
- Changing the season of use on the NFTS,
- Implementation of mitigation measures
- Amending the Forest Plan with respect to the western pond turtle.

Assumptions Specific to Terrestrial and Aquatic Species

While some of these assumptions may be arguable, the comparison of alternatives using these assumptions is valid because the same assumptions are applied to all alternatives.

1. The Risk – Disturbance Hypothesis: Animals respond to non-lethal human disturbance similarly to how they respond to predation (Frid and Dill 2002).
2. All vehicle classes result in the same amount of disturbance effects to wildlife, unless there is local information enabling a separate analysis by vehicle class.
3. Location of a route is equal to disturbance effects from that route (i.e., assume all routes provide the same level of disturbance), unless local data or knowledge indicate otherwise.
4. Habitat is already impacted in the short term. In the long term, habitat will remain the same on added routes, and will increase to at least some degree on non-added routes with ban of cross country travel and subsequent passive restoration.
5. Without a prohibition on cross country travel, route proliferation would continue to occur. Alternative 2 would not prohibit cross country travel; therefore, route proliferation would likely occur over the short and long term throughout the project area. Since it is largely unknown where route proliferation may occur over the long term, it is assumed that individuals of many species may be adversely impacted by this alternative.
6. Aquatic species spend all or significant portions of their life cycles either in or moving through riparian habitats.
7. Although hazard tree sales result in the reduction of snags along Maintenance Level (ML) 2 and ML3 roads within the project area, snags are not actively removed along ML1 roads and along NFTS trails.
8. Not all suitable habitats for each species have been surveyed sufficiently to determine absence of the species. So the presence of all species is assumed if there is suitable habitat present.

Data Sources

1. Geographic Information System (GIS) layers with the following information: routes; habitats; and ‘designated’ or important wildlife areas.
2. Site-specific surveys/assessments of any local sensitive wildlife habitats with routes proposed to be added to the NFTS.

Terrestrial and Aquatic Species Methodology by Action

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

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

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Methodology: calculation of amount of habitat currently open to cross country travel.

2. Direct and indirect effects of adding facilities to the NFTS

Rationale: Literature indicates that placement of routes in relation to habitat can affect wildlife species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA 2000b). Motorized routes have a "zone of influence" adjacent to those routes, within which habitat effectiveness or suitability is reduced and wildlife population densities are lower (Gaines et al. 2003, Trombulek and Frissell 2000). The degree of effect of the various factors associated with routes can be evaluated more effectively when considering the proportion of a given species' habitat that occurs within this zone.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Indicator(s): (1) Density of motorized routes; (2) Miles of motorized routes; (3) Miles of ML 1 roads converted to trails; (4) Number of sensitive sites for TES species (e.g., Protected Activity Centers, nest sites, winter roost areas) within ¼ mile of an added route; (5) The proportion of a species' (or species group's) habitat that is affected by motorized routes.

Methodology: GIS analysis of added routes in relation to habitat and important/sensitive wildlife biota areas; site-specific surveys/assessments of any local sensitive wildlife habitats with routes proposed to be added to the NFTS.

3. Direct and indirect effects of changes to the public use on existing NFTS routes

Rationale: Literature indicates that placement of routes in relation to habitat can affect wildlife species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA 2000b). Changing the vehicle class on NFTS routes may also result in adverse impacts to wildlife. When routes that have historically been managed as ML1 roads are changed to ML2 or ML3 roads or to trails, they then become open to public use. Opening these roads for public use would essentially result in the same direct effects to wildlife as adding a route to the system. Therefore, the analysis of effects of changing ML1 roads on the existing NFTS to ML2 or ML3 roads or to motorized trails are analyzed in conjunction with the effects of additions to the NFTS.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Indicator(s): (1) Miles of ML1 road converted to trail within occupied wildlife habitat; (2) Miles of ML1 road converted to trail within suitable, preferred, and emphasis wildlife habitat; (3) Miles of ML1 road converted to trail near or within sensitive sites.

Methodology: GIS analysis of converted routes in relation to habitat and important/sensitive wildlife biota areas.

4. Direct and indirect effects of changes to the season of use on the existing NFTS

Rationale: Limiting the seasons of use may provide beneficial effects to wildlife species and their habitat.

Short-term timeframe: 1 year.

Long-term timeframe: 20 years.

Spatial boundary: Forest.

Indicator(s): (1) Amount of wildlife habitat receiving protection from seasonal closures; (2) Number/Percentage of sensitive areas receiving protection from seasonal closures.

Methodology: GIS analysis of seasonal closures in relation to wildlife habitat.

5. Direct and indirect effects of implementing the mitigation measures

Rationale: The implementation of mitigation measures may result in various types of short-term adverse effects to wildlife species. Some of the mitigation measures may benefit some species in the long term.

Short-term timeframe: 1 year.

Long-term timeframe: 5 years.

Spatial boundary: Forest.

Indicator(s): (1) Number of mitigation measures proposed in occupied habitat; (2) Number of mitigation measures proposed in suitable, preferred, emphasis habitat.

Methodology: GIS analysis of proposed mitigation measures in relation to habitat and important/sensitive wildlife biota areas.

6. Cumulative Effects

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

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.

Methodology: GIS analysis of past/current, added, and future routes in relation to habitat and important/sensitive wildlife areas and in context of other past/current and future management actions affecting habitat.

Affected Environment – General Wildlife

The Stanislaus National Forest (Stanislaus National Forest) provides habitat for numerous species of birds, mammals, amphibians, reptiles, and fish. There are currently 6 terrestrial and aquatic wildlife species listed as Endangered or Threatened under the ESA and 21 species listed as Forest Service Sensitive (Table 3.11-2) which could occur on the Stanislaus National Forest. These species and their habitats on the Stanislaus National Forest are described in detail in the Stanislaus National Forest Motorized Travel Management EIS BA/BE, which can be found in the project record and is herein incorporated by reference. Species-specific information is summarized below within the species-specific analysis for those species which could be more than nominally affected by the project. In addition, there are 12 MIS on the Stanislaus National Forest (Table 3.11-2). These species and their

habitats are described in detail in the Stanislaus National Forest Motorized Travel Management Project MIS Report, which can be found in the project record and is herein incorporated by reference. Species-specific information is summarized below within the species-specific Affected Environment and Environmental Consequences sections for those MIS which could be more than nominally affected by the project.

Table 3.11-2 Special Status Terrestrial and Aquatic Wildlife Species

Common Name	Scientific Name	Status
Invertebrates		
Valley Elderberry Longhorn Beetle	Desmocerus californicus dimorphus	T
Aquatic Macroinvertebrates	Numerous Species	MIS
Fish		
Delta Smelt	Hypomesus transpacificus	T
Lahontan Cutthroat Trout	Oncorhynchus clarki henshawi	T
Central Valley Steelhead	Oncorhynchus mykiss	T
Hardhead	Mylopharodon conocephalus	S
Reptiles and Amphibians		
California Red-legged Frog	Rana aurora draytonii	T
California Tiger Salamander	Ambystoma californiense	T
Relictual (Hell Hollow) Slender Salamander	Batrachoseps (diabolicus) relictus	S
Limestone Salamander	Hydromantes brunus	S
Yosemite Toad	Bufo canorus	S
Foothill Yellow-legged Frog	Rana boylii	S
Mountain (Sierra Nevada) Yellow-legged Frog	Rana (sierrae) muscosa	S
Western Pond Turtle	Clemmys marmorata	S
Pacific Tree (Chorus) Frog	Pseudacris regilla	MIS
Birds		
Bald Eagle	Haliaeetus leucocephalus	S
California Spotted Owl	Srix occidentalis occidentalis	S, MIS
Great Gray Owl	Strix nebulosa	S
Northern Goshawk	Accipiter gentilis	S
Swainson's Hawk	Buteo swainsoni	S
Peregrine Falcon	Falco peregrinus	S
Willow Flycatcher	Epidonax traillii	S
Sooty (Blue) Grouse	Dendragapus obscurus	MIS
Mountain Quail	Oreortyx pictus	MIS
Black-backed Woodpecker	Picoides arcticus	MIS
Hairy Woodpecker	Picoides villosus	MIS
Fox Sparrow	Passerella iliaca	MIS
Yellow Warbler	Dendroica petchia	MIS
Mammals		
Mule Deer	Odocoileus hemionus	MIS
American Marten	Martes americana	S, MIS
Pacific Fisher	Martes pennanti pacifica	S
California Wolverine	Gulo gulo luteus	S
Sierra Nevada Red Fox	Vulpes vulpes necator	S
Northern Flying Squirrel	Glaucomys sabrinus	MIS
Townsend's Big-eared Bat	Corynorhinus townsendii	S
Western Red Bat	Lasiurus blossevillii	S
Pallid Bat	Antrozous pallidus	S

The following species were considered, but will not be analyzed any further within this document because they are not known to occur within the analysis area and would not be affected by the project alternatives: delta smelt, central valley steelhead, hardhead, California tiger salamander, limestone salamander, and Swainson's hawk.

Some of the species listed in Table 3.11-2 are currently being affected by motorized use of the Stanislaus National Forest. Literature describing the effects of motorized roads and trails upon wildlife have often grouped or categorized species in various ways to describe these effects (Knight and Gutzwiller, ed. 1995, Gaines et al. 2003). Gaines et al. (2003) categorized species into groups based upon a combination of their biology and interactions with road- and motorized trail-associated

factors. The following groups from Gaines et al. were used to assess potential impacts from motorized use on the Stanislaus National Forest: (1) old forest associated (or late-successional forest associated) species; (2) ungulates; (3) riparian-associated species; (4) cavity dependent species (for this analysis, species associated with snags in green forest); and (5) aquatic-associated species. In addition, species from the following 3 groups were also used to assess potential impacts: (6) shrubland-associated species, (7) early and mid seral coniferous forest species group, and (8) late seral open coniferous forest species group. Table 3.11-3 shows the species specifically considered for the analysis in each group. Effects on species from the cavity-dependent species group, the shrubland-associated species group, the early and mid seral coniferous forest group, and the late seral open coniferous forest species group are briefly summarized below.

Table 3.11-3 Wildlife Group and Terrestrial and Aquatic Species

Wildlife Group	Species
Late-successional forest associated species	American marten, Pacific fisher, California spotted owl, northern goshawk, northern flying squirrel
Ungulates	Mule deer
Riparian-associated species	Bald eagle, great gray owl, yellow warbler
Aquatic-associated species	California red-legged frog, foothill yellow-legged frog, mountain yellow-legged frog, western pond turtle, Yosemite toad, macroinvertebrates, Pacific tree frog
Shrubland-associated species	Valley elderberry longhorn beetle, fox sparrow
Species associated with early and mid seral coniferous forest	Mountain quail
Species associated with late seral open coniferous forest	Sooty (blue grouse)
Species associated with snags in green forest	Hairy woodpecker

The project BA/BE report contains the analysis of the effects of all project alternatives (Alternatives 1, 2, 3, 4, and 5) to all TES species. Analysis of the effects of the project alternatives in this report indicated that the following species would not be affected by the action alternatives (Alternatives 1, 4, and 5). Therefore, they are not discussed in detail in this document: Townsend's big-eared bat and western red bat. For further disclosure of the analysis of the project alternatives for these species, refer to the project BA/BE (project record).

Analysis of the effects of the project alternatives documented in the BA/BE indicated that the valley elderberry longhorn beetle, Lahontan cutthroat trout, California wolverine, Sierra Nevada red fox, pallid bat, peregrine falcon, willow flycatcher, and Hell Hollow slender salamander would be nominally impacted by Alternatives 1, 3, 4, and 5.

There are no elderberry plants with stem diameters greater than 1 inch (suitable habitat for the beetle) within 20 feet of any of the unauthorized routes proposed to be added to the system. The miles of route that could be added to the system below 3,000 feet in elevation (the elevation range for the valley elderberry longhorn beetle) is minor—10.22 for Alternative 4, which would add the most miles.

Under Alternatives 1, 4, and 5, cross country travel would be prohibited and the direct and indirect effects of adding routes in Lahontan cutthroat trout habitat would be insignificant and discountable. Prohibiting cross country travel would prevent increases in disturbance and habitat modification/fragmentation. Under Alternative 3, cross country travel would be prohibited and there would be no addition of routes in habitat.

The direct, indirect, and cumulative effects of Alternatives 1, 3, 4, and 5 on the California wolverine would be minor because the majority of suitable habitat within the project area exists within wilderness areas that would not be impacted by the alternatives.

For the Sierra Nevada red fox, the direct, indirect, and cumulative effects of Alternatives 1, 3, 4, and 5 would be minor because, as with the wolverine, the majority of suitable habitat within the project area exists within wilderness areas that would not be impacted by those alternatives.

There would be no direct effects from any of the alternatives on the pallid bat. Under Alternatives 1, 4, and 5, some ML1 routes would be changed to ML2 or ML3 and some ML2 and ML3 routes would be changed to ML1. The Stanislaus National Forest has a policy of removing hazard trees (usually snags) along ML2 and ML3 roads, but not ML1 roads or trails. The bat uses snags for roosting. The change in miles of roads along which snags may be removed under Alternatives 1, 4, and 5 would have an indirect effect on this species, but it would be small because the net change in miles would be small. The cumulative effects of these 3 alternatives would be minor. There would be no change in maintenance level under Alternative 3, so there would be no effect on the species from Alternative 3.

Under Alternatives 1, 3, 4, and 5, cross country travel would be prohibited and there would not be any motorized routes added to the NFTS within one mile of peregrine falcon eyries or near foraging areas. Prohibiting cross country travel would prevent disturbance to eyries and near foraging areas over the long term.

Under Alternatives 1, 4, and 5, cross country travel would be prohibited and the direct and indirect effects of adding routes in willow flycatcher habitat would be insignificant and discountable. Under Alternative 3, no routes would be added in habitat. Prohibiting cross country travel would prevent habitat modification/fragmentation; providing beneficial effects over the long term.

Hell Hollow slender salamander is found below 2,000 feet in elevation. The route proposed to be added to the NFTS removed very little habitat when they were created. The salamanders are primarily active at night when vehicle use of the routes being considered is low. Very few miles would be added to the system or converted from closed to open status in Hell Hollow salamander habitat under any of the alternatives. So the effects on the species would be very minor.

These eight species will not be discussed further within this document. For a complete discussion of the effects of the project alternatives on these species, refer to the project BA/BE (project record).

The project MIS report contains the analysis of the effects of the project alternative (Alternatives 1, 2, 3, 4, and 5) to all MIS species. Analysis of the effects of the project alternatives in this report indicated that the habitat of the black-backed woodpecker (a MIS) would not be impacted by the action alternatives. For a complete discussion of the effects of the project alternatives on this species, refer to the project MIS Report (project record).

Analysis of the effects of the project alternatives in the MIS report indicated that the following MIS species habitat would be nominally impacted by the action alternatives (Alternatives 1, 4, and 5): macroinvertebrates, fox sparrow, yellow warbler, Pacific tree frog, mountain quail, sooty (blue) grouse, and the hairy woodpecker. Following is a summary of those effects. For a complete discussion of the effects on the habitats of these species, refer to the project MIS Report (project record).

Macroinvertebrates: The action alternatives would not alter the existing trend in macroinvertebrate habitat, nor would they lead to a change in the distribution of macroinvertebrates across the Sierra Nevada bioregion. This is based on the relatively low amount of lacustrine and riverine habitat affected (possible sedimentation from 19.3 miles of routes and 81 stream crossings in RCAs under Alternative 4, which would have the most miles of routes and the most crossings of the action alternatives) and the prohibition of cross country travel within 262,482 RCA acres.

Fox sparrow: The Stanislaus National Forest Travel Management Project would directly, indirectly, and cumulatively affect between 9,232 acres (highest) of fox sparrow shrubland habitat under Alternative 2 (No Action) and 0 acres (lowest) under Alternative 3. Based on the acres affected, which range from 0% to 1% of the total Sierra Nevada-wide, the Stanislaus National Forest Motorized Travel Management Project would not change the existing trend in the habitat, nor would it lead to a change in the distribution of fox sparrows across the Sierra Nevada bioregion.

Yellow warbler: The Stanislaus National Forest Travel Management Project would directly, indirectly, and cumulatively affect between 25 acres (highest) of yellow warbler habitat under Alternative 2 (No Action) and 0 acres (lowest) under Alternative 3. Based on the acres affected, which range from 0% to 1% of the total Sierra Nevada-wide, the Stanislaus National Forest Motorized Travel Management Project would not change the existing trend in the habitat, nor would it lead to a change in the distribution of yellow warblers across the Sierra Nevada bioregion.

Pacific tree frog: The Stanislaus National Forest Travel Management Project would directly, indirectly, and cumulatively affect between 1.27 acres (highest) of wet meadow habitat under Alternative 2 (No Action) and 0 acres (lowest) under Alternative 3. Based on the acres affected, which under all the alternatives are less than 0.01% of the total Sierra Nevada-wide, the Stanislaus National Forest Motorized Travel Management Project would not change the existing trend in the habitat, nor would it lead to a change in the distribution of Pacific tree frogs across the Sierra Nevada bioregion.

Mountain quail: The Stanislaus National Forest Travel Management Project would directly, indirectly, and cumulatively affect between 26,503 acres (highest) of early and mid seral coniferous habitat under Alternative 2 (No Action) and 0 acres (lowest) under Alternative 3. Based on the acres affected, which range from 0% to 1% of the total Sierra Nevada-wide, the Stanislaus National Forest Motorized Travel Management Project would not change the existing trend in the habitat, nor would it lead to a change in the distribution of mountain quail across the Sierra Nevada bioregion.

Sooty grouse: The Stanislaus National Forest Travel Management Project would directly, indirectly, and cumulatively affect between 1,924 acres (highest) of late seral open canopy coniferous forest habitat under Alternative 2 (No Action) and 0 acres (lowest) under Alternative 3. Based on the acres affected, which range from 0% to 2.6% of the total Sierra Nevada-wide, the Stanislaus National Forest Motorized Travel Management Project would not change the existing trend in the habitat, nor would it lead to a change in the distribution of sooty grouse across the Sierra Nevada bioregion.

Northern flying squirrel: The effects on the habitat of the northern flying squirrel are the same as those for the spotted owl and marten (see discussions below under each of those two species), as the three species represent the same habitat (late seral closed canopy coniferous forest, or late successional).

Hairy woodpecker: The potential reduction in medium-sized snags per acre on 66,600 to 72,000 acres (depending on the alternative selected) out of 450,000 acres of habitat on the Stanislaus National Forest will not alter the existing trend in the ecosystem component, nor will it lead to a change in the distribution of hairy woodpecker across the Sierra Nevada bioregion.

These species will not be discussed further within this document.

Detailed discussions of the effects of the alternatives on the species shown in Table 3.11-4 follow.

Table 3.11-4 Wildlife Groups and Species

Wildlife Group	Species
Late-successional forest associated species	American marten, Pacific fisher, California spotted owl, northern goshawk
Ungulates	Mule deer
Riparian-associated species	Bald eagle, great gray owl
Aquatic-associated species	California red-legged frog, foothill yellow-legged frog, mountain yellow-legged frog, western pond turtle, Yosemite toad

Terrestrial Biota

Late-Successional Forest Species

American Marten – Affected Environment

Species and Habitat Account

The American marten is a wide-ranging member of the Mustelidae family. Marten are widely distributed throughout the coniferous habitats of North America and currently occupy much of their historic range in California (Kucera and Zielinski 1995). Incidental observations of marten have been recorded throughout the higher elevations of the Stanislaus National Forest. Marten are morphologically adapted to be mobile in deep snow, and typically inhabit higher elevations receiving snow depths greater than 23 centimeters (approximately 9 inches) per winter month (Krohn et al. 1997). Numerous mesocarnivore surveys have been completed on the Stanislaus National Forest with the use of baited camera stations and track plates. Results of these surveys further indicate that marten use higher elevations within the project area. Marten were not found at survey stations below 5,000 feet in elevation and the majority of them were above 7,000 feet. Although the presence of marten has been documented within the project area, there are no known den sites on Stanislaus National Forest.

Martens typically prefer late seral coniferous forests above 5,000 feet in elevation that have moderate-to-high canopy closure interspersed with riparian areas and meadows (Freel 1991, Zeiner et al. 1990b). These habitats typically contain an abundance of snags and downed logs needed to provide the coarse woody debris that is necessary for effective winter foraging (Sherburne and Bissonette 1994). Marten den in cavities in large trees, snags, stumps, or logs or burrows, caves, and crevices in rocky areas (Zeiner et al. 1990b). Important habitat attributes consist of the following: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1987). One study found that martens selected stands with 40 to 60 percent canopy closure for both resting and foraging and avoided stands with less than 30 percent canopy closure (Spencer et al. 1983). Martens generally avoid habitats that lack overhead cover, presumably because these areas do not provide protection from avian predators (Allen 1982, Buskirk and Powell 1994, Spencer et al. 1983). Although martens tend to spend the majority of their time in mature forests, meadows are important components of foraging habitat. Spencer et al. (1983) found that marten preferred areas within 60 meters (approximately 200 feet) of meadows and were rarely found further than 400 meters (0.25 mile) from a meadow. For the purposes of this analysis, preferred marten habitat on the Stanislaus National Forest has been mapped as the following: CWHR types PPN, SMC, WFR, RFR; classes 5 and 6; canopy closures M and D (USDA 2007e).

American Marten – Environmental Consequences

Indicators

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

- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, highway-legal-only {HLO} roads, all-vehicle trails, all-terrain-vehicle {ATV} trails, motorcycle {MC} trails, or four-wheel-drive {4WD} trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within preferred marten habitat.
- Net change from existing NFTS in miles of routes within meadows.

- Existing density (mi/mi^2) of NFTS routes within preferred marten habitat (outside wilderness areas).
- Density (mi/mi^2) of NFTS routes within preferred marten habitat (outside wilderness areas) with proposed designated routes.
- Net change from existing NFTS in percentage of preferred marten habitat occurring within a 400 meter "zone of influence" (percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status)

DIRECT AND INDIRECT EFFECTS

General - All Alternatives

The project alternatives could result in direct and indirect effects to marten through the following activities:

- Prohibiting cross country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These activities may have direct and indirect effects on marten through human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: Opening routes to public use would improve access to marten habitat. Improving access to these habitats may result in increased instances of collisions with vehicles or in increased instances of incidental trapping. Marten are widely known for their vulnerability to trapping (Ruggerio et al. 1994). Since the State of California banned the use of body-gripping traps in 1998, the incidental loss of marten to trapping has been greatly reduced. Direct human effects on marten populations also include highway accidents (Buskirk and Ruggerio 1994). Collisions typically occur along well-maintained roadways that allow high rates of travel. Routes proposed for designation within the project alternatives are native-surfaced routes that only allow much slower rates of travel. These types of routes result in far fewer collisions than highways or paved routes.

Changes in Behavior: Types of changes in behavior that may result from the project alternatives are displacement or avoidance or disturbance at a specific location. The use of motorized vehicles in marten habitat may result in disturbance to martens that are foraging or denning. Robitaille and Aubrey (2000), studying marten in an area of low road density and low traffic (primarily logging roads), found that marten use of habitat within 300 and 400 meters (approximately 0.2 and 0.25 mile) of roads was significantly less than habitat use 700 or 800 meters (approximately 0.4 or 0.5 mile) distance. However, in a study conducted in northern California, Zielinski et al. (2008) found that marten occupancy or probability of detection did not change in relation to the presence or absence of motorized routes and OHV use when the routes (plus a 50 meter [approximately 165 foot] buffer) did not exceed about 20 percent of a 50 square kilometer (approximately 19.5 square mile) area, and traffic did not exceed one vehicle every 2 hours. The study did not, however, measure behavioral changes or changes in use patterns and the study authors caution that application of their results to other locations would apply only if OHV/OSV use at the other locations is no greater than reported in their study.

While there is little research disclosing the specific effects of disturbance to marten den sites, other forest carnivores have been shown to abandon the den site upon human disturbance (Copeland 1996). Wet meadows have been shown to be particularly important foraging areas for marten (USDA 2001).

Routes added to the NFTS near and through meadows may increase disturbance within the meadow, thereby reducing the meadow's value as a foraging habitat for martens.

Habitat Modification: Roads and trails modify marten habitat by directly removing it or indirectly by reducing its quality. While simple habitat loss is the most obvious, roads and trails also reduce habitat quality through fragmentation. Since marten have been found to be sensitive to changes in overhead cover, clearings associated with routes may reduce habitat quality near routes for foraging and may reduce marten movement between habitats that are separated by routes (Buskirk and Powell 1994, Hargis et al. 1999).

Hazard tree removal along NFTS roads has the potential to reduce downed logs and suitable resting and denning sites for marten. Hazard tree removal is typically conducted along ML 2, 3, 4 and 5 roads (not along trails or ML 1 roads). Closures that are proposed on ML 1 and 2 roads within any of the project alternatives would result in a reduction in miles of road on which hazard trees may be removed. On the other hand, opening roads currently closed (converting ML1 routes to ML2) would result in an increase in miles of road on which hazard trees may be removed. The net amount of impact that the project alternatives may have on future hazard tree removal would be minor.

Wet meadows have been shown to be particularly important foraging areas for marten (USDA 2001). Meadow habitat quality may be affected different ways by motorized travel. The most obvious way motorized vehicles may impair meadow quality is through direct mechanical damage (rutting). Since soil typically has lower bulk density and can be more easily penetrated when it is wet, mechanical damage often occurs in meadows that are naturally wet, in dry meadows after significant rainfall, or immediately following the retreat of the snow at higher elevations. When roads or trails are created in meadows they may intercept surface and subsurface flow (Kattelmann 1996). When flows are intercepted and redirected, meadow drying occurs which in turn results in changes to the fauna and flora associated with it.

Changing the faunal community within meadows may impact their value as foraging areas for marten. Microtus species have been noted as being important prey items to martens at all times of the year (Zielinski et al. 1983). Winter (1982) found that Microtus were associated with moist areas that had good grass cover. Therefore, slight shifts in meadow hydrology caused by motorized travel may impact suitable habitat for mictrotines, thereby adversely affecting the marten prey source.

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within preferred marten habitat and near meadows. This would reduce the risk of direct and indirect effects to martens from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-5). Actions proposed in this alternative would not likely result in any human-caused mortality, but would likely increase disturbance to some marten within the project area. Although there are no documented den sites within the project area, it is assumed that they occur. The routes already exist on the ground, den sites are specifically selected by individuals of the species, and, as verified by field review for this and other projects, there are many suitable denning locations throughout the project area. So individuals can select and perhaps already have selected den sites that are not disturbed by motor vehicle travel.

The disturbance from the existing NFTS is on-going. Disturbance to martens may reduce some individuals' fitness, but, since only about 9% of the habitat would be subject to a net increase over the existing NFTS (Table 3.11-5), these impacts would not result in any population level impacts to the marten.

Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. The loss of habitat from these routes has already occurred. Because no new routes are being proposed for construction, there would be little change in the amount of habitat or on habitat fragmentation. Vegetation along unauthorized routes that are not added to the NFTS or existing NFTS routes that would be closed would, over time, grow into the road. So there would be a minor increase in habitat quantity and a decrease in fragmentation.

Field surveys were completed on all routes that were proposed to be added to the NFTS within meadows. The purpose of the field surveys was to determine whether the route would have the potential to affect hydrology within the meadow. These surveys indicated that the routes that were proposed to be added within meadows would not significantly alter their hydrology (see Chapter 3.10, Water Resources). However, some routes were identified as needing mitigation to improve hydrologic conditions. Effects of the mitigation measures on this species are discussed below.

Season of Use: Marten typically inhabit higher elevations with greater amounts of snow. Therefore, preferred habitat primarily falls within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Marten breed in the summer. Gestation is 220 to 290 days, including delayed implantation, wherein the fertilized egg doesn't attach to the uterine wall until February. Most litters are born in March and April (Zeiner et al. 1990b). The proposed closures would reduce disturbance to denning and foraging martens, and to pregnant females in the last half or so of the gestation period. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and would protect meadows from mechanical damage. The season of use would not apply to wheeled over-snow use (WOS) routes (see Table 2.02-2), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Mitigation Measures: The types of mitigation measures that would be implemented within preferred marten habitat include tread hardening, drain dips, fence/log/rock barriers, and hardened stream crossings. Implementation of these mitigation measures would include hand tool and machine work that would result in short-term disturbance to individual marten within the project area. This amount of disturbance would not likely reduce any individual marten's fitness. The proposed mitigation measures would in the long term improve hydrologic conditions (see 3.10 Water Resources), and therefore meadow habitat. Because of the low level of disturbance and the relatively minor improvements to marten habitat, the mitigation measures would not result in any population level impacts within the project area.

Table 3.11-5 Alternative 1: Direct and Indirect Effects Indicators (American marten)

Indicators	
Net change from existing NFTS in miles of routes within preferred marten habitat[1]	+ 29.37
Net change from existing NFTS in miles of routes within meadows[1]	+ 0.83
Existing density (mi/mi^2) of open NFTS routes within preferred marten habitat	1.94
Density (mi/mi^2) of open NFTS routes within preferred marten habitat with proposed designated routes (additional density)	2.08 (+ 0.15)
Net change from existing NFTS in percentage of preferred marten habitat occurring within a 400 meter "zone of influence" [2]	9.13%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects

would be similar to those discussed for adding routes to the NFTS. Approximately 143,100 acres of preferred marten habitat are open to cross country travel.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of disturbance to marten and increased fragmentation/modification of their habitat. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes. In addition, creation of new routes could alter habitat and increase fragmentation through the removal of vegetation.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although any seasonal closures implemented within this alternative would somewhat reduce potential disturbance to marten, these seasonal closures would not adequately protect all meadows from mechanical damage that may occur since cross country travel would be allowed. Therefore, it may be assumed that hydrology within some meadows may be affected and that it may result in impacts to marten prey base.

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative. Any damage to hydrologic conditions in meadows would continue on routes identified as needing mitigation, causing a potential degradation of meadow habitat.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within preferred marten habitat and near meadows. This would reduce the risk of direct and indirect effects to marten from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to marten to a certain extent.

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative. Any damage to hydrologic conditions in meadows would continue on routes identified as needing mitigation, causing a potential degradation of meadow habitat.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within preferred marten habitat and near meadows. This would reduce the risk of direct and indirect effects to martens from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-6). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the net change in the NFTS system within preferred marten habitat and within meadows, there would be a slight increase in the direct and indirect effects to marten within the project area. This alternative would result in a net increase over the existing NFTS of about 11% of preferred marten habitat lying within a 400-meter (¼-mile) zone of influence (Table 3.11-6). Although these increases would result in more individuals being

impacted, they would not likely be significant enough to result in impacts to marten populations within the project area.

Season of Use: Marten typically inhabit higher elevations with greater amounts of snow. Therefore, preferred habitat primarily falls within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Marten breed in the summer. Gestation is 220 to 290 days, including delayed implantation, wherein the fertilized egg doesn't attach to the uterine wall until February. Most litters are born in March and April (Zeiner et al. 1990b). The proposed closures would reduce disturbance to denning and foraging martens and to pregnant females in the last few months of the gestation period. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and would protect meadows from mechanical damage. The season of use would not apply to WOS routes (see Table 2.02-2), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-6 Alternative 4: Direct and Indirect Effects Indicators (American marten)

Indicators	
Net change from existing NFTS in miles of routes within preferred marten habitat[1]	+ 39.52
Net change from existing NFTS in miles of routes within meadows[1]	+ 1.33
Existing density (mi/mi^2) of open NFTS routes within preferred marten habitat	1.94
Density (mi/mi^2) of open NFTS routes within preferred marten habitat with proposed designated routes (additional density)	2.13 (+ 0.19)
Net change from existing NFTS in percentage of preferred marten habitat occurring within a 400 meter "zone of influence" [2]	11.53%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within preferred marten habitat and near meadows. This would reduce the risk of direct and indirect effects to martens from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-7). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a substantial decrease from Alternative 1 in the net change to the NFTS within preferred marten habitat and within meadows, there would be a substantial decrease in the direct and indirect effects to marten within the project area. These impacts would affect only about 1% less of marten habitat than under the existing NFTS (Table 3.11-7), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Season of Use: Marten typically inhabit higher elevations with greater amounts of snow. Therefore, preferred habitat primarily falls within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Marten breed in the summer. Gestation is 220 to 290 days, including delayed implantation, wherein the fertilized egg doesn't attach to the uterine wall until February. Most litters are born in March and April (Zeiner et al. 1990b). The proposed closures would reduce disturbance to denning and foraging martens, and to pregnant females in the last half or so of the gestation period. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and would protect meadows from mechanical damage.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-7 Alternative 5: Direct and Indirect Effects Indicators (American marten)

Indicators	
Net change from existing NFTS in miles of routes within preferred marten habitat[1]	-- 5.94
Net change from existing NFTS in miles of routes within meadows[1]	+ 1,33
Existing density (mi/mi^2) of open NFTS routes within preferred marten habitat	1.94
Density (mi/m$^{\prime 2}$) of open NFTS routes within preferred marten habitat with proposed designated routes (additional density)	1.91 (-- 0.03)
Net change from existing NFTS in percentage of preferred marten habitat occurring within a 400 meter "zone of influence" [2]	-- 0.92%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

CUMULATIVE EFFECTS

In 2001 and 2004, the Forest Service amended 11 Sierra Nevada Forest Plans to better address the needs of old forest-associated species (USDA 2001 and 2004). In this assessment, the following key risk factors were identified for marten in the Sierra Nevada: (1) habitat alteration, particularly the removal of overhead cover, large diameter trees, or coarse woody material; (2) livestock grazing and other activities that might reduce the availability of prey in meadows; and (3) the use of roads and associated human access. Appendix B provides a list and description of past, present, and reasonably foreseeable vegetation and fuels management projects on NFS lands and private lands within the Stanislaus National Forest 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.

On the Stanislaus National Forest, 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 2008, vegetation/fuels thinning treatments on NFS lands have occurred within less than 5% of marten habitat. These vegetation treatments have reduced habitat quality for marten 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. Vegetation/fuels reduction projects will continue to be one of the primary activities affecting marten habitat on the Stanislaus National Forest (Appendix B). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Some, but not all of the projects will affect marten habitat. Over time, fuels treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat removed by stand replacing wildfires will be reduced in response to these treatments (USDA 2004).

The California Department of Forestry and Fire Protection (CDF) currently lists approximately 2,365 acres of private land within the Stanislaus National Forest administrative boundary for which timber harvest plans have been submitted. The portion of these projects occurring within the marten's range has not been determined. Timber harvest on private lands is generally more intensive and does not typically result in suitable habitat for marten.

Livestock grazing occurs on 35 active grazing allotments on the Stanislaus National Forest, totaling approximately 792,042 acres of NFS and private lands. In some meadows, livestock grazing has reduced the suitability of meadow vegetation for microtine rodents and other marten prey (USDA 2001). On the Stanislaus National Forest, the impacts of livestock grazing on meadows has been steadily decreasing as fewer allotments are grazed and as forage utilization levels are being reduced

by stricter standards established by the SNFPA. These past and present effects contribute to the effects of the project alternatives on meadow habitat and condition.

Recreation use has increased and is expected to continue to increase on the Stanislaus National Forest (see 3.04 Recreation Resources, Affected Environment), resulting in greater likelihood and magnitude of human disturbance to wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation based upon State figures for OHV sales (see 3.04 Recreation Resources). Approximately 5 miles of new trail construction, as well as numerous short route segments for dispersed camping access, have been proposed for the future (separate from the this project). These trails are proposed to provide "connector routes" between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes would be similar to those described under direct and indirect effects of the alternatives: changes in behavior; and habitat modification through loss of habitat and further fragmentation of habitat.

Unauthorized motorized routes that are prohibited to motorized use may receive non-motorized use (hiking, mountain bicycling, equestrian). It is generally considered that non-motorized use would result in fewer disturbances to marten. The extent and magnitude of non-motorized use is unknown. However, it is expected that, over time, unauthorized routes that are prohibited to motorized use will eventually become revegetated and recover either through active or passive restoration means.

Direct and indirect effects of the project alternatives, as described previously, cumulatively contribute to each of the risk factors identified for marten. Table 3.11-8 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would cause the most disturbance to individuals. Because Alternative 2 does not prohibit cross country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon marten. Alternatives 1, 3, 4, and 5 contribute cumulatively to the disturbance and habitat alteration from fuels treatments and habitat alteration from livestock grazing in meadows. Alternatives 4, 1, 3, and 5 would result in progressively lower risk to martens due to the amount of motorized routes under each alternative. While Alternative 3 would not add any routes to the NFTS, Alternative 5 would have fewer miles of routes in preferred marten habitat because of the miles of NFTS routes closed under this alternative. Alternatives 1, 3, 4, and 5 do not result in a loss of habitat (no route construction), but may influence marten habitat. This influence, combined with fuels treatment and livestock grazing effects upon marten habitat, would likely impact individuals throughout the project area. Inventoried Roadless Areas and adjacent wilderness areas may become increasingly important as the cumulative effect of fuels treatment activities expand within other portions of marten habitat. Considering the proportion of marten habitat influenced by motorized routes and projections for future increases in recreation uses and OHV activity, the alternatives could result in cumulative impacts when combined with other factors affecting marten habitat (Zielinski et al. 2008). Although the action alternatives may result in cumulative impacts, they are very minor in comparison to existing road densities and other potentially significant impacts (fire, fuels/vegetation treatments).

Table 3.11-8 Drivable Routes in American marten habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of routes within preferred marten habitat[1]	627.81	853.23	594.81	638.83	589.20[2]
Miles of routes within meadows[1]	45.8	57.29	44.59	46.34	44.25
Density (mi/mi^2) of all routes within preferred marten habitat[1]	2.81	3.82	2.66	2.86	2.64
Preferred marten habitat % occurring within a 400 meter (0.25 mile) "zone of influence" of all routes[1]	46.54	62.25	45.59	47.04	45.17

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.

SUMMARY OF EFFECTS

The American marten occupies most of its historic range in the Sierra Nevada and is well distributed on the Stanislaus National Forest, though trends in populations or habitat are not well known (Kucera et al. 1995). The direct and indirect effects of the project alternatives (1, 2, 3, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. As can be seen from Table 3.11-9, of the alternatives, Alternative 5 would have the least negative impact. As described in the project MIS report (see project record), based on the small proportion of late seral closed canopy coniferous forest habitat that is directly, indirectly and cumulatively affected (0% to 3% of Sierra Nevada habitat) by the alternatives within a 200-meter (approximately $^{1}/_{8}$ mile) zone of influence of proposed motorized route additions, the Stanislaus National Forest Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of American marten across the Sierra Nevada bioregion. For further discussion of the effects analysis and determinations, see the project MIS and BA/BE reports (project record).

Table 3.11-9 Ranking of Alternative Indicators (American marten)

Indicators	Rankings of Alternatives for Each Indicator[1]				
	1	2	3	4	5
Miles of routes within preferred marten habitat[2]	3	1	4	2	5
Miles of routes within meadows[2]	3	1	4	2	5
Density (mi/m^{2}) of all routes within preferred marten habitat[2]	3	1	4	2	5
Preferred marten habitat % occurring within a 400 meter (0.25 mile) "zone of influence" of all routes[2]	3	1	4	2	5
Average	**3**	**1**	**4**	**2**	**5**

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2]Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes known at the time the data base was last updated and routes where this is no public right-of-way.

Pacific Fisher – Affected Environment

Species and Habitat Account

The fisher is a wide-ranging forest mustelid that historically occurred throughout much of the Sierra Nevada. Currently, they occupy a very small portion of their historical range in California and are isolated in two remnant populations (Zielinski et al. 1995, Zielinski et al. 2004). One of these populations is located in the southern Sierras, south of the Stanislaus National Forest. Numerous mesocarnivore surveys have been completed on the Stanislaus National Forest with the use of baited camera stations and track plates, but there have been no recent detections or verified sightings of fisher on the Stanislaus National Forest. Although there are currently no known populations of fisher within the project area, over the long term they may become naturally re-established from known populations located south of the project area.

The fisher typically occupies mature forests with relatively high canopy closure, significant amounts of downed woody debris and snags, and adequate habitat connectivity. Green et al. (submitted) provide detailed discussions and an overview of the existing literature pertaining to the Pacific fisher. Suitable habitat for the fisher is located throughout the Forest, but there are no known den sites on the Stanislaus National Forest. Since fisher are not known to currently occupy the Stanislaus National Forest, it is unlikely that there are any existing den sites. For the purposes of this analysis, preferred fisher habitat on the Stanislaus National Forest has been mapped as the following: CWHR types ASP, PPN, JPN, MHC; classes 4, 5 and 6; canopy closures M and D.

Pacific Fisher – Environmental Consequences

Indicators

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

- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, HLO roads, ATV trails, MC trails, or 4WD trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within preferred fisher habitat.
- Existing density (mi/mi^2) of NFTS routes within preferred fisher habitat.
- Density (mi/mi^2) of NFTS routes within preferred fisher habitat with proposed designated routes.

DIRECT AND INDIRECT EFFECTS

General - All Alternatives

The project alternatives could result in direct and indirect effects to fisher by:

- Prohibiting cross country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on fisher through the following: human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: Based upon a review of the literature, fisher were found to likely be affected by the same road and motorized trail-associated direct effects as marten. Refer to the previous discussion for marten.

Changes in Behavior: Based upon a review of the literature, fisher were found to likely be affected by the same road and motorized trail-associated direct effects as marten. Refer to the previous discussion for marten.

Habitat Modification: Roads and trails modify fisher habitat by directly removing it or indirectly by reducing its quality. While simple habitat loss is the most obvious, roads and trails also reduce habitat quality through fragmentation. Since fisher have been found to be sensitive to changes in overhead cover; clearings associated with routes may reduce habitat quality near routes for foraging and may reduce fisher movement between habitats that are separated by routes (Buskirk and Powell 1994, Hargis et al. 1999).

Hazard tree removal along NFTS roads has the potential to reduce downed logs and suitable resting and denning sites for fisher. Hazard tree removal is typically conducted along ML 2, 3, 4 and 5 roads (not trails or ML 1 roads). Closures that are proposed on ML 1 and 2 roads within any of the action alternatives would result in a reduction in miles of road on which hazard trees may be removed. On the other hand, opening roads currently closed (converting ML1 routes to ML2) would result in an increase in miles of road on which hazard trees may be removed. The net amount of impact that the project alternatives may have on future hazard tree removal would be minor.

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-10). Actions proposed in this alternative would not likely result in any human-caused mortality, but would likely increase disturbance to some fisher (if re-established) within the project area over the long term. There are no documented fisher den sites within the project area. Since fisher are not known to currently occupy the Stanislaus National Forest, it is unlikely that there are any existing den sites. Therefore, this alternative would not have the potential to disturb fisher den sites.

The disturbance from the existing NFTS is on-going. Potential increases in disturbance to foraging fisher may reduce some individuals' fitness over the long term (if fisher were re-established), but these impacts would not likely result in any population level impacts.

Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. The loss of habitat from these routes has already occurred. Because no new routes are being proposed for construction, there would be little change in the amount of habitat or on habitat fragmentation. Vegetation along unauthorized routes that are not added to the NFTS or existing NFTS routes that would be closed would, over time, grow into the road. So there would be a minor increase in habitat quantity and a decrease in fragmentation.

Season of Use: Preferred fisher habitat is primarily located throughout mid-elevations within the project area. Therefore, motorized use would be seasonally restricted in approximately 50% of preferred fisher habitat. These closures would reduce disturbance to foraging fisher over the long term (if fisher were re-established). The season of use would not apply to WOS routes (see Table 2.02-2), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Mitigation Measures: The types of mitigation measures that would be implemented within preferred fisher habitat include the following: tread hardening, drain dips, fence/log/rock barriers, and hardened stream crossings. Implementation of these mitigation measures would include hand tool and machine work that would result in short-term disturbance to individual fisher within the project area (if re-established). This amount of disturbance would not likely reduce any individual fisher's fitness and would not result in any population level impacts within the project area.

Table 3.11-10 Alternative 1: Direct and Indirect Effects Indicators (Pacific fisher)

Indicators	
Net change from existing NFTS in miles of routes within preferred fisher habitat[1]	+ 19.08
Existing density (mi/mi2) of open NFTS routes within preferred fisher habitat	1.02
Density (mi/mi2) of open NFTS routes within preferred fisher habitat with proposed designated routes (additional density)	1.14 (+ 0.12)

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. Approximately 130,700 acres of preferred fisher habitat is open to cross country travel.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing unauthorized routes because cross country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of disturbance to fisher (if re-established) and increased fragmentation/modification of their habitat. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes. In addition, creation of new routes could alter habitat and increase fragmentation through the removal of vegetation.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to fisher (if re-established).

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to fisher (if re-established).

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-11). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within preferred fisher habitat, there would be a slight increase in the direct (if the fisher were re-established) and indirect effects to fisher within the project area. Although these increases would result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to fisher populations within the project area.

Season of Use: Preferred fisher habitat is primarily located throughout mid-elevations within the project area. Therefore, motorized use would be seasonally restricted in approximately 50% of preferred fisher habitat. These closures would reduce disturbance to foraging fisher (if re-established) over the long term. The season of use would not apply to WOS routes (see Table 2.02-2), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Table 3.11-11 Alternative 4: Direct and Indirect Effects Indicators (Pacific fisher)

Indicators	
Net change from existing NFTS in miles of routes within preferred fisher habitat[1]	+ 33.47
Existing density (mi/mi2) of open NFTS routes within preferred fisher habitat	1.02
Density (mi/mi2) of open NFTS routes within preferred fisher habitat with proposed designated routes (additional density)	1.21 (+ 0.18)

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-12). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a substantial decrease from Alternative 1 in the number of routes added to the system or converted to a trail within preferred fisher habitat, there would be a substantial decrease in the direct (if fisher were re-established) and indirect effects to fisher within the project area. These decreases would result in fewer individuals being impacted and less habitat being fragmented, and this alternative is unlikely to result in impacts to fisher populations within the project area.

Season of Use: Preferred fisher habitat is primarily located throughout mid-elevations within the project area. Therefore, motorized use would be seasonally restricted in approximately 50% of preferred fisher habitat. These closures would reduce disturbance to foraging fisher over the long term (if fisher were re-established).

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-12 Alternative 5: Direct and Indirect Effects Indicators (Pacific fisher)

Indicators	
Net change from existing NFTS in miles of routes within preferred fisher habitat[1]	+ 5.02
Existing density (mi/mi2) of open NFTS routes within preferred fisher habitat	1.02
Density (mi/mi2) of open NFTS routes within preferred fisher habitat with proposed designated routes (additional density)	1.00 (-- 0.02)

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])

CUMULATIVE EFFECTS

In 2004, the USFWS determined that listing of the West Coast population of the fisher was warranted, and identified the following primary threats from activities on NFS lands: (1) loss and fragmentation of habitat due to timber harvest and hazardous fuels reduction; (2) increased predation resulting from canopy cover reductions; (3) mortality from vehicle collisions; and (4) increased human disturbance. Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the Stanislaus National Forest and private lands within the Forest boundary.

On the Stanislaus National Forest, past timber harvest and more recent hazardous fuels reduction projects have reduced large trees, canopy cover, structural complexity, and coarse woody material within treated units. Between 2000 and 2008, vegetation/fuels thinning treatments on NFS lands have

occurred within less than 4% of fisher habitat. These vegetation treatments have reduced habitat quality for 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. Vegetation/fuels reduction projects will continue to be one of the primary activities affecting fisher habitat on the Stanislaus National Forest (Appendix B). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Some, but not all, of them will affect fisher habitat. Over time, fuels treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat removed by stand replacing wildfires will be reduced in response to these treatments (USDA 2004).

CDF currently lists approximately 2,365 acres of private land within the Stanislaus National Forest administrative boundary for which timber harvest plans have been submitted. The portion of these projects occurring within the fisher's range has not been determined. Timber harvest on private lands is generally more intensive and does not typically result in suitable habitat for fisher.

Recreation use has increased and is expected to continue to increase on the Stanislaus National Forest (see 3.04 Recreation Resources, Affected Environment), resulting in greater likelihood and magnitude of human disturbance to wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation based upon State figures for OHV sales (see 3.04 Recreation Resources). Approximately 5 miles of new trail construction, as well as numerous short route segments for dispersed camping access, have been proposed for the future (separate from the this project). These trails are proposed to provide "connector routes" between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes would be similar to those described under direct and indirect effects of the alternatives: changes in behavior; and habitat modification through loss of habitat and further fragmentation of habitat.

Table 3.11-13 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. Since routes proposed within the action alternatives are native surfaced routes that do not generally have high rates of travel, these road-related effects are expected to be minimal. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would cause the most disturbance to individuals. Because this alternative does not prohibit cross country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon fisher. The action alternatives do not result in a loss of habitat (no route construction), but noise and traffic disturbance would influence habitat use and availability where fisher may be present (if re-established). If fisher were to recolonize or to be reintroduced on the Stanislaus National Forest, project alternatives would still contribute to the past, current, and reasonably foreseeable conditions described above. While Alternative 3 would not add any routes to the NFTS, Alternative 5 would have fewer miles of routes in preferred fisher habitat because of the miles of routes closed under this alternative. The greatest influence upon fisher habitat occurs under Alternative 2 and progressively lower levels of impact occur under Alternatives 4, 1, 3, and 5. Thus, the combined effect of the project alternatives and current levels of hazardous fuels reduction treatments may result in adverse cumulative effects to a few individual fisher (if re-established).

In the upper Tule River Basin, six female fisher home ranges were established through radio telemetry methods (minimum convex polygon) from 1994 to 1998. At least three of the six females were observed to successfully reproduce during the study period. Values for road density within the observed home ranges varied from 2.3 to 6.9 miles per square mile, depending on the individual (R. Galloway 2008 pers. com. with D. Craig). Under the alternatives for this project, the route density varies from 2.28 (Alternative 5) to 3.13 (Alternative 2), at the lower end of the range in the six Tule River Basin home ranges.

Spencer et al. (2008) stated that, "it appears that northward expansion of the [fisher] population onto the Stanislaus National Forest has strong potential to significantly increase population size and extent, and hence viability. However, there is uncertainty about the likelihood of such expansion occurring naturally, due to potential dispersal impediments (e.g., steep canyon slopes, open habitats, the Merced River, and heavily traveled roads)." The project alternatives do not include the addition of or the opening of heavily traveled roads. Thus, the alternatives are not likely to increase dispersal barriers.

Table 3.11-13 Drivable Routes in Pacific fisher habitat

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of routes within preferred fisher habitat[1]	492.61	639.32	468.77	508.67	465.22
Density (mi/mi^2) of all routes within preferred fisher habitat[1]	2.41	3.13	2.30	2.49	2.28

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.

Although the action alternatives may result in cumulative impacts, they are very minor in comparison to dispersal impediments and other potentially significant impacts (fire, fuels/vegetation treatments). The project effects could potentially have minor impacts on the ability or likelihood for fisher to re-occupy suitable habitat on the Stanislaus National Forest.

SUMMARY OF EFFECTS

The Pacific fisher has a limited distribution in the Sierra Nevada of California and is not known to occur within the project area. The direct and indirect effects (if fisher were re-established) of the project alternatives (1, 2, 3, 4 and 5) combined with the cumulative effects are not likely to result in a loss of viability for this species that has been found warranted for federal listing. As can be seen from Table 3.11-8, of the alternatives, Alternative 5 would have the least negative impact on the species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Table 3.11-14 Ranking of Alternative Indicators (Pacific fisher)

Indicators	Rankings of Alternatives for Each Indicator[1]				
	1	2	3	4	5
Miles of routes within preferred fisher habitat[2]	3	1	4	2	5
Density (mi/mi^2) of all routes within preferred fisher habitat[2]	3	1	4	2	5
Average	3	1	4	2	5

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; a score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2] Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes known at the time the data base was last updated and routes where this is no public right-of-way.

California Spotted Owl – Affected Environment

Species and Habitat Account

The California spotted owl is one of three recognized subspecies of spotted owls. They are currently found throughout most of their historic range, which primarily occurs on the west side of the Sierra Nevada Mountains of California. The Stanislaus National Forest is located in the central portion of their range, and they are dispersed throughout the Forest. Surveys for spotted owls have been conducted on the Forest for approximately 20 years. Although these surveys have not covered the Forest in its entirety, they have covered a large majority of it. Protected Activity Centers (PACs) and Home Range Core Areas (HRCAs) are comprised of the best available habitat around to known spotted owl pairs or territorial singles. PACs encompass approximately 300 acres, and HRCAs encompass approximately 1000 acres, including the associated PAC. Based on systematic surveys and incidental sightings, there are currently 218 documented PACs on the Stanislaus National Forest. Spotted owls inhabit a wide variety of forest types generally characterized by dense forest, high

canopy closure, high structural diversity, large residual trees, and downed woody debris (Call et al. 1992, Moen and Gutierrez 1997). For the purposes of this analysis, preferred California spotted owl habitat on the Stanislaus National Forest has been mapped as the following: CWHR types PPN, SMC, WFR, RFR; classes 5 and 6; canopy closures M and D.

California Spotted Owl – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the California spotted owl. Although thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within PACs
- Net change from existing NFTS in number of PACs affected by NFTS routes (Percentage of all PACs in Project Area)
- Net change from existing NFTS in miles of routes within 400 meters of Activity Centers
- Net change from existing NFTS in number of Activity Centers within 400 meters of NFTS routes (Percentage of all Activity Centers in Project Area)
- Net change from existing NFTS in number of Activity Centers within 60 meters of NFTS routes (Percentage of all Activity Centers in Project Area)
- Net change from existing NFTS in percentage of spotted owl PACs (total acres) occurring within a 400 meter “zone of influence”
- Net change from existing NFTS in percentage of preferred spotted owl habitat occurring within a 400 meter “zone of influence”

DIRECT AND INDIRECT EFFECTS

General - All Alternatives

The project alternatives could result in direct and indirect effects to the California spotted owl through the following activities:

- Prohibiting cross country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on spotted owls through the following: human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: Allowing cross country travel or adding routes to the NFTS may result in collisions with spotted owls. Although it may not be as prevalent in spotted owls as some other bird species, it has been documented. The Cascade Raptor Center (2007) reported that collisions with vehicles were one of the most common problems in northern spotted owls. Collisions with vehicles typically occur along well maintained roadways that allow high rates of travel. Routes proposed for designation within the project alternatives are native surfaced routes that only allow much slower rates of travel. These types of routes would result in far fewer, if any collisions.

Changes in Behavior: Types of changes in behavior that may result from the project alternatives include the following: displacement or avoidance, disturbance at a specific location, or physiological response. The use of motorized vehicles in spotted owl habitat may result in disturbance to owls that are nesting, roosting, or foraging. The Forest Service, Region 5, has generally assumed that activities (including road and trail use) occurring farther than 0.25 miles (400 meters) from California spotted owl nest sites have little potential to affect owl nesting (USDA 2004). Delaney et al. (1999) found that Mexican spotted owls were found to show an alert response to chainsaws at distances less than 400 meters. Available literature indicates that the likelihood of owls flushing from a nest is greater when disturbance occurs within 60 meters (approximately 200 feet) (Delaney et al. 1999, Swarthout and Steidl 2001). Although it is unclear whether these levels of disturbance would result in high levels of stress, Marra and Holberton (1998) found that chronic high levels of stress hormone may have negative effects on reproduction. 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 (0.26 mile) from a major logging road compared to spotted owls in areas >0.41 km from a major logging road. In the absence of further research, it is assumed that motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting owls and that effects from motorized activities within 60 meters of an activity center would result in negative effects to reproduction over the short term. California spotted owls have been known to shift their nest site. Over the long term, spotted owls that were experiencing significant disturbance at their current nest site would likely move to another suitable nest site within the PAC.

Habitat Modification: Roads and trails modify habitat by directly removing it or indirectly by reducing its quality. While simple habitat loss is the most obvious, roads and trails also reduce habitat quality through fragmentation. 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 California spotted owl.

Hazard tree removal along NFTS roads has the potential to reduce canopy closure and increase habitat fragmentation for spotted owls. Hazard tree removal is typically conducted along ML2, 3, 4 and 5 roads (not trails or ML1 roads). Closures that are proposed on ML 1 and 2 roads within any of the project alternatives would result in a reduction in miles of road on which hazard trees may be removed. On the other hand, opening roads currently closed (converting ML1 routes to ML2) would result in an increase in miles of road on which hazard trees may be removed. The net amount of impact that the project alternatives may have on future hazard tree removal would be minor.

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near spotted owl activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to the spotted owl from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-16). Standards and guidelines in the Forest Plan direct that impacts be mitigated where there is documented evidence of disturbance to a spotted owl nest site from existing road or motorized trail use. The Forest has not monitored spotted owl nest sites in proximity to roads or trails and has not documented specific instances of disturbance. Actual nest locations are often difficult to locate and may move around from year-to-year within a PAC. Therefore, actual nest locations remain unknown for many of the PACs and those nests that have been located may have moved since it was last located. Furthermore, it is

not well known why owls choose certain nest sites from year to year but it is likely that the nest sites will continue to move within the PAC over the long term. Therefore, activity centers may be defined as a nest site, a pair roost location, or a territorial single located within the PAC. In the absence of recent nest site locations for every PAC, the relative risk of project alternatives resulting in disturbance to nesting spotted owls is evaluated by considering the following: (1) the number of spotted owl activity centers occurring within 400 meters (0.25 mile) of proposed routes, (2) the number of spotted owl activity centers occurring within 400 meters of ML1 roads that are being converted to trails, (3) the miles of routes that are being added to the NFTS within PACs, and (4) the miles of ML1 roads that are being converted to trails within PACs (Table 3.11-15).

Table 3.11-15 Alternative 1: Summary of PAC-by-PAC Analysis (California spotted owl)

Disturbance	Rationale	PACs	% of total
High	Route being added within 60 meters (200 feet) of activity center. A lot of other routes being added.	1	<1%
Moderate	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography	20	9%
Low	Routes being added less than 60 meters but more 400 meters from activity center. Activity center on other side of ridge from loop. Additions less than 10% of total mileage currently drivable in PAC.	1	<1%
Low	Route being added 320 meters from activity center. Less than 6% of drivable miles now in PAC. Existing routes less than 60 meters on either side of activity center, so disturbance from the existing routes would greatly outweigh the potential increased disturbance from the addition	1	<1%
Low	Route that is less than 400 meters from activity center is short spur (<0.01 mile) off existing route on edge of PAC 230 meters from activity center	1	<1%
Low	All additions and conversions from closed to open >400 meters from activity center	24	11%
Low	Route being added >400 meters from activity center, and route being closed in PAC	1	<1%
	total of Low	28	13%
None--Decrease	No routes being added or converted from closed to open, but routes are being converted from open to closed	3	1%
	PACs in which routes are being added and/or being converted from closed to open	49	22%

Since routes proposed within this alternative are native surface routes with slower rates of travel, they would not likely result in any human-caused mortality. They would likely increase disturbance to some nesting and roosting owls within the project area over that from the existing NFTS. Although actual disturbance effects will be largely influenced by site-specific factors, it is assumed that all routes within a PAC may result in disturbance to nesting and roosting owls.

A detailed PAC-by-PAC analysis was conducted on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. The BA/BE discusses the details of that analysis. Following is a summary of that discussion.

The routes proposed to be added to the NFTS and the routes proposed to be converted from closed to open contribute a certain amount of disturbance to the activity center on which each PAC is based. Disturbance could result in flushing from nests, roosts, or perches, in alarm responses, and in increased stress hormone levels in individual spotted owls. In the absence of further research, it is assumed that motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting owls. Based on that assumption, approximately 13% of activity centers would receive some disturbance from routes added to the NFTS and routes that would be opened. Without further research, this analysis assumes that effects within 60 meters (approximately 200 feet) of an activity center will result in negative effects to reproduction over the short term. Therefore, if all the routes proposed to be added to the NFTS or proposed to be converted from closed to open are further than 400 meters from the activity center on which a given PAC is based, it is assumed that the routes under this alternative in that PAC would contribute a low level of disturbance to the owls at that activity center. If any of the routes proposed to be added to the NFTS or proposed to be converted from closed to open are between 60 meters and 400 meters from the activity center on

which the PAC is based, it is generally assumed that the routes under this alternative in that PAC would contribute a moderate level of disturbance to the owls at that activity center. Within certain PACs meeting that criterion, the contribution to disturbance was rated as low for the reasons given below. If any of the routes proposed to be added to the NFTS or proposed to be converted from closed to open are within 60 meters of the activity center, it is assumed that the routes under this alternative in that PAC would contribute a high level of disturbance to the owls at that activity center.

The following table summarizes the findings from the analysis. In the table, the column labeled "Disturbance" refers to the contribution of the routes under the alternative to the disturbance to the owls at each PAC's activity center.

Routes would be added and/or converted from closed to open in 49 PACs, 22% of the PACs in the project area. One PAC (TL041) would have a route added to the NFTS within 60 meters (200 feet) of the activity center. This route (16EV79) is rated as 4 and is not recommended for inclusion in the NFTS. Because of the proximity of the route to the activity center, there would be a high level of contribution to disturbance of the owls at this PAC's activity center (less than 1% of the total).

In 24 of the PACs, the routes to be added and the routes to be converted from a closed to open status would be more than 400 meters from the activity center at their closest point. The level of contribution to disturbance of the owls at these PACs' activity centers is considered low because of the distance of these routes from the PACs' activity centers.

One PAC (TL206) in which the one route to be added would be more than 400 meters from the activity center also has a route which would be closed. The level of contribution to disturbance of the owls at this PAC's activity center is considered low because of the distance of the one addition from the PAC's activity center.

In one PAC (TL055), while the routes to be added are less than 400 meters from the PAC's activity center, the level of contribution to disturbance at this PAC's activity center is considered low for the following reasons: (1) the routes form parts of a loop that is on the other side of a ridge from the activity center; (2) the closest part of the loop is 320 meters from the activity center; (3) the additions are less than 10% of the total mileage currently drivable in the PAC.

The level of contribution to disturbance at PAC TL057's activity center, while the one route to be added is within 400 meters of the activity center, is also considered low for the following reasons: (1) the addition is less than 6% of the total mileage currently drivable in the PAC; (2) there are existing routes that would still be part of the system less than 60 meters on either side of the activity center, so disturbance from the existing routes would greatly outweigh the potential increased disturbance from the addition; (3) the route being added is 320 meters from the activity center.

The route that is being added in PAC TL012 within 400 meters of the PAC's activity center contributes a low level of disturbance to the PAC's activity center, because it is a short spur (less than 0.01 mile in length) off an existing route on the edge of a PAC 230 meters from the activity center.

Overall, the level of contribution to disturbance in 28 PACs (13% of the total) is considered low.

The contribution to disturbance in 20 PACs (9% of the total) is considered at a moderate level because there are additions and/or conversion from a closed to open status from 60 meters to 400 meters from the PACs' activity centers, and there is no intervening topography to shield the activity centers from the noise along those routes.

The total number of PACs in which the level of contribution to disturbance is moderate to high is 21 PACs, 10% of the total.

There are 3 PACs (1% of the total in the project area) in which no routes would be added, no routes would be converted from a closed to open status, and routes would be converted from an open to closed status. In these PACs the disturbance would be decreased.

Although disturbance effects would impact individuals and some reproducing pairs over the short term, the changes proposed under this alternative would reduce the effects from the existing condition, and would not result in impacts to populations within the project area over the short or long term for the following reasons:

- It is assumed that motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting owls and that effects from motorized activities within 60 meters of an activity center would result in negative effects to reproduction over the short term.
- Only one PAC (less than 1% of the total number of PACs in the project area) would have routes added to the NFTS or routes converted from closed to open within 60 meters of that PAC's activity center.
- In three PACs disturbance would be reduced from that currently existing because the only change within those PACs would be route closures.

Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. The loss of habitat from these routes has already occurred. Because no new routes are being proposed for construction, there would be little change in the amount of habitat or on habitat fragmentation. Vegetation along unauthorized routes that are not added to the NFTS or existing NFTS routes that would be closed would, over time, grow into the road. So there would be a minor increase in habitat quantity and a decrease in fragmentation.

Season of Use: Although the exact timing may vary, California spotted owls may start nesting in early March. Seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period. Since approximately 80% of the PACs would be within these Zones, these closures would reduce disturbance to those individuals during the early nesting period. The season of use would not apply to WOS routes (see Table 2.02-2), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Table 3.11-16 Alternative 1: Direct and Indirect Effects Indicators (California spotted owl)

Indicators	
Net change from existing NFTS in miles of routes within PACs [1]	+ 18.79
PACs affected by additions to NFTS and by conversion from closed to open (Percentage of all PACs in Project Area)	+ 48 (22%)
Net change from existing NFTS in miles of routes within 400 meters of Activity Centers [1]	+ 5.53
Activity Centers within 400 meters of additions to NFTS and of conversion from closed to open (Percentage of all Activity Centers in Project Area)	+ 27 (+ 13%)
Activity Centers within 60 meters of additions to NFTS and of conversion from closed to open (Percentage of all Activity Centers in Project Area)	+ 2 (+ 1%)
Net change from existing NFTS in percentage of spotted owl PACs (total acres) occurring within a 400 meter "zone of influence"[2]	+ 13%
Net change from existing NFTS in percentage of preferred spotted owl habitat occurring within a 400 meter "zone of influence" [2]	+ 8%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

Mitigation Measures: The types of mitigation measures that would be implemented within PACs include the following: tread hardening, drain dips, fence/log/rock barriers, and hardened stream crossings. The types of mitigation measures that would be implemented within 400 meters (0.25 mile) of an activity center include the following: tread hardening, drain dips, and fence/log/rock barriers. Implementation of these mitigation measures would include hand tool and machine work that may result in short-term disturbance to individual foraging or roosting owls within the project area. To

prevent potential disturbance to nesting owls, machine work on routes through PACs or within 400 meters of activity centers would not be completed until the end of the nesting season. Disturbance to foraging and roosting owls outside of the nesting season would not likely reduce any individual owl's fitness and would not result in any population level impacts within the project area.

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. It is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. Approximately 161,200 acres of preferred spotted owl habitat are open to cross country travel.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross country travel would be allowed. It is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to spotted owls. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by continued route proliferation. In addition, creation of new routes could alter habitat and increase fragmentation through the removal of vegetation.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to spotted owls.

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near spotted owl activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to the spotted owl from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to spotted owls.

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near spotted owl activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to the spotted owl from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-18). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above.

The same detailed PAC-by-PAC analysis was conducted for Alternative 4 as for Alternative 1 on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. The same assumptions were used in ranking the routes within the alternative as contributing a high, moderate, or low level of disturbance to the owls at each activity center. The BA/BE discusses the details of that analysis. Following is a summary of that discussion.

Table 3.11-17 Alternative 4: Summary of PAC-by-PAC Analysis (California spotted owl)

Disturbance	Rationale	PACs	% of total
High	Route being added within 60 meters (200 feet) of activity center. A lot of other routes being added.	1	<1%
Moderate	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography	25	11%
Low	Routes being added less than 400 meters but more than 320 meters from activity center. Activity center on other side of ridge from loop. Additions less than 10% of total mileage currently drivable in PAC.	1	<1%
Low	Route being added 320 meters from activity center. Less than 6% of drivable miles now in PAC. Existing routes less than 60 meters on either side of activity center, so disturbance from the existing routes would greatly outweigh the potential increased disturbance from the addition	1	<1%
Low	Route that is less than 400 meters from activity center is short spur (<0.01 mile) off existing route on edge of PAC 230 meters from activity center	1	<1%
Low	All additions and conversions from closed to open >400 meters from activity center	26	12%
	total of Low	29	13%
	PACs in which routes are being added and/or being converted from closed to open	55	25%

There are some PACs under Alternative 4 which would have additions and/or conversions from a closed to open status in them but which would not have either of those types of changes under Alternative 1. Some PACs which would have those types of changes under Alternative 1 would have more changes under Alternative 4. Some PACs which would have changes from an open to a closed status under Alternative 1 would have none of or fewer than those types of changes under Alternative 4. For information on PACs in which the changes under Alternative 4 would be the same as the changes under Alternative 1, please see the BA/BE.

Routes would be added and/or routes would be converted from a closed to open status in 55 PACs, 25% of the PACs in the project area. One PAC (TL041) would have a route added to the NFTS within 60 meters (200 feet) of the activity center on which the PAC is based. Because of the proximity of the route to the activity center, there would be a high level of contribution to disturbance to the owls at this PAC's activity center (less than 1% of the total).

In 26 of the PACs (12% of the PACs), the routes to be added and the routes to be converted from a closed to open status would be more than 400 meters from the activity center at their closest point. The level of contribution to disturbance is considered low because of the distance of these routes from the PACs' activity centers.

One PAC (TL206) in which the one route to be added would be more than 400 meters from the activity center also has a route which would be closed. The level of contribution to disturbance in this PAC is considered low because of the distance of the one addition from the PAC's activity center.

In one PAC (TL055), while the routes to be added are less than 400 meters from the PAC's activity center, level of contribution to disturbance is considered low for the following reasons: (1) the routes form parts of a loop that is on the other side of a ridge from the activity center; (2) the closest part of the loop is 320 meters from the activity center; (3) the additions are less than 10% of the total mileage currently drivable in the PAC.

The level of contribution to disturbance in PAC TL057, while the one route to be added is within 400 meters of the activity center, is also considered low for the following reasons: (1) the addition is less than 6% of the total mileage currently drivable in the PAC; (2) there are existing routes that would

still be part of the system less than 60 meters on either side of the activity center, so disturbance from the existing routes would greatly outweigh the potential increased disturbance from the addition; (3) the route being added is 320 meters from the activity center.

The level of contribution to disturbance is considered low in PAC TL012 because, although the route that is being added in PAC TL012 within 400 meters of the PAC's activity center, it is a short spur (less than 0.01 mile in length) off an existing route on the edge of a PAC 230 meters from the activity center.

Overall, the level of contribution to disturbance to owls at the activity centers of 29 PACs (13% of the total) is considered low.

The level of contribution to disturbance to owls at the activity centers of twenty-five PACs (11% of the total) is considered moderate because there are additions and/or conversion from a closed to open status from 60 meters to 400 meters from the PACs' activity centers, and there is no intervening topography to shield the activity centers from the noise along those routes.

The total number of PACs in which the level of contribution to disturbance is moderate to high is 26 PACs, 12% of the total.

Although disturbance effects would impact individuals and some reproducing pairs over the short term, the changes proposed under this alternative would reduce the effects from the existing condition, and would not result in impacts to populations within the project area over the short or long term for the following reasons:

- It is assumed that motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting owls and that effects from motorized activities within 60 meters of an activity center would result in negative effects to reproduction over the short term.
- Only one PAC (less than 1% of the total number of PACs in the project area) would have routes added to the NFTS or routes converted from closed to open within 60 meters of that PAC's activity center.

Table 3.11-18 Alternative 4: Direct and Indirect Effects Indicators (California spotted owl)

Indicators	
Net change from existing NFTS in miles of routes [1]	+ 28.97
PACs affected by additions to NFTS and by conversion from closed to open (Percentage of all PACs in Project Area)	+ 56 (+ 26%)
Net change from existing NFTS in miles of routes within 400 meters of Activity Centers [1]	+ 9.56
Activity Centers within 400 meters of additions to NFTS and of conversion from closed to open (Percentage of all Activity Centers in Project Area)	+ 34 (+ 16%)
Activity Centers within 60 meters of additions to NFTS and of conversion from closed to open (Percentage of all Activity Centers in Project Area)	+ 4 (+ 2%)
Net change from existing NFTS in percentage of spotted owl PACs (total acres) occurring within a 400 meter "zone of influence"[2]	+ 17%
Net change from existing NFTS in percentage of preferred spotted owl habitat occurring within a 400 meter "zone of influence" [2]	+ 10%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

Season of Use: Although the exact timing may vary, California spotted owls may start nesting in early March. Therefore, seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period. Since approximately 80% of the PACs would be within these Zones, these closures would reduce disturbance to those individuals during the early nesting period. The season of use would not apply to WOS routes (see Table 2.02-2),

so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near spotted owl activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to the spotted owl from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-18). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above. In the absence of further research, it is assumed that motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting owls. Based on that assumption, less than 1% of activity centers would receive some disturbance from adding routes to the NFTS and opening routes currently closed. Without further research, this analysis will assume that effects within 60 meters (approximately 200 feet) of an activity center will result in negative effects to reproduction over the short term. This alternative would not result in increased amounts of motorized use over the existing NFTS within 60 meters of any activity centers. Since there is a decrease from Alternative 1 in the number of routes added to the system or converted to a trail within PACs, near activity centers, and within preferred habitat, there would be a decrease in the direct and indirect effects to individual spotted owls within the project area. Although these effects would impact individuals over the short term, they would not result in impacts to populations within the project area over the short or long term.

The same detailed PAC-by-PAC analysis was conducted for Alternative 5 as for Alternative 1 on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. The same assumptions were used in ranking the routes within the alternative as contributing a high, moderate, or low level of disturbance to the owls at each activity center. The BA/BE discusses the details of that analysis. Following is a summary of that discussion.

There are some PACs under Alternative 1 which would have additions and/or conversions from a closed to open status in them but which would not have either of those types of changes under Alternative 5. Some PACs which would have those types of changes under Alternative 1 would have fewer changes under Alternative 5. Some PACs which would have changes from an open to a closed status under Alternative 5 would have none of or fewer than those types of changes under Alternative 1. Table 3.11-19 summarizes the findings from the analysis.

Table 3.11-19 Alternative 5: Summary of PAC-by-PAC Analysis (California spotted owl)

Disturbance	Rationale	PACs	% of total
Low	All additions and conversions from closed to open >400 meters from activity center	4	2%
None--Decrease	No routes being added or converted from closed to open, but routes are being converted from open to closed	8	4%
	PACs in which routes are being added and/or being converted from closed to open	4	2%

Routes would be added and/or routes would be converted from a closed to open status in 4 PACs, 2% of the PACs in the project area. In those 4 PACs, the routes to be added and the routes to be converted from a closed to open status would be more than 400 meters from the activity center at their closest

point. The level of contribution to disturbance is considered low because of the distance of these routes from the PACs' activity centers.

There would not be any PACs in which the level of contribution to disturbance would be moderate to high.

There are 8 PACs (4% of the total in the project area) in which no routes would be added, no routes would be converted from a closed to open status, and routes would be converted from an open to closed status. In these PACs the disturbance would be decreased.

Although disturbance effects would impact individuals and some reproducing pairs over the short term, the changes proposed under this alternative would reduce the effects from the existing condition, and would not result in impacts to populations within the project area over the short or long term because the level of contribution to disturbance would not be moderate or high in any PACs.

Season of Use: Although the exact timing may vary, California spotted owls may start nesting in early March. Therefore, seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period. Since approximately 80% of the PACs would be within these Zones, these closures would reduce disturbance to those individuals during the early nesting period.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-20 Alternative 5: Direct and Indirect Effects Indicators (California spotted owl)

Indicators	
Net change from existing NFTS in miles of routes [1]	-- 6.5
PACs affected by additions to NFTS and by conversion from closed to open (Percentage of all PACs in Project Area)	+ 4 (+ 2%)
Net change from existing NFTS in miles of routes within 400 meters of Activity Centers [1]	-- 4.01
Activity Centers within 400 meters of additions to NFTS and of conversion from closed to open (Percentage of all Activity Centers in Project Area)	+ 1 (< 1%)
Activity Centers within 60 meters of additions to NFTS and of conversion from closed to open (Percentage of all Activity Centers in Project Area)	0
Net change from existing NFTS in percentage of spotted owl PACs (total acres) occurring within a 400 meter "zone of influence"[2]	-- 1%
Net change from existing NFTS in percentage of preferred spotted owl habitat occurring within a 400 meter "zone of influence" [2]	-- 1%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

CUMULATIVE EFFECTS

In its Notice of Finding on a petition to list the California spotted owl, the USFWS identified that loss of habitat to stand-replacing fires and habitat modification for fuels reduction were the primary risk factors to California spotted owls occurring on NFS lands (USDI 2006). Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the Stanislaus National Forest and private lands within the Stanislaus National Forest boundary. Some, but not all, of these activities will contribute to effects upon California spotted owls.

Based on GIS analysis, 14 wildfires have burned through 17 or 8% of spotted owl PACs affecting approximately 971 acres or 2% of those PACs since 2000. Forest vegetation/fuels thinning projects (designed to reduce the risk of additional habitat loss to wildfires) have treated within approximately 1,410 acres or 2% of spotted owl PACs between 2000 and 2008. CDF currently lists a total of 2,365 acres of private land within the Stanislaus National Forest administrative boundary for which timber

harvest plans have been submitted. Timber harvest on private lands is generally more intensive and does not typically maintain habitat suitability for spotted owls. These wildfires, fuels treatment, and timber harvest projects have resulted in reduction in the amount and quality of spotted owl habitat within the Stanislaus National Forest boundary.

Vegetation/fuels reduction projects will continue to be the primary activity affecting spotted owl habitat on the Stanislaus National Forest (see Appendix B). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Although these treatments will degrade habitat in the short term, it is anticipated that over time, the amount of habitat removed in stand-replacing wildfires will be reduced as a result of these treatments (USDA 2004c).

Recreation use has increased and is expected to continue to increase on the Stanislaus National Forest (see 3.04 Recreation Resources, Affected Environment), resulting in greater likelihood and magnitude of human disturbance to wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation based upon State figures for OHV sales (see Chapter 3.04 Recreation). Approximately 5 miles of new trail construction, as well as numerous short route segments for dispersed camping access, have been proposed for the future (separate from the this project). These trails are proposed to provide "connector routes" between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes would be similar to those described under direct and indirect effects of the alternatives: changes in behavior; and habitat modification through loss of habitat and further fragmentation of habitat.

Table 3.11-21 Drivable Routes in California spotted owl habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of routes within PACs[1]	266.59	345.72	244.40	278.55	237.78
PACs intersected by routes (Percentage of all PACs in Project Area) [1]	185 (85%)	188 (86%)	180 (83%)	185 (85%)	181 (83%)
Miles of routes within 400 meters of Activity Centers[1]	122.59	163.42	114.86	127.06	110.89
Activity Centers occurring within 400 meters of all routes (Percentage of all Activity Centers in Project Area) [1]	151 (69%)	172 (79%)	147 (67%)	152 (70%)	143 (66%)
Activity Centers occurring within 60 meters of all routes (Percentage of all Activity Centers in Project Area) [1]	31 (14%)	41 (19%)	31 (14%)	33 (15%)	29 (13%)
Percentage of spotted owl PACs (total acres) occurring within a 400 meter "zone of influence" of all routes[1]	71%	79%	70%	72%	69%
Percentage of preferred spotted owl habitat occurring within a 400 meter "zone of influence" of all routes[1]	65%	82%	61%	70%	61%

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.

Table 3.11-21 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. The effect of open motorized routes on spotted owl populations or habitats was not identified as a significant risk factor by either the Forest Service (USDA 2004c) or the USFWS (USDI 2006). However, given the proportion of spotted owl nest sites and habitat potentially affected, as indicated in the table, and considering the projections for future increases in recreation uses and OHV activity, Alternative 2 may, over time, contribute to measurable cumulative effects upon spotted owl populations. Because Alternative 2 does not restrict vehicles to designated routes, there is a high degree of uncertainty about where future route proliferation in owl habitat may occur that may have disturbance and habitat effects beyond the effects of routes open to motorized use. Alternative 2 presents the greatest risk of contributing to adverse cumulative effects upon spotted owl habitat and populations because there would not be a prohibition on cross country travel. Alternative 5 contributes the least to cumulative effects because cross country travel would be prohibited and open route densities in spotted owl habitat would be lowest. Alternatives 4, 1, and 3 would result in progressively lower risk to spotted owls due to the amount of motorized routes resulting from each alternative. Considering the

proportion of spotted owl habitat influenced by motorized routes and projections for future increases in recreation uses and OHV activity, the alternatives may result in minor cumulative impacts when combined with other factors affecting spotted owl habitat. Although adding routes to the NFTS and opening routes currently closed may result in cumulative impacts, they are very minor in comparison to total route densities and other potentially significant impacts (fire, fuels/vegetation treatments).

SUMMARY OF EFFECTS

The California spotted owl is widespread throughout the Sierra Nevada and the project area. The direct and indirect effects of the project alternatives (1, 2, 3, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. As described in the project MIS report (see project record), based on the small proportion of late seral closed canopy coniferous forest habitat that is directly, indirectly and cumulatively affected (0% to 3% of Sierra Nevada habitat) by the alternatives, the Stanislaus National Forest Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change in the distribution of California spotted owl across the Sierra Nevada bioregion. As can be seen from Table 3.11-22, of the alternatives, Alternative 5 would have the least negative impact on the species. For further discussion of the effects analysis and determinations, see the project MIS and BA/BE reports (project record).

Table 3.11-22 Ranking of Alternative Indicators (California spotted owl)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Miles of routes within PACs[2]	3	1	4	2	5
PACs intersected by all routes[2]	3	1	5	3	4
Miles of routes within 400 meters of Activity Centers[2]	3	1	4	2	5
Activity Centers occurring within 400 meters of routes added to the NFTS or ML1 roads converted to trails[2]	3	1	5	2	4
Activity Centers occurring within 400 meters of all routes (Percentage of all Activity Centers in Project Area) [2]	3	1	4	2	5
Activity Centers occurring within 60 meters of all routes (Percentage of all Activity Centers in Project Area) [2]	4	1	4	2	5
Percentage of spotted owl PACs (total acres) occurring within a 400 meter "zone of influence" of all routes[2]	3	1	4	2	5
Percentage of preferred spotted owl habitat occurring within a 400 meter "zone of influence" of all routes[2]	3	1	5	2	5
Average	**3.13**	**1**	**4.38**	**2.13**	**4.78**

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2] Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes known at the time the data base was last updated and routes where this is no public right-of-way.

Northern Goshawk – Affected Environment

Species and Habitat Account

The northern goshawk is a large raptor that is found throughout forested habitats of the United States (Keane 1999). Although goshawks remain widely distributed throughout their historic range, current sampling techniques are inadequate to determine population status or trends of this species (63 FR 35183). It is estimated that there are around 600 known goshawk territories on NFS lands in the Sierra Nevada (USDA 2001). Surveys for goshawks have been conducted on the Forest for approximately 20 years. Although these surveys have not covered the Forest in its entirety, they have covered a large majority of it. PACs are comprised of the best available habitat encompassing approximately 200 acres around to goshawk pairs or territorial singles. Based on systematic surveys and incidental sightings, there are currently 76 documented PACs on the Stanislaus National Forest.

Suitable goshawk habitat in the Sierra Nevada consists of dense, multi-layered mature forested stands with dense canopy cover for nesting, and dense to moderately open overstories, and open understories

interspersed with meadows, shrub patches, riparian areas, or other openings for foraging. Goshawks use nest-sites with greater canopy cover, greater basal area, greater numbers of large diameter trees, and lower shrub/understory cover relative to random sites. High canopy cover is the most consistent structural feature similar across studies of northern goshawk nesting habitat. Goshawks typically nest in stands with canopy cover between 60% and 80% (Keane 1999, Maurer 2000).

Northern Goshawk – Environmental Consequences

Indicators

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

- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within PACs
- Net change from existing NFTS in number of PACs affected by NFTS routes (Percentage of all PACs in Project Area)
- Net change from existing NFTS in miles of routes within 400 meters of Activity Centers
- Net change from existing NFTS in number of Activity Centers within 400 meters of NFTS routes (Percentage of all Activity Centers in Project Area)
- Net change from existing NFTS in percentage of goshawk PACs (total acres) occurring within a 400 meter “zone of influence”

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the northern goshawk through the following activities:

- Prohibiting cross country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on goshawks through changes in behavior and habitat modification.

Changes in Behavior: Types of changes in behavior that may result from the project alternatives include the following: displacement or avoidance, disturbance at a specific location, or physiological response. Critical times for human disturbance are through the nesting and post fledging period (February 15 through September 15). Because goshawks initiate breeding when the ground is still covered with snow and roads and trails are not in use, nests are sometimes directly located along roads and trails that provide flight access. Following melt-out these sites can be prime candidates for conflict as humans begin using the roads and trails (USDA 2001). Northern goshawks are aggressive nest defenders that will attack humans that venture into active nest stands. The potential for negative human interactions increases where motorized routes or dispersed campsites are in proximity to goshawk nest stands (USDA 2001).

The Forest Service, Region 5, has generally assumed that activities (including road and trail use) occurring farther than 400 meters from a goshawk nest site have little potential to affect goshawk nesting (USDA 2004). Grubb et al. (1998) reported that vehicle traffic from roads caused no discernable behavioral response by goshawks at distances greater than 400 meters (0.25 miles) from nests. Little information is available on disturbance distances for goshawks but, as with other raptors, the risk of flushing from the nest or even nest abandonment is likely to increase as the disturbance distance decreases.

Habitat Modification: Roads and trails modify habitat by directly removing it or indirectly by reducing its quality. While simple habitat loss is the most obvious, roads and trails also reduce habitat quality through fragmentation. Northern goshawks may be affected by edge effects from roads when roads and trails fragment suitable habitat. Several studies indicate that goshawks are sensitive to changes in forest canopy closure and habitat fragmentation that could result from a network of roads (Beier and Drennan 1997, Daw and DeStefano 2001). 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 goshawk.

Hazard tree removal along NFTS roads has the potential to reduce canopy closure and increase habitat fragmentation for goshawks. Hazard tree removal is typically conducted along ML 2, 3, 4 and 5 roads (not trails or ML 1 roads). Closures that are proposed on ML 1 and 2 roads within any of the project alternatives would result in a reduction in miles of road on which hazard trees may be removed. On the other hand, opening roads currently closed (converting ML1 routes to ML2) would result in an increase in miles of road on which hazard trees may be removed. The net amount of impact that the project alternatives may have on future hazard tree removal would be minor.

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near goshawk activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to goshawks from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-24). Standards and guidelines in the Forest Plan direct that impacts be mitigated where there is documented evidence of disturbance to the nest site from existing road or motorized trail use. The Forest has not monitored goshawk nest sites in proximity to roads or trails and has not documented specific instances of disturbance. Actual nest locations are often difficult to locate and may move around from year to year within a PAC. Therefore, actual nest locations remain unknown for many of the PACs and those nests that have been located may have moved since they were last located. Furthermore, it is not well known why goshawks choose certain nest sites from year to year, but it is likely that the nest sites will continue to move within the PAC over the long term. Activity centers may be defined as a nest site, a pair roost location, or a territorial single located within the PAC. In the absence of recent nest site locations for every PAC, the relative risk of project alternatives resulting in disturbance to nesting goshawks is evaluated by considering the following: (1) the net change in miles of routes within PACs, (2) the net change from existing NFTS in number of PACs affected by NFTS routes, (3) the net change from existing NFTS in miles of routes within 400 meters of Activity Centers, (4) the net change from existing NFTS in number of Activity Centers within 400 meters of NFTS routes, and (5) the net change from existing NFTS in percentage of goshawk PACs (total acres) occurring within a 400 meter “zone of influence” (Table 3.11-24).

Since routes proposed within this alternative are native surface routes with slower rates of travel, they would not likely result in any human-caused mortality, but would likely increase disturbance to some roosting goshawks within the project area.

A detailed PAC-by-PAC analysis was conducted on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. The BA/BE discusses the details of that analysis. Following is a summary of that discussion.

The routes proposed to be added to the NFTS and the routes proposed to be converted from closed to open contribute a certain amount of disturbance to the activity center on which each PAC is based. Disturbance could result in flushing from nests, roosts, or perches, in alarm responses, and in increased stress hormone levels in some individual goshawks. Although actual disturbance effects will be largely influenced by site-specific factors, it is assumed that all routes within a PAC may result in disturbance to some goshawks. Therefore, if all the routes proposed to be added to the NFTS or proposed to be converted from closed to open are further than 400 meters from the activity center on which a given PAC is based, it is assumed that the routes under this alternative in that PAC would contribute a low level of disturbance to the goshawks at that activity center. If any of the routes proposed to be added to the NFTS or proposed to be converted from closed to open are within 400 meters of the activity center, or if the location of the nest stand is unknown, it is assumed that the routes under this alternative in that PAC would contribute a high level of disturbance to the goshawks at that activity center. Within certain PACs meeting that criterion, the contribution to disturbance was rated as moderate for the reasons given below.

The following table summarizes the information from the analysis. In the table, the column labeled "Disturbance" refers to the contribution of the routes under the alternative to the disturbance to the goshawks at each PAC's activity center.

Table 3.11-23 Alternative 1: Summary of PAC-by-PAC Analysis (Northern goshawk)

Disturbance	Rationale	PACs	% of total
High	Nest stand not known, so routes could be close to or cross through nest stand	1	1%
High	Routes being added or converted from closed to open less than 400 meters, and no intervening topography	2	3%
	Total of High	3	4%
Moderate	Routes being added or being converted from closed to open nearly 400 meters from activity center. Additions less than 10% of total mileage currently drivable in PAC.	2	3%
Low	Additions >400 meters from activity center	2	3%
None--Decrease	No routes being added or converted from closed to open, but routes are being converted from open to closed	1	1%
	PACs in which routes are being added and/or being converted from closed to open	7	9%

Routes would be added and/or routes would be converted from a closed to open status in 7 PACs, 9% of the PACs in the project area.

The nest stand location in one PACs (R05F16D51T03 - CLAVEY) is unknown. Because of the uncertainty of the nest stand location, the level of contribution to disturbance to the goshawks at this PAC's activity center is deemed high.

The routes to be added in two PACs (R05F16D54T07 - BIG CREEK BASIN and R05F16D54T25 - WOLFIN MEADOW) are within 400 meters of the activity centers, and there is no intervening topography to shield the activity centers from the noise generated those routes. Because of these reasons, the level of contribution to disturbance to the goshawks at these PACs' activity centers is considered high.

The level of contribution to disturbance at the activity centers of two PACs (R05F16D51T20 - UPPER HULL CREEK and R05F16D54T40 - RUSH CREEK), while the routes to be added are within 400 meters of the activity center and the intervening topography would not shield the activity centers from the noise generated those routes, is considered moderate because (1) the additions are less than 10% of the total mileage currently drivable in the PACs, and (2) the routes being added are

nearly 400 meters from the activity center, 350 meters from the Upper Hull Creek PAC's activity center and 370 meters from the Rush Creek PAC's activity center..

In two of the PACs (R05F16D52T26 - LONG GULCH and R05F16D51T09 - TROUT CREEK), the routes to be added would be more than 400 meters from the activity center. The level of contribution to disturbance is considered low because of the distance of these routes from the PACs' activity centers.

The total number of PACs in which the level of contribution to disturbance is moderate to high is 5 PACs, 7% of the total.

There is one PACs (1% of the total in the project area) in which no routes would be added, no routes would be converted from a closed to open status, and a route would be converted from an open to closed status. The disturbance to goshawks in the PAC would be decreased.

An assumption, given earlier in this document that based on existing research, motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting goshawks. However, there is no current research showing at what distance disturbance could cause reproductive failure. There is anecdotal information showing that goshawks do reproduce even when there are motorized routes within 400 meters of the activity center.

On the Stanislaus National Forest, there are 76 known goshawk activity centers. There is available data on 23, or 30%, of those activity centers. The 23 activity centers are located on the Summit and Groveland Ranger Districts, 11 on Summit and 12 on Groveland. Of those 23, the goshawks at 17 (74% of the 23) had young in at least one year recorded in the database consulted. The number of years in which surveys of the activity centers were recorded varied from 1 to 8 years. Most have records of surveys from two to four years. Of those 17, 13 (76% of the 17) have at least one route that is considered drivable. That is, the route is (1) ML1 (closed), (2) ML2, (3) ML3, (4) administrative use, (5) unauthorized, (6) other public, or (7) private. (Not included are routes that (1) have been closed by NEPA, (2) have been decommissioned, or (3) are overgrown.) Details on this analysis can be found in the project record.

This data is not sufficient to offer statistically valid proof that goshawks nesting within 400 meters of routes successfully reproduce. However, if certain assumptions are accepted, this data supports the conclusion that, while the level of contribution of disturbance from routes in a goshawk PAC within 400 meters of the activity center is considered high, the disturbance would be likely to disrupt goshawk reproduction in only a limited number of PACs. Two assumptions apply to all the analyses in this document, and are stated in the list of assumptions at the beginning of Chapter 3.11:

- All vehicle classes result in the same amount of disturbance effects to wildlife, unless there is local information enabling a separate analysis by vehicle class.
- Location of a route is equal to disturbance effects from that route (i.e., assume all routes provide the same level of disturbance), unless local data or knowledge indicate otherwise.

Additional assumptions are as follows:

- The activity centers on which data is available is representative of all the activity centers on the Forest. Summit District includes the higher elevation activity centers, and Groveland includes the lower elevation activity centers. Thus, in terms of elevation, the activity centers are representative of the activity centers on the Forest.
- Routes that are classed as ML1 and routes that are unauthorized are currently being used. Field review for this and other projects has shown that many ML1 routes are not physically closed, and so are often being used. The routes designated as unauthorized exist on the ground, and were created by users.

- The quality of the habitat in the 17 PACs in which reproduction has been noted is similar to that in the 6 PACs in which reproduction has not been noted.

The changes proposed under this alternative would reduce the effects from the existing condition because cross country travel would be prohibited, not all unauthorized routes would be added to the NFTS, and some routes would be converted from an open to closed status. Since in only 7% of the PACs would routes be added to the NFTS or converted from a closed to open status within 400 meters of the activity center, and since it is believed that disturbance within 400 meters of the activity center would be likely to affect goshawk reproduction in a limited number of PACs, it is concluded that the alternative would not result in impacts to populations within the project area over the short or long term.

Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. The loss of habitat from these routes has already occurred. Because no new routes are being proposed for construction, there would be little change in the amount of habitat or on habitat fragmentation. Vegetation along unauthorized routes that are not added to the NFTS or existing NFTS routes that would be closed would, over time, grow into the road. So there would be a minor increase in habitat quantity and a decrease in fragmentation.

Season of Use: Although the exact timing may vary, goshawks may start nesting in February. Therefore, seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period. Since approximately 96% of the goshawk PACs would be within these Zones, these closures would reduce disturbance to most goshawks during the early nesting period. The season of use would not apply to WOS routes (see Table 2.02-2), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Mitigation Measures: The types of mitigation measures that would be implemented within PACs and within 400 meters (0.25 mile) of activity centers include the following: tread hardening, drain dips, and fence/log/rock barriers. Implementation of these mitigation measures would include hand tool and machine work that may result in short-term disturbance to individual foraging or roosting goshawks within the project area. To prevent potential disturbance to nesting goshawks, machine work on routes through PACs or within 400 meters of activity centers would not be completed until the end of the nesting season. Disturbance to foraging and roosting goshawks outside of the nesting season would not likely reduce any individual goshawk's fitness and would not result in any population level impacts within the project area.

Table 3.11-24 Alternative 1: Direct and Indirect Effects Indicators (northern goshawk)

Indicators	
Net change from existing NFTS in miles of routes within PACs[1]	+ 1.43
PACs affected by additions to NFTS and by conversion from closed to open (Percentage of all PACs in Project Area)	+ 7 (+ 9%)
Net change from existing NFTS in miles of routes within 400 meters of Activity Centers [1]	+ 1.55
Activity Centers within 400 meters of additions to NFTS and of conversion from closed to open (Percentage of all Activity Centers in Project Area)	+ 7 (+ 9%)
Net change from existing NFTS in percentage of goshawk PACs (total acres) occurring within a 400 meter "zone of influence"[2]	+ 8%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. Approximately 161,200 acres of preferred goshawk habitat (the same habitat in broad-scale terms as that for the California spotted owl) are open to cross country travel.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to goshawks. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes. In addition, creation of new routes could alter habitat and increase fragmentation through the removal of vegetation.

Season of Use: The seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to goshawks.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near goshawk activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to goshawks from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to goshawks.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near goshawk activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to goshawks from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-26). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above.

The same detailed PAC-by-PAC analysis was conducted for Alternative 4 as for Alternative 1 on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. The same assumptions were used in ranking the routes within the alternative as contributing a high, moderate, or low level of disturbance to the owls at each activity center. The BA/BE discusses the details of that analysis. Following is a summary of that discussion.

There are some PACs under Alternative 4 which would have additions and/or conversions from a closed to open status in them but which would not have either of those types of changes under Alternative 1. Some PACs which would have those types of changes under Alternative 1 would have more changes under Alternative 4. Some PACs which would have changes from an open to a closed status under Alternative 1 would have none of or fewer than those types of changes under Alternative 4. Table 3.11-25 summarizes the findings from the analysis.

Table 3.11-25 Alternative 4: Summary of PAC-by-PAC Analysis (Northern goshawk)

Disturbance	Rationale	PACs	% of total
High	Nest stand not known, so routes could be close to or cross through nest stand	2	3%
High	Routes being added or converted from closed to open less than 400 meters, and no intervening topography	5	7%
	Total of High	7	9%
Moderate	Routes being added or being converted from closed to open nearly 400 meters from activity center. Additions less than 10% of total mileage currently drivable in PAC.	2	3%
Low	Additions >400 meters from activity center	3	4%
	PACs in which routes are being added and/or being converted from closed to open	12	16%

Routes would be added and/or routes would be converted from a closed to open status in 12 PACs, 16% of the PACs in the project area.

The nest stand locations in two PACs (R05F16D51T03 - CLAVEY RIVER and R05F16D51T03 - CLAVEY RIVER) are unknown. Because of the uncertainty of the nest stand location, the level of contribution to disturbance to the goshawks in this PAC is deemed high.

The routes to be added in five PACs are within 400 meters of the activity centers, and there is no intervening topography to shield the activity centers from the noise generated those routes. Because of these reasons, the level of contribution to disturbance to the goshawks in the PACs is considered high.

The level of contribution to disturbance at the activity centers of two PACs (R05F16D51T20 - UPPER HULL CREEK and R05F16D54T40 - RUSH CREEK), while the routes to be added are within 400 meters of the activity center and the intervening topography would not shield the activity centers from the noise generated those routes, is considered moderate because (1) the additions are less than 10% of the total mileage currently drivable in the PACs, and (2) the routes being added are nearly 400 meters from the activity center, 350 meters from the Upper Hull Creek PAC's activity center and 370 meters from the Rush Creek PAC's activity center..

In three PACs the routes to be added or converted from closed to open would be more than 400 meters from the activity center at its closest point. The level of contribution to disturbance is considered low because of the distance of this route from the PACs' activity centers.

The total number of PACs in which the level of contribution to disturbance is moderate to high is 9 PACs, 12% of the total.

The changes proposed under Alternative 4 would reduce the effects from the existing condition because cross country travel would be prohibited, not all unauthorized routes would be added to the NFTS, and some routes would be converted from an open to closed status. Since in only 12% of the PACs would routes be added to the NFTS or converted from a closed to open status within 400 meters of the activity center, and since it is believed that disturbance within 400 meters of the activity center would be likely to affect goshawk reproduction in a limited number of PACs (see discussion under Alternative 1 above), it is concluded that the alternative would not result in impacts to populations within the project area over the short or long term.

Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. The loss of habitat from these routes has already occurred. Because no new routes are being proposed for construction, there would be little change in the amount of habitat or on habitat

fragmentation. Vegetation along unauthorized routes that are not added to the NFTS or existing NFTS routes that would be closed would, over time, grow into the road. So there would be a minor increase in habitat quantity and a decrease in fragmentation.

Season of Use: Although the exact timing may vary, goshawks may start nesting in February. Therefore, seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period. Since approximately 96% of the goshawk PACs would be within these zones, these closures would reduce disturbance to most goshawks during the early nesting period. The season of use would not apply to WOS routes (see Table 2.02-2), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-26 Alternative 4: Direct and Indirect Effects Indicators (northern goshawk)

Indicators	
Net change from existing NFTS in miles of routes within PACs[1]	+ 3.48
PACs affected by additions to NFTS and by conversion from closed to open (Percentage of all PACs in Project Area)	+ 12 (16%)
Net change from existing NFTS in miles of routes within 400 meters of Activity Centers [1]	+ 3.30
Activity Centers within 400 meters of additions to NFTS and of conversion from closed to open (Percentage of all Activity Centers in Project Area)	+ 10 (+ 13%)
Net change from existing NFTS in percentage of goshawk PACs (total acres) occurring within a 400 meter "zone of influence" [2]	+ 12%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near goshawk activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to goshawks from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-28). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above. In the absence of further research, it is assumed that motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting goshawks. Based on that assumption, approximately 1% of activity centers would receive some disturbance from routes added to the NFTS and routes that would be opened. Since the change to the existing NFTS is a decrease in the miles of NFTS within PACs and near activity centers, there would be a decrease from the other alternatives in the direct and indirect effects on goshawks within the project area. Although these effects would impact individuals and some reproducing pairs over the short term, they would not result in impacts to populations within the project area over the short or long term.

The same detailed PAC-by-PAC analysis was conducted for Alternative 5 as for Alternative 1 on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. The same assumptions were used in ranking the routes within the alternative as contributing a high, moderate, or low level of disturbance to the owls at each activity center. The BA/BE discusses the details of that analysis. Following is a summary of that discussion.

There are some PACs under Alternative 1 which would have additions and/or conversions from a closed to open status in them but which would not have either of those types of changes under Alternative 5. Some PACs which would have those types of changes under Alternative 5 would have more changes under Alternative 1. Some PACs which would have changes from an open to a closed status under Alternative 5 would have none of or fewer than those types of changes under Alternative 1. Table 3.11-27 summarizes the findings from the analysis.

Table 3.11-27 Alternative 5: Summary of PAC-by-PAC Analysis (Northern goshawk)

Disturbance	Rationale	PACs	% of total
High	Nest stand not known, so routes could be close to or cross through nest stand	1	1%
Moderate	Routes being added or being converted from closed to open nearly 400 meters from activity center. Additions less than 10% of total mileage currently drivable in PAC.	1	1%
None--Decrease	No routes being added or converted from closed to open, but routes are being converted from open to closed	3	4%
	PACs in which routes are being added and/or being converted from closed to open	3	3%

Routes would be added and/or routes would be converted from a closed to open status in 2 PACs, 3% of the PACs in the project area.

The route being converted from a closed to open status in one PAC (R05F16D54T07 - BIG CREEK BASIN) is within 400 meters of the activity centers, and there is no intervening topography to shield the activity center from the disturbance generated on that route. Because of these reasons, the level of contribution to disturbance to the goshawks in the PAC is considered high.

The level of contribution to disturbance at the activity center for one PAC (R05F16D51T20 - UPPER HULL CREEK), while the route to be added is within 400 meters of the activity center and the intervening topography would not shield the activity center from the disturbance generated by that route, is considered moderate because (1) the addition is less than 4% of the total mileage currently drivable in the PAC, and (2) the route being added is nearly 400 meters (350 meters) from the activity center..

The total number of PACs in which the level of contribution to disturbance is moderate to high is 2 PACs, 3% of the total.

There are three PACs (4% of the total in the project area) in which no routes would be added, no routes would be converted from a closed to open status, and routes would be converted from an open to closed status. The disturbance to goshawks in these PACs would be decreased.

The changes proposed under Alternative 5 would reduce the effects from the existing condition because cross country travel would be prohibited, not all unauthorized routes would be added to the NFTS, and some routes would be converted from an open to closed status. Since in only 3% of the PACs would routes be added to the NFTS or converted from a closed to open status within 400 meters of the activity center, and since it is believed that disturbance within 400 meters of the activity center would be likely to affect goshawk reproduction in a limited number of PACs (see discussion under Alternative 1 above), it is concluded that the alternative would not result in impacts to populations within the project area over the short or long term.

Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. The loss of habitat from these routes has already occurred. Because no new routes are being proposed for construction, there would be little change in the amount of habitat or on habitat fragmentation. Vegetation along unauthorized routes that are not added to the NFTS or existing NFTS routes that would be closed would, over time, grow into the road. So there would be a minor increase in habitat quantity and a decrease in fragmentation.

Season of Use: Although the exact timing may vary, goshawks may start nesting in February. Therefore, seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would

overlap the beginning of the nesting period. Since approximately 96% of the goshawk PACs would be within these Zones, these closures would reduce disturbance to most goshawks during the early nesting period.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-28 Alternative 5: Direct and Indirect Effects Indicators (northern goshawk)

Indicators	
Net change from existing NFTS in miles of routes within PACs[1]	-- 1.74
PACs affected by additions to NFTS and by conversion from closed to open (Percentage of all PACs in Project Area)	+ 1 (+ 1%)
Net change from existing NFTS in miles of routes within 400 meters of Activity Centers[1]	-- 2.00
Activity Centers within 400 meters of additions to NFTS and of conversion from closed to open (Percentage of all Activity Centers in Project Area)	+ 1 (+ 1%)
Net change from existing NFTS in percentage of goshawk PACs (total acres) occurring within a 400 meter "zone of influence"[2]	-- 2%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

CUMULATIVE EFFECTS

In 2001 and 2004 the Forest Service amended 11 Sierra Nevada Forest Plans to better address the needs of old forest-associated species (USDA 2001 and 2004c). During this assessment, the following risk factors were identified for northern goshawks in the Sierra Nevada: (1) changes to the amount and quality of goshawk habitat from timber harvest and fuels treatments; (2) loss of breeding territories due to stand replacing fires; and (3) breeding site disturbance from vegetation treatments, human recreation, or falconry harvest. Fuels reduction treatments and wildfire effects are identified as the predominant effectors of goshawk habitat. Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the Stanislaus National Forest and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects upon northern goshawks.

Based on GIS analysis, 3 wildfires have burned through 3 goshawk PACs (4%) affecting approximately 28 acres or less than 1% of those PACs since 2000. Forest vegetation/fuels thinning projects (designed to reduce the risk of additional habitat loss to wildfires) have treated approximately 788 acres or 5% of goshawk PACs between 2000 and 2008. CDF currently lists a total of 2,365 acres of private land within the Stanislaus National Forest administrative boundary for which timber harvest plans have been submitted. Timber harvest on private lands is generally more intensive and does not typically maintain habitat suitability for spotted owls. These wildfires, fuels treatment, and timber harvest projects have resulted in reduction in the amount and quality of goshawk habitat within the Stanislaus National Forest boundary.

Vegetation/fuels reduction projects will continue to be the primary activity affecting goshawk habitat on the Stanislaus National Forest (Appendix B). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Although these treatments will degrade habitat in the short term, it is anticipated that, over time, the amount of habitat removed in stand replacing wildfires will be reduced as a result of these treatments (USDA 2004c).

The effect of open motorized routes on goshawk populations or habitats was not identified as a significant risk factor by the Forest Service, but breeding site disturbance from human recreation was addressed (USDA 2001 and 2004c). Recreation use has increased and is expected to continue to increase on the Stanislaus National Forest (see 3.04 Recreation Resources, Affected Environment.

OHV use has been increasing at an even more rapid pace than other forms of recreation based upon State figures for OHV sales (see 3.04 Recreation Resources). Approximately 5 miles of new trail construction, as well as numerous short route segments for dispersed camping access, have been proposed for the future (separate from the this project). These trails are proposed to provide "connector routes" between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes would be similar to those described under direct and indirect effects of the alternatives: changes in behavior; and habitat modification through loss of habitat and further fragmentation of habitat.

Since human disturbance has been recognized as a significant risk factor, non-motorized recreation (hiking, cycling, and equestrian use) may result in additional disturbance to nesting and foraging goshawks. Non-motorized recreation occurs along an additional 394 miles of summer trails. Human disturbance from use of non-motorized routes contributes to the direct and indirect effects of the project alternatives.

Table 3.11-29 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. Given the proportion of goshawk nest sites and habitat potentially affected, as indicated in the table, and considering the projections for future increases in recreation uses and OHV activity (see 3.04 Recreation Resource), Alternative 2 may, over time, contribute measurably to cumulative effects upon goshawk populations. Because Alternative 2 does not restrict vehicles to designated routes, there is a high degree of uncertainty about future route proliferation in goshawk habitat which may have disturbance and habitat effects beyond the effects of routes open to motorized use. The action alternatives do not result in a loss of habitat (no route construction), but noise and traffic disturbance would influence habitat use and availability where goshawks may be present. Alternative 5 contributes the least to cumulative effects on this species because cross country travel would be prohibited and open route densities in goshawk habitat are lowest. Alternatives 4, 1, and 3 would result in progressively lower risk to goshawks due to the amount of motorized routes resulting from each of these alternatives. Although the action alternatives may result in cumulative impacts, they are fairly minor in comparison to potentially significant impacts (fire, fuels/vegetation treatments, timber harvest on private land).

Table 3.11-29 Drivable Routes in northern goshawk habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of routes within PACs[1]	59.19	79.45	57.47	61.64	56.02
PACs intersected by all routes (Percentage of all PACs in Project Area) [1]	61 (80%)	68 (89%)	60 (79%)	61 (80%)	61 (80%)
Miles of routes within 400 meters of Activity Centers[1]	42.87	59.79	40.86	45.14	39.38
Activity Centers occurring within 400 meters of all routes (Percentage of all Activity Centers in Project Area) [1]	22 (29%)	22 (29%)	22 (29%)	22 (29%)	22 (29%)
Percentage of PACs (total acres) occurring within a 400 meter "zone of influence" of all routes[1]	72%	83%	71%	72%	70%

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.

SUMMARY OF EFFECTS

The northern goshawk is widespread throughout the western United States and the project area. The direct and indirect effects of the project alternatives (1, 2, 3, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. As can be seen from Table 3.11-30, of the alternatives, Alternative 5 would have the least negative impact on the species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Table 3.11-30 Ranking of Alternative Indicators (northern goshawk)

Indicators	Rankings by Alternatives for [1]				
	1	2	3	4	5
Miles of routes within PACs[2,3]	3	1	4	2	5
PACs intersected by all routes[2,3]	3	1	5	3	3
Miles of routes within 400 meters of Activity Centers[2,3]	3	1	4	2	5
Activity Centers occurring within 400 meters of all routes[2,3]	3	3	3	3	3
Percentage of PACs (total acres) occurring within a 400 meter "zone of influence" of all routes[2,3]	3	1	3	2	5
Average	**3**	**1.4**	**3.8**	**2.40**	**4.2**

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2] Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes known at the time the data base was last updated and routes where this is no public right-of-way.
[3] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 is less than the miles of open routes under Alternative 3.

Ungulates

Mule Deer – Affected Environment

Species and Habitat Account

The mule deer is found throughout the western United States and is the only large ungulate that inhabits Stanislaus National Forest. Mule deer populations throughout the western United States, including the Sierra Nevada of California, reached their peak in the middle of the 20th century and have since declined (Gill 1999, Salwasser et al. 1978). More recently, mule deer populations (estimated by buck harvest and winter range counts) within the project area have been stable to slightly decreasing and below management objectives (CDFG 1980, CDFG 1984). For example, between 1994 and 2006, the fawn to doe ratio (a measure of fawn survivability, which is an accepted indicator of deer population trend) for the Stanislaus deer herd averaged 29 fawns per 100 does, and, for the Tuolumne herd, 33 fawns per 100 does (2007nberg 2008). The situation is similar for the Railroad Flat and Yosemite herds, the other two migratory deer herds that use the Stanislaus. Based on a 20 percent adult doe mortality rate of collared does from 1987 to 1996, the spring fawn to doe ratio must be 45 fawns or more per 100 does to maintain the population (Ibid.).

It is generally agreed that mule deer within the project area exhibit two different life history strategies: migrational and resident. Resident deer spend the majority of their lives at lower elevations, exhibiting little or no seasonal movement between elevational habitat types. Although it has been recognized since the mid 20th century that these two life history strategies are exhibited, there has been little to no research focused on resident deer (Leopold et al. 1951). It is possible that an individual may exhibit both life history strategies over the course of their lives (i.e., an adult doe may migrate to summer range one year and not the next), and it is generally recognized and assumed that individuals expressing either strategy regularly coexist and interbreed on the winter range and during the rut. For example, Browning et al. (1973) stated that, "it is known . . . that some of the deer [from the Rail Road Flat herd] migrate west of the Rail Road Flat and Sheep Ranch roads to winter with the resident black-tailed deer." Since resident deer are closely associated with human development near the Forest boundary, this analysis will focus on the effects to the migrant deer herds within the project area. The migrant deer move down the western slopes of the Sierra Nevada to lower elevations with the onset of the rut and first snowfalls. After completing the rut and spending the winter at lower elevations, they follow "spring green-up" and migrate back to higher elevations where does will typically fawn and spend the summer. Some of the deer migrate to the east side of the Sierra crest.

Mule deer are a habitat generalist, found throughout numerous plant communities within the project area, but are primarily dependent on early successional vegetation types. Meadow habitat is of considerable importance to mule deer, especially on the summer range. Monitoring of the condition

and trend of Sierra montane meadows indicates that meadow condition across the bioregion shows a slight upward trend (Green 2003).

In general, there are three key habitats that migrating mule deer depend on to complete their life history: winter range, summer range, and migration corridors. The 2001 SNFPA further delineated summer and winter range habitat as follows: general winter range (309.6 mi^2 on the Forest), winter concentration areas (164.91 mi^2), critical winter range (55.12 mi^2), summer concentration areas (187.33 mi^2), and critical summer range (24.71 mi^2) (USDA 2001). Since individuals of all herds of mule deer within the project area coexist and interbreed, this analysis focuses on the effects to delineated summer (concentration and critical) and winter (concentration and critical) range habitats.

Mule Deer – Environmental Consequences

Indicators

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

Summer Concentration Areas

- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within summer concentration areas.
- Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within summer concentration areas.
- Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within summer concentration areas with proposed designated routes (additional density).
- Net change from existing NFTS in percentage of summer concentration areas occurring within a 200-meter (approximately 650-foot) "zone of influence"

Critical Summer Range

- Net change from existing NFTS in miles of routes within critical summer range.
- Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical summer range.
- Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical summer range with proposed designated routes (additional density).
- Net change from existing NFTS in percentage of critical summer range occurring within a 200-meter (approximately 650-foot) "zone of influence"

Winter Concentration Areas

- Net change from existing NFTS in miles of routes within winter concentration areas.
- Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within winter concentration areas.
- Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within winter concentration areas with proposed designated routes (additional density).
- Net change from existing NFTS in percentage of winter concentration areas occurring within a 200-meter (approximately 650-foot) "zone of influence"

Critical Winter Range

- Net change from existing NFTS in miles of routes within critical winter range.

- Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical winter range.
- Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical winter range with proposed designated routes (additional density).
- Net change from existing NFTS in percentage of critical winter range occurring within a 200-meter (approximately 650-foot) "zone of influence"

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the mule deer through the following activities:

- Prohibiting cross country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on mule deer through the following: human-caused mortality, changes in behavior, or habitat modification.

Human-Caused Mortality: In general, types of human-caused mortality that have been identified for the mule deer include collisions. Collisions with motorized vehicles have been identified as one of the greatest risks to mule deer populations (USDA 2004c). Collisions are typically associated with well-maintained roads that allow high rates of travel (e.g. highways). Routes proposed for designation within the project alternatives are native surfaced routes that allow only much slower rates of travel. These types of routes result in far fewer collisions than highways or paved routes and would likely have an insignificant impact on mule deer mortality within the project area.

Changes in Behavior: The types of changes in behavior that have been identified for the mule deer include displacement or avoidance and disturbance at a specific location. Deer responses to recreational uses have not been studied in detail, making it difficult to make reliable inferences. In general, however, studies show that mule deer will move away from, or flush, from an approaching person and will usually allow a person in or on a vehicle to get closer than a person on foot (Wisdom et al. 2004). Wisdom et al. (Ibid.) found that mule deer showed little measurable flight response to experimental OHV treatments but cautioned that deer may well be responding with fine-scale changes in habitat use (i.e., avoidance), rather than substantial increases in movement rates and flight responses. Although several studies have found that mule deer avoid areas in proximity to roads, Boroski and Mossman (1998) found that human disturbance did not impede mule deer use of water sources.

Road density has traditionally been used as an indicator for habitat effectiveness models (Perry and Overly 1977, Thomas et al. 1979). These models indicate that, as open road density increases, deer use declines (Thomas et al. 1979). Deer avoid primary roads more than secondary or tertiary roads and also avoid roads more in open habitats as opposed to areas with vegetative or topographic cover (Thomas et al. 1979). The displacement distances vary between 200 and 800 meters (approximately 650 and 2,620 feet) in various studies, depending upon the road type and traffic level, and the surrounding habitat (Perry and Overly 1977, Rost and Bailey 1979, Johnson et al. 2000). Main roads were found to reduce deer use up to 0.5 miles (800 m), whereas secondary and primitive roads reduced deer densities from between 200 to 400 meters (approximately 650 to 1,310 feet) in these studies. Additional variables such as the amount and frequency of traffic, and the spatial distribution of roads in relation to deer use, influence the degree of negative effects that roads have on deer use in forested habitats (Perry and Overly 1977, Johnson et al. 2000, deVos et al. 2003).

Changes in behavior, expressed through flight response or changes in habitat use may reduce the fitness of individuals within a herd (Yarmoloy et al. 1988). Adverse effects to fitness may be measured through reduced fat or energy reserves. Adverse effects to energy reserves are typically the most significant during the winter when mule deer may already be experiencing low energy reserves and reduced food availability (Livezey 1991). If an individual's energy reserves are depleted to low enough levels on the winter range they may die (starvation) or experience reduced reproductive success the following spring. Therefore, if disturbance from motorized vehicles was having a significant impact on mule deer populations within the winter range it would likely result in malnutrition or mortality from starvation.

Numerous cases of large winter die-offs, caused by starvation, have been documented throughout the western United States (Leopold et al. 1947). Herds may be particularly prone to large scale die-offs from starvation when (1) snow depths are great and deer are unable to migrate to lower elevations (below the snow level) or (2) herd size exceeds winter range carrying capacity. Winter habitat within the project area extends over a broad elevational range, which typically allows mule deer to move down the slope and below significant snow depths. Although there are historic records of large-scale winter die-offs within the project area (Leopold et al. 1951), literature and anecdotal evidence do not indicate that starvation is a significant or limiting factor to mule deer herds on the Stanislaus National Forest (CDFG 1980, CDFG 1981, CDFG 1984).

Another way in which mule deer populations may be impacted, by reduced fat or energy reserves is through reduced reproductive fitness or fawn production. Yarmoloy et al. (1988) found significant reductions in fawn production from does which were intentionally harassed by ATVs. Although it is not well understood how harassment causes reduced fawn production, a mature doe that successfully breeds during the rut may not successfully carry the fawn to full term due to stress or inadequate nutrition. Low fawn recruitment is the factor that likely caused declines in the latter part of the 20th century throughout the Sierra Nevada and the factor that is currently attributed to limiting herd growth within the project area (Salwasser et al. 1978, CDFG 1984). Annual fall deer count data and recent findings from a radio telemetry study conducted within the project area indicate results similar to mortality factors discussed by CDFG (1984): a low proportion of fawns are surviving through the summer and making it onto winter range (Annual Deer Count Data - project record). Results from this study and spring deer counts further showed that seasonal fawn mortality was similar to that found on the Kings River deer herd by Salwasser et al. (1978), indicating that significant fawn mortality occurs within the first few months following birth and that winter fawn mortality was minor (Ibid.). CDFG (2007) reported that 50% of early fawn losses were attributed to predation from bears, while the other 50% "were found dead with no apparent cause". Furthermore, they concluded that early fawn mortality was likely underestimated since captured fawns were more than a week old. Although early fawn mortality may have a significant impact on recruitment and mule deer populations within the project area, the causes for these losses may be numerous and are largely unknown.

Habitat Modification: Roads and trails modify habitat by directly removing it. In addition, meadow habitat quality may be affected in different ways by motorized travel. The most obvious way motorized vehicles may impair meadow quality is through direct mechanical damage (rutting). Since soil typically has lower bulk density and can be more easily penetrated when it is wet, mechanical damage often occurs in meadows that are naturally wet or in dry meadows after significant rainfall or immediately following the retreat of the snow at higher elevations. When roads or trails are created in meadows they may intercept surface and subsurface flow (Kattelmann 1996). When flows are intercepted and redirected, meadow drying occurs, changing the flora associated with it. A change in flora can impact deer, especially pregnant and lactating does, by removing forage plants and by removing hiding cover.

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within all types of mule deer habitat. This would reduce the risk of direct and indirect effects to mule deer from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-31). Actions proposed in this alternative would not likely result in measurable increases in human-caused mortality, but would likely cause disturbance to some mule deer within the project area. Resulting road densities and percentages of habitat influenced by motorized vehicles on summer and winter range would likely result in disturbance to some individuals. They would not likely have a measurable impact to populations. Mule deer within the project area are generally in fairly good condition on the winter range and starvation is not currently a significant factor impacting mule deer populations. Current levels of motorized use on the winter range are not likely having a substantial impact on mule deer populations through malnutrition or starvation. The causes of early fawn losses are poorly understood; motorized use could be one of those causes. The amount of disturbance to mule deer in the different ranges would decrease from the existing condition (existing NFTS routes and unauthorized routes), as shown by the decrease in route density and percent of habitats affected by routes (Table 3.11-31).

Table 3.11-31 Alternative 1: Direct and Indirect Effects Indicators (mule deer)

Indicators	
Summer Concentration Areas	
Net change from existing NFTS in miles of routes within summer concentration areas[1]	12.47
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within summer concentration areas	0.79
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within summer concentration areas, including changes (additional density)	0.85 (0.06)
Net change from existing NFTS in percentage of summer concentration areas occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	2.15%
Critical Summer Range	
Net change from existing NFTS in miles of routes within critical summer range[1]	0.75
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical summer range	0.52
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical summer range, including changes (additional density)	0.55 (0.03)
Net change from existing NFTS in percentage of critical summer range occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	1.08%
Winter Concentration Areas	
Net change from existing NFTS in miles of routes within winter concentration areas[1]	31.70
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within winter concentration areas	1.75
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within winter concentration areas, including changes (additional density)	2.05 (0.3)
Net change from existing NFTS in percentage of winter concentration areas occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	4.82%
Critical Winter Range	
Net change from existing NFTS in miles of routes within critical winter range[1]	11.78
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical winter range	1.44
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical winter range, including changes (additional density)	1.82 (0.38)
Net change from existing NFTS in percentage of critical winter range occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	4.76%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of habitat occurring within a 200 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 200 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 200 meter "zone of influence" of routes converted from open to closed status

Field surveys were completed on all routes that were proposed to be added to the NFTS within meadows. The purpose of the field surveys was to determine whether the route would have the potential to affect hydrology within the meadow. These surveys indicated that the routes that were proposed to be added within meadows would not significantly alter their hydrology (see 3.10 Water and RCO Analysis in project record). However, some routes were identified as needing mitigation to improve hydrologic conditions. Effects of the mitigation measures on this species are discussed below.

Since these impacts would affect a small percentage of habitat (Table 3.11-31), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long-term.

Season of Use: Mule deer spend a significant portion of the year at lower elevations and may be particularly prone to disturbance on winter range. This alternative would result in seasonal closures (as identified for each route in Appendix I) on approximately 73% of winter concentration areas and 73% of critical winter range. These closures would reduce disturbance to deer, therefore providing beneficial impacts to individuals within the project area.

Mitigation Measures: The types of mitigation measures that would be implemented within mule deer habitat include the following: tread hardening, drain dips, fence/log/rock barriers, and hardened stream crossings. Implementation of these mitigation measures would include hand tool and machine work that would result in short-term disturbance to individual deer within the project area. This amount of disturbance would not likely reduce any individual deer's fitness. The proposed mitigation measures would in the long term improve hydrologic conditions, and therefore meadow habitat. Meadow habitat is key to mule deer, especially on the summer range. Because of the low level of disturbance and the relatively minor improvements to deer habitat, the mitigation measures would not result in any population level impacts within the project area.

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. The amounts of deer ranges open to cross country travel are as follows: (1) summer concentration areas—68,900 acres; (2) critical summer range—7,000 acres; (3) winter concentration areas—105,500 acres; (4) critical winter range—35,300.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to mule deer. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes. In addition, creation of new routes could alter habitat through the removal of vegetation.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to mule deer.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to hydrologic conditions in meadows would continue on routes identified as needing mitigation, causing a potential degradation of meadow habitat.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within mule deer habitat. This would reduce the risk of direct and indirect effects to mule deer from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to mule deer.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to hydrologic conditions in meadows would continue on routes identified as needing mitigation, causing a potential degradation of meadow habitat.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within mule deer habitat. This would reduce the risk of direct and indirect effects to mule deer from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-32). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the net change in miles of routes within summer and winter range habitat, there would be a slight increase in the direct and indirect effects to mule deer within the project area. Although these increases over Alternative 1 would result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to mule deer populations within the project area.

Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. The loss of habitat from these routes has already occurred. Because no new routes are being proposed for construction, there would be little change in the amount of habitat. Vegetation along unauthorized routes that are not added to the NFTS or existing NFTS routes that would be closed would, over time, grow into the road. So there would be a minor increase in habitat quantity.

Season of Use: Mule deer spend a significant portion of the year at lower elevations and may be particularly prone to disturbance on winter range. This alternative would result in seasonal closures (as identified for each route in Appendix I) on approximately 73% of winter concentration areas and 73% of critical winter range. These closures would reduce disturbance to deer, therefore providing beneficial impacts to individuals within the project area.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-32 Alternative 4: Direct and Indirect Effects Indicators (mule deer)

Indicators	
Summer Concentration Areas	
Net change from existing NFTS in miles of routes within summer concentration areas[1]	12.93
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within summer concentration areas	0.79
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within summer concentration areas, including changes (additional density)	0.85 (0.06)
Net change from existing NFTS in percentage of summer concentration areas occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	2.48%
Critical Summer Range	
Net change from existing NFTS in miles of routes within critical summer range[1]	0.75
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical summer range	0.52
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical summer range, including changes (additional density)	0.55 (0.03)
Net change from existing NFTS in percentage of critical summer range occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	1.54%
Winter Concentration Areas	
Net change from existing NFTS in miles of routes within winter concentration areas[1]	60.74
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within winter concentration areas	1.75
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within winter concentration areas, including changes (additional density)	2.05 (0.3)
Net change from existing NFTS in percentage of winter concentration areas occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	8.92%
Critical Winter Range	
Net change from existing NFTS in miles of routes within critical winter range[1]	21.48
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical winter range	1.44
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical winter range, including changes (additional density)	1.82 (0.38)
Net change from existing NFTS in percentage of critical winter range occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	9.03%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of habitat occurring within a 200 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 200 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 200 meter "zone of influence" of routes converted from open to closed status

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within mule deer habitat. This would reduce the risk of direct and indirect effects to mule deer from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-33). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since the change to the existing NFTS is a decrease in the miles of NFTS, there would be a decrease from Alternative 1 in the direct and indirect effects on mule deer within the project area. Although these effects would impact individuals, they would not result in impacts to mule populations within the project area.

Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. The loss of habitat from these routes has already occurred. Because no new routes are being proposed for construction, there would be little change in the amount of habitat. Vegetation along unauthorized routes that are not added to the NFTS or existing NFTS routes that would be closed would, over time, grow into the road. So there would be a minor increase in habitat quantity.

Season of Use: Mule deer spend a significant portion of the year at lower elevations and may be particularly prone to disturbance when concentrated on winter range. This alternative would result in seasonal closures (as identified for each route in Appendix I) on approximately 73% of winter concentration areas and 73% of critical winter range. These closures would reduce disturbance to deer, therefore providing beneficial impacts to individuals within the project area.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-33 Alternative 5: Direct and Indirect Effects Indicators (mule deer)

Indicators	
Summer Concentration Areas	
Net change from existing NFTS in miles of routes within summer concentration areas[1]	2.13
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within summer concentration areas	0.79
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within summer concentration areas, including changes (additional density)	0.85 (0.06)
Net change from existing NFTS in percentage of summer concentration areas occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	0.65%
Critical Summer Range	
Net change from existing NFTS in miles of routes within critical summer range[1]	-- 0.61
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical summer range	0.52
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical summer range, including changes (additional density)	0.55 (0.03)
Net change from existing NFTS in percentage of critical summer range occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	-- 0.56%
Winter Concentration Areas	
Net change from existing NFTS in miles of routes within winter concentration areas[1]	-- 11.15
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within winter concentration areas	1.75
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within winter concentration areas, including changes (additional density)	2.05 (0.3)
Net change from existing NFTS in percentage of winter concentration areas occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	-- 0.86%
Critical Winter Range	
Net change from existing NFTS in miles of routes within critical winter range[1]	-- 6.56
Existing density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical winter range	1.44
Density (mi/mi^2) of routes under Stanislaus National Forest jurisdiction within critical winter range, including changes (additional density)	1.82 (0.38)
Net change from existing NFTS in percentage of critical winter range occurring within a 200-meter (approximately 650-foot) "zone of influence" [2]	-- 2.70%

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Percentage of habitat occurring within a 200 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 200 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 200 meter "zone of influence" of routes converted from open to closed status

CUMULATIVE EFFECTS

Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the Stanislaus National Forest and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects upon mule deer. CDFG (1998) identified the following primary factors influencing deer populations in the central Sierra Nevada: (1) reduced forage availability resulting from fire exclusion; (2) reduced forage and cover resulting from logging, forest thinning, and/or herbicide treatments; (3) reduced forage and cover resulting from livestock grazing in meadows; and (4) loss of habitat to private land development.

Within the project area, hazardous fuels reduction and associated timber harvest have occurred on approximately 25,410 acres of NFS land since 2000 (Appendix B). These treatments are anticipated

to be the primary activity that will alter forest vegetation within deer ranges over the next several years. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Poor forage condition has largely resulted from fire suppression and changing forest management practices on public and private land (forest thinning treatments, rather than clearcutting and group selection timber harvest) (CDFG 1981). Mastication can benefit deer by removing dense overstory vegetation, thereby encouraging the growth of young brush, grasses, and forbs in the understory, which is preferred by deer for forage. Thinning of conifers also releases the remaining oaks and encourages new oak sprouts. The benefit of thinning on deer habitat has been questioned, however, due to concern that the treatments remove hiding and thermal cover over large acreages and may result in a decline in forage in the short term (Kucera and Barrett 1995, Barrett et al. 2004). Although these treatments will reduce deer hiding cover and may reduce forage for several years, forage values are expected to improve in the long term, especially where followed by additional prescribed burning treatments.

CDF currently lists a total of 2,365 acres of private land within the Stanislaus National Forest administrative boundary for which timber harvest plans have been submitted. On private timberlands, harvest methods include selective thinning and regeneration (clearcut) and then planting and using herbicides to suppress competing vegetation. Clearcut harvest can benefit deer by promoting early succession vegetation that deer prefer, but the benefit to foraging habitat is limited in quality, quantity, and duration by reforestation efforts (CDFG 1998, deVos et al. 2003). Early succession habitat is available to deer for 8 to 12 years under these conditions as opposed to up to 30 years under natural regeneration (deVos et al. 2003).

Wildfires that do occur have tended to burn with more intensity than they did prior to fire suppression. Since 2000, approximately 103,000 acres of NFS land have burned in wildfires. These fires have likely increased forage availability across the broad landscape, but the intensity and large size of the fires did not result in optimum distribution of openings and cover. Within the project area, prescribed burning has occurred on about 22,500 acres between 2000 and 2008. Prescribed burning can help offset the negative effects of fire suppression and is widely accepted as a valuable tool to enhance deer habitat (CDFG 1998). Burning enhances many plants favored by deer for forage by stimulating new growth on sprouting species, germinating seeds of fire-adapted species, thinning understory vegetation to allow more light to the forest floor, and consuming part of the duff layer to enhance the seedbed.

Livestock grazing, particularly within meadows and aspen stands, has reduced the quality of fawning and foraging habitats for deer. Monitoring of the condition and trend of Sierra montane meadows indicates that meadow condition across the bioregion shows a slight upward trend (Green 2003). Livestock grazing occurs on 35 active grazing allotments on the Stanislaus National Forest, totaling approximately 792,042 acres of NFS and private lands. On the Stanislaus National Forest, the impacts of livestock grazing on meadows is variable between years, but has been steadily decreasing as forage utilization levels are being reduced by stricter standards established by the SNFPA.

Although mule deer populations “ultimately are limited by habitat quality and quantity,” other stressors can exacerbate decline, particularly in poor habitat conditions (deVos et al. 2003, Barrett et al. 2004). At present, livestock grazing influences the quality of meadow habitat used by all mule deer in the project area, and fuels treatments may be reducing cover or forage in localized areas (though forage may be improving in areas treated more than five to ten years ago). Existing roads influence a considerable portion of deer habitat and surfaced roads (e.g. highways) also result in increased mortality from collisions. Recreation use has increased and is expected to continue to increase on the Stanislaus National Forest (see 3.04 Recreation Resources, Affected Environment), resulting in greater likelihood and magnitude of human disturbance to wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation based upon State figures for OHV sales (see 3.04 Recreation Resources). Approximately 5 miles of new trail construction, as well as numerous

short route segments for dispersed camping access, have been proposed for the future (separate from the this project). These trails are proposed to provide "connector routes" between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes would be similar to those described under direct and indirect effects of the alternatives: changes in behavior; and loss of habitat. Other types of recreation, including hiking and equestrian use along 394 miles maintained as non-motorized trails, result in disturbance and displacement effects that may be similar to those described for the motorized routes in the project alternatives. The combined effects of forest uses and management actions upon deer and their habitat is complex (deVos et al. 2003).

The direct and indirect effects of the project alternatives would contribute to cumulative effects for this species. Table 3.11-34 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. As can be seen from the table, Alternative 2 would have the most miles of routes. Because this alternative does not prohibit cross country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon mule deer. The alternative would contribute most to disturbance to individuals of this species. Alternatives 1, 3, 4, and 5 contribute cumulatively to the disturbance and habitat alteration from activities described above. Alternatives 4, 1, 5, and 3 would result in progressively lower risk to deer due to the amount of motorized routes resulting under each. These alternatives do not result in a loss of habitat (no route construction), but would likely influence habitat suitability. Although the action alternatives may result in additional cumulative impacts, they are very minor in comparison to other factors affecting this species.

Table 3.11-34 Drivable Routes in mule deer habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Summer Concentration					
Miles of routes within summer concentration areas[1,2]	186.85	223.37	175.83	189.37	178.09
Density of all routes (mi/mi^2) within summer concentration areas[1,2]	1.00	1.19	0.94	1.01	0.95
Percentage of summer concentration areas occurring within a 200 meter (approximately 650 foot) "zone of influence" of all routes	18.33 %	20.66 %	17.72 %	18.49 %	17.72 %
Critical Summer Range					
Miles of routes within critical summer range[1,2]	15.13	20.85	14.38	15.56	13.77
Density of all routes (mi/mi^2) within critical summer range[1,2]	0.61	0.84	0.58	0.63	0.56
Percentage of critical summer range within a 200 meter "zone of influence" of all routes[1,2]	11.39 %	14.31 %	11.05 %	11.39 %	10.49 %
Winter Concentration Areas					
Miles of routes within winter concentration areas[1,2]	425.83	574.50	386.97	456.96	384.62
Density of all routes (mi/mi^2) within winter concentration areas[1,2]	2.58	3.48	2.35	2.77	2.33
Percentage of winter concentration areas within a 200 meter "zone of influence" of all routes[1,2]	40.56 %	51.14 %	38.91 %	43.17 %	38.14 %
Critical Winter Range					
Miles of routes within critical winter range[1,2]	103.55	157.36	90.15	113.25	83.59
Density of all routes (mi/mi^2) within critical winter range[1,2]	1.88	2.85	1.64	2.05	1.52
Percentage of critical winter range within a 200 meter "zone of influence" of all routes[1,2]	29.85 %	41.96 %	29.71 %	32.83 %	27.03 %

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.
[2] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 are less than the miles of open routes under Alternative 3.

SUMMARY OF EFFECTS

Mule deer populations are stable to slightly decreasing throughout the project area (CDFG 1980, CDFG 1981, CDFG 1984). The direct and indirect effects of the project alternatives (1, 2, 3, 4 and 5) combined with the cumulative effects would likely result in impacts to some individuals but would not likely impact populations within the project area. As described in the project MIS report, project alternatives may affect habitat quality but will not alter the existing habitat trend, nor will it lead to a change in the distribution of mule deer across the Sierra Nevada bioregion (project record). As can be

seen from Table 3.11-35, of the alternatives, Alternative 5 would have the least negative impact on the species.

Table 3.11-35 Ranking of Alternative Indicators (mule deer)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Summer Concentration					
Miles of routes within summer concentration areas[2,3]	3	1	5	2	4
Density of all routes (mi/mi^2) within summer concentration areas[2,3]	3	1	5	2	4
Percentage of summer concentration areas within a 200 meter "zone of influence" of all routes[2,3]	3	1	5	2	5
Critical Summer					
Miles of routes within critical summer range[2,3]	3	1	4	2	5
Density of all routes (mi/mi^2) within critical summer range[2,3]	3	1	4	2	5
Percentage of critical summer range within a 200 meter "zone of influence" of all routes[2,3]	3	1	4	3	5
Winter Concentration					
Miles of routes within winter concentration areas[2,3]	3	1	4	2	5
Density of all routes (mi/mi^2) within winter concentration areas[2,3]	3	1	4	2	5
Percentage of winter concentration areas within a 200 meter "zone of influence" of all routes[2,3]	3	1	4	2	5
Critical Winter					
Miles of routes within critical winter range[2,3]	3	1	4	2	5
Density of all routes (mi/mi^2) within critical winter range[2,3]	3	1	4	2	5
Percentage of critical winter range within a 200 meter "zone of influence" of all routes[2,3]	3	1	4	2	5
Average	**3.00**	**1.00**	**4.25**	**2**	**4.83**

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2] Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes known at the time the data base was last updated and routes where this is no public right-of-way.
[3] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 is less than the miles of open routes under Alternative 3.

Riparian Associated Species

Bald Eagle – Affected Environment

Species and Habitat Account

The bald eagle is a large raptor that is found throughout North America. Down-listed from Endangered to a Sensitive species, the bald eagle has experienced range wide population increases since a nationwide ban on the use of DDT, a pesticide which causes eggshell thinning and low reproductive success. Bald eagles are strongly associated with large riparian areas since their primary prey species are waterfowl and fish. On the Stanislaus National Forest, bald eagles are commonly seen wintering along numerous bodies of water including the following: Beardsley Reservoir, Cherry Lake, and Lyons Lake. The Stanislaus National Forest has four bald eagle management areas and two known nest sites. Neither of the nest sites are within the designated bald eagle management areas, but are located near the bald eagle management areas on the shores of Beardsley Reservoir and Cherry Lake. Two other areas that may provide suitable nesting habitat for bald eagles are Salt Springs Reservoir and Lyons Lake. Bald eagles have been observed at both of these locations, but despite numerous surveys nesting has never been documented.

Bald Eagle – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the bald eagle. Although thresholds for these indicators

have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Net change from existing NFTS in miles of routes within Designated Territories.
- Net change from existing NFTS in miles of routes within 660 feet of nest sites.
- Net change from existing NFTS in miles of routes within 400 meters (0.25 mile) of lakes/reservoirs used for foraging.

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the bald eagle through the following activities:

- Prohibiting cross country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on bald eagles through the following: human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: In general, the road and trail-associated factors related to human-caused mortality that have been identified for the bald eagle include poaching (Skagen et al. 1991, Stalmaster and Newman 1978).

Changes in Behavior: In general, the road and trail-associated factors related to changes in behavior that have been identified for the bald eagle include disturbance at specific sites (nests and roost sites), and avoidance and displacement (Skagen et al. 1991, Stalmaster and Newman 1978). Individuals will show different thresholds of tolerances for disturbance, but are particularly vulnerable during the breeding season. Several studies reported that eagles avoid or are adversely affected by human disturbance during the breeding period and such disturbance may result in nest abandonment and reproductive failure (Stalmaster and Newman 1978, Andrew and Mosher 1982, Fraser 1985, Fraser et al. 1985, Knight and Skagen 1988, Buehler et al. 1991, Grubb and King 1991, Grubb et al. 1992, Chandler et al. 1995, Grubb 1995, Trombulak and Frissell 2000). Although disturbance has been shown to adversely affect nesting bald eagles, individual pairs of bald eagles may be more tolerant to disturbance. For example, the Tahoe National Forest documented a bald eagle nest, in 2005, near a county road that was used to access a popular reservoir. A similar case has been documented on the Stanislaus National Forest where the pair continues to successfully reproduce.

Adding routes to the NFTS or converting ML1 roads to trails may result in increased disturbance to nesting or foraging bald eagles. To reduce disturbance to nesting bald eagles, land management agencies typically implement restrictions on certain activities within a specified distance (buffer) of nests. Recommended buffers around nests have typically varied between 100 and 800 meters (approximately 330 and 2,620 feet [1/2 mile]) (Anthony and Isaacs 1989, Fraser et al. 1985, McGarigal 1988, USDI 2007). Latest recommendations from USFWS (USDI 2007) suggest 660 feet where there is increased visibility and exposure to noise. To minimize disturbance to foraging bald eagles routes motorized vehicles use should be minimized or not allowed between nesting or roosting sites and foraging areas (USDI 2007).

Habitat Modification: Travel management and motorized activity may also indirectly affect bald eagles through impacts to potentially suitable roost or nest trees and to their prey base. Forest policy requires that hazard trees be removed along roads for public safety, often resulting in a reduction of snags within a 60-meter (approximately 200-foot) zone along both sides of some NFTS roads. Hazard

tree removal along NFTS roads has the potential to reduce potential nest and roost sites for bald eagles. Hazard tree removal is typically conducted along ML2, 3, 4 and 5 roads (not trails or ML1 roads). Closures that are proposed on ML1 and 2 roads within any of the project alternatives would result in a reduction in miles of road on which hazard trees may be removed. On the other hand, opening roads currently closed (converting ML1 routes to ML2) would result in an increase in miles of road on which hazard trees may be removed. The net amount of impact that the project alternatives may have on future hazard tree removal would be minor.

Although bald eagles are opportunistic foragers, their primary prey base is fish. Roads and trails may contribute sediment to nearby streams, thereby reducing the quantity and quality of fish spawning habitat. Although the action alternatives would result in some sedimentation to select drainages within the project area, the primary foraging areas for bald eagles in the project area are lakes and reservoirs. These lakes and reservoirs contain abundant populations of fish, which provide an adequate prey base for bald eagles. Sedimentation resulting from the action alternatives would result in an immeasurable decrease in fish populations associated with bald eagle foraging.

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within Designated Territories, near nest sites, and near foraging areas. This would reduce the risk of direct and indirect effects to bald eagles from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-36). Actions proposed in this alternative would not likely result in any human-caused mortality, but would likely increase disturbance to bald eagles within the project area. This alternative would result in a net increase over the existing NFTS of approximately 1.73 miles within 400 meters (0.25 mile) of bald eagle foraging areas. This change would likely result in disturbance to some individual eagles, but would not likely result in impacts to populations within the project area over the short or long-term.

Actions proposed in this alternative would not likely result in any indirect effects to bald eagles through habitat modification. These actions would not result in any adverse impacts to available roost or nest sites nor would they measurably impact the bald eagles' prey base.

Season of Use: Although the exact timing may vary, bald eagles may start nesting in late winter into early spring. Bald eagle nest sites and foraging areas are located within Zone 2 and Zone 3 (as identified for each route in Appendix I) of the seasonal closure. These closures would reduce disturbance to over-wintering individuals and bald eagle pairs during the early portion of their nesting season.

Table 3.11-36 Alternative 1: Direct and Indirect Effects Indicators (bald eagle)

Indicators	
Net change from existing NFTS in miles of routes within Designated Territories[1]	0
Net change from existing NFTS in miles of routes within 660 feet of nest sites[1]	0
Net change from existing NFTS in miles of routes within 400 meters (0.25 mile) of lakes/reservoirs used for foraging [1]	+ 1.73

[1]Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])

Mitigation Measures: Mitigation measures would not be implemented near any bald eagle nest sites or within any Designated Territories. The only types of mitigation measures that would be implemented near reservoirs used for foraging are tread hardening and drain dips. Implementation of these mitigation measures would include hand tool and machine work that may result in short-term disturbance to individual foraging eagles within the project area. This amount of disturbance would

not likely reduce any individual bald eagle's fitness and would not result in any population level impacts within the project area. The proposed mitigation measures are designed to reduce sedimentation, which could improve habitat for the bald eagle's prey (fish).

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. Approximately 90,500 acres of foraging habitat, the area within all of the bald eagle territories, and the area within 660 feet of the two known nests are open to cross country travel.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to bald eagles. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes. In addition, creation of new routes could alter habitat through the removal of vegetation.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to bald eagles.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. There would be no opportunity to reduce sedimentation to streams.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within Designated Territories, near nest sites, and near foraging areas. This would reduce the risk of direct and indirect effects to bald eagles from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to bald eagles.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. There would be no opportunity to reduce sedimentation to streams.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within Designated Territories, near nest sites, and near foraging areas. This would reduce the risk of direct and indirect effects to bald eagles from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-37). Direct and indirect effects of the actions proposed in this alternative would be the same as those discussed in Alternative 1.

Season of Use: Although the exact timing may vary, bald eagles may start nesting in late winter into early spring. Bald eagle nest sites and foraging areas are located within Zone 2 and Zone 3 (as identified for each route in Appendix I) of the seasonal closure. These closures would reduce disturbance to over-wintering individuals and bald eagle pairs during the early portion of their nesting season.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-37 Alternative 4: Direct and Indirect Effects Indicators (bald eagle)

Indicators	
Net change from existing NFTS in miles of routes within Designated Territories[1]	0
Net change from existing NFTS in miles of routes within 660 feet of nest sites[1]	0
Net change from existing NFTS in miles of routes within 400 meters (0.25 mile) of lakes/reservoirs used for foraging[1]	+ 1.73

[1]Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes within Designated Territories, near nest sites, and near foraging areas. This would reduce the risk of direct and indirect effects to bald eagles from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-38). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a decrease from Alternative 1 in the number of routes added to the system or converted to a trail near foraging habitat, there would be a decrease in the direct effects to bald eagles within the project area. These impacts would affect a very small percentage of foraging habitat. Thus, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Season of Use: Although the exact timing may vary, bald eagles may start nesting in late winter into early spring. Bald eagle nest sites and foraging areas are located within Zone 2 and Zone 3 (as identified for each route in Appendix I) of the seasonal closure. These closures would reduce disturbance to over-wintering individuals and bald eagle pairs during the early portion of their nesting season.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-38 Alternative 5: Direct and Indirect Effects Indicators (bald eagle)

Indicators	
Net change from existing NFTS in miles of routes within Designated Territories[1]	0
Net change from existing NFTS in miles of routes within 660 feet of nest sites[1]	0
Net change from existing NFTS in miles of routes within 400 meters (0.25 mile) of lakes/reservoirs used for foraging [1]	+ 0.56

[1]Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])

CUMULATIVE EFFECTS

Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the Stanislaus National Forest and private lands within the Forest boundary. Some, but not all, of these

activities will contribute to effects upon bald eagles. The primary risks to the bald eagles have been identified as the following: (1) ingestion of poisonous substances; (2) collision with stationary or moving structures or objects; (3) degradation of wintering or breeding habitat through human development or habitat alteration; and (4) disturbance at nest and roost sites (USDI 2007; Zeiner et al. 1990a).

On the Stanislaus National Forest, increasing recreation use and associated disturbances at reservoirs, and habitat alteration associated with fuels reduction projects, are the primary factors influencing bald eagles or their habitat. Recreation disturbance at known nest locations has been limited through the use of area closures, but boating and campground activity may result in some degree of habitat avoidance by foraging eagles, or may result in avoidance of potential nesting habitats. Reservoirs on the Stanislaus National Forest vary in size, but typically provide large areas of undisturbed habitat due to the surrounding topography. Since fuels reduction projects are not removing large trees or snags, they are generally not reducing the quality of nesting habitat, and treatments are expected to make habitat more sustainable in the event of a wildfire.

Table 3.11-39 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. The direct and indirect effects of the project alternatives contribute to two of the four risk factors described above. Alternative 2 has the greatest potential to result in disturbance to nesting and foraging bald eagles since cross country travel would not be prohibited and vehicles could potentially gain access near foraging areas and nest sites. Since the action alternatives would only result in small amounts of route near foraging areas and nest sites, they would only have very minor impacts to individual foraging bald eagles within the project area. The effects of the action alternatives when combined with the effects of current and future recreation activities may result in minor adverse cumulative effects to some individuals and would not likely measurably impact populations.

Table 3.11-39 Drivable Routes in bald eagle habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of routes within Designated Territories[1]	3.40	4.41	3.38	3.40	3.38
Miles of routes within 660 feet of nest sites[1]	0.57	0.57	0.56	0.57	0.56
Miles of routes within 400 meters of lakes/reservoirs used for foraging[1]	26.64	32.52	24.38	26.64	24.94

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.

SUMMARY OF EFFECTS

Bald eagle populations are estimated to be increasing range-wide (USDA 2007c). The direct and indirect effects of the project alternatives (1, 2, 3, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. As can be seen from Table 3.11-40, of the alternatives, Alternative 5 would have the least negative impact on the species. For further discussion of the analysis and determinations, see the BA/BE (project record).

Table 3.11-40 Ranking of Alternative Indicators (bald eagle)

Indicators	Rankings by Alternatives[1]				
	1	2	3	4	5
Miles of routes within Designated Territories[2]	3	1	5	3	5
Miles of routes within 660 feet of nest sites[2]	2	2	5	2	5
Miles of routes within 400 meters of lakes/reservoirs used for foraging[2]	3	1	5	3	4
Average	**2.67**	**1.33**	**5.00**	**2.67**	**4.67**

[1]A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2]Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes known at the time the data base was last updated and routes where this is no public right-of-way.

Great Gray Owl – Affected Environment

Species and Habitat Account

The great gray owl is a large nocturnal owl that is not easily observed. It is found in the boreal climatic zones of North America from Alaska to central California (Franklin 1988). The population that inhabits California represents the southern extent of its range (van Riper III and Wagtendonk 2006). Yosemite National Park and the Stanislaus National Forest currently represent the core range of the great gray owl in California. There are currently 21 documented great gray owl PACs on the Stanislaus National Forest, which are primarily located on the southern portion of the Forest. Great gray owl PACs are defined as "at least 50 acres of the highest quality nesting habitat available in the forested area surrounding nests and the meadow or meadow complex that support a prey base for the nesting owls" (USDA 2004). Although there are 21 designated PACs within the project area, activity centers have only been designated for 12 of them. PACs that do not currently have a designated activity center have not had any documented activity for a significant period of time. Activity centers for the PACs may not necessarily be nest sites, but may be the location of a roost site or territorial call. This data may vary in its accuracy, but it is currently considered the best available information and provides a means by which to evaluate the relative impacts of each of the project alternatives.

Great gray owls are found in mixed conifer forests, but are highly dependent upon meadows for foraging habitat (Winter 1981). A radio telemetry study in and around Yosemite National Park found that over 80% of the owl relocations were within 200 meters (approximately 650 feet, or $^{1}/_{8}$ mile) of meadows (Winter 1982). For this analysis, great gray owl emphasis habitat will be defined as meadows greater than 15 acres that are within 5 miles of existing PACs. Since great gray owls have been found to prefer areas within 200 meters of meadows, a 200 meter buffer will be applied to these meadows and included in the emphasis habitat. The results of this habitat delineation indicated that there are approximately 3,077 acres of meadows and a total of approximately 13,971 acres of emphasis habitat (includes buffer acres) within the project area.

Great Gray Owl – Environmental Consequences

Indicators

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

- Net change from existing NFTS in miles of routes within great gray owl PACs
- Net change from existing NFTS in number of great gray owl PACs affected by NFTS routes (Percentage of all PACs in Project Area)
- Net change from existing NFTS in miles of routes within 400 meters of documented great gray owl activity centers
- Net change from existing NFTS in miles of routes within great gray owl emphasis habitat

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the great gray owl by through the following activities:

- Prohibiting cross country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on owls through the following: human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: Collisions with motor vehicles have been documented in several locations and have been a significant source of trauma and mortality in some areas (Lopes et al. 2007, USDA 2004). The Cascades Raptor Center (2007) reported that collisions with vehicles "was the greatest cause of mortality" in great gray owls. There have been at least two reported collisions near the project area on Highways 120 and 140. Collisions with vehicles typically occur along well-maintained roadways that allow high rates of travel. Routes proposed for designation within the project alternatives are native surfaced routes that allow much slower rates of travel. These types of routes would result in far fewer, if any, collisions.

Changes in Behavior: Although there is very little documented information regarding disturbance from human activity to great gray owls, it will be assumed that great gray owls would respond to noise and human disturbance in much the same way as other owls. Therefore, changes in behavior are anticipated to be similar to those discussed in the California spotted owl analysis. The Forest Service, Region 5, has generally assumed that activities (including road and trail use) occurring farther than 0.25 miles from California spotted owl nest sites have little potential to affect spotted owl nesting (USDA 2004). The miles of routes that will be added to the NFTS with 0.25 miles of great gray owl activity centers have been determined for each of the alternatives. Although activity centers have not been documented for each of the PACs and all of the activity centers may not be known nest sites, this analysis will serve as an indicator of the amount of disturbance that may occur to nest sites.

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

Changing the faunal community within meadows may impact quantity and quality of great gray owl foraging. Two species that have been noted as being important prey items to great gray owls are microtines and pocket gophers (Franklin 1988, Winter 1981, Winter 1982). Winter (1981 and 1982) found that microtines may be a preferred prey item for great gray owls in the Sierra Nevada area and may be essential for successful reproduction. He further suggested that *Microtus* were also associated with moist areas that had good grass cover. Therefore, slight shifts in meadow hydrology caused by motorized travel may impact suitable habitat for mictrotines, thereby potentially adversely affecting the quantity and quality of great gray owl prey.

Roads and trails modify nesting and roosting habitat by directly removing it or indirectly by reducing its quality. While simple habitat loss is the most obvious, roads and trails also reduce habitat quality through fragmentation.

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near great gray owl activity centers, PACs, and emphasis habitat. This would reduce the risk of direct and indirect effects to the great gray owl from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-41). Alternative 1

would result in the addition of 0.44 miles of motorized routes to 2 great gray owl PACs (Crocker Meadow and Ackerson 3) and 0.24 mile of routes converted from closed to open status in two PACs (Crocker Meadow and Jordan Valley). There would be a total of 0.24 mile of routes added within 400 meters of three Activity Centers and 0.13 mile of routes converted from closed to open status within 400 meters of one Activity Center. The Crocker Meadow PAC has great gray owl activity almost every year. Great grays nested there in 2007. Although the Ackerson 3 PAC has not had any recently documented activity, great gray owls use the entire Ackerson Meadow complex. Great gray owls have been seen at the Jordan Valley PAC in the fall and spring, but, in recent years, not during the breeding season. This alternative would result in disturbance to some individual great gray owls within the project area. Disturbance resulting from this alternative would not likely be substantial enough to reduce any individual owl's fitness. Therefore, it would not result in any population level impacts to the great gray owl.

Field surveys were completed on the routes that are proposed to be added to the NFTS within the PACs. The route that was proposed to be added within the Crocker Meadow PAC does not cross any streams, nor does it enter the meadow. Therefore, the addition of this route to the NFTS would not have significant impacts to the hydrology of the meadow. One of the routes that were proposed to be added to the NFTS within the Ackerson 3 PAC crosses a small unnamed tributary to Ackerson Creek. The route and the crossing are not within the meadow. The addition of this route would not likely result in significant impacts to the hydrology of the meadow complex. If GIS analysis indicated that a route proposed for addition to the NFTS within great gray owl emphasis habitat crossed a stream, a field survey was completed on the route. The GIS analysis indicated that there were two routes (FR98514 and FR98486) within great gray owl emphasis habitat that crossed streams. After completing field surveys on these routes, it was determined that they would not result in any adverse impact to the hydrology of the meadows (see 3.10 Water and RCO Analysis in project record). However, some routes were identified as needing mitigation to improve hydrologic conditions. Effects of the mitigation measures on this species are discussed below.

Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. The loss of habitat from these routes has already occurred. Because no new routes are being proposed for construction, there would be little change in the amount of habitat or on habitat fragmentation. Vegetation along unauthorized routes that are not added to the NFTS or existing NFTS routes that would be closed would, over time, grow into the road. So there would be a minor increase in habitat quantity and a decrease in fragmentation.

Season of Use: Although the exact timing may vary, great gray owls start nesting near the month of March. Since seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period and approximately 90% of the great gray owl PACs would be within these Zones, these closures would reduce disturbance to those individuals returning to their breeding territories and starting to nest. The season of use would not apply to WOS routes (see Table 2.02-2), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Table 3.11-41 Alternative 1: Direct and Indirect Effects Indicators (great gray owl)

Indicators	
Net change from existing NFTS in miles of routes within great gray owl PACs[1]	+ 0.69
Net change from existing NFTS in number of great gray owl PACs affected by NFTS routes (Percentage of all PACs in Project Area)	+ 3 (+ 14%)
Net change from existing NFTS in miles of routes within 400 meters of documented great gray owl activity centers[1]	+ 0.37
Net change from existing NFTS in miles of routes within great gray owl emphasis habitat[1]	+ 2.39

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])

Mitigation Measures: The only type of mitigation measure that would be implemented within PACs is no-dig barriers. There would not be any mitigation measures implemented within 400 meters (0.25 mile) of activity centers. The installation of no-dig barriers would be completed with hand tools and would not likely result in any disturbance to owls within the PAC. The proposed mitigation measures would in the long term improve hydrologic conditions, and therefore meadow habitat.

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. All great gray owl PACs and approximately 12,900 acres of emphasis habitat are currently open to cross country travel.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to great gray owls. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to great gray owls.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to hydrologic conditions in meadows would continue on routes identified as needing mitigation, causing a potential degradation of meadow habitat.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near great gray owl activity centers, PACs, and preferred habitat. This would reduce the risk of direct and indirect effects to the great gray owl from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to great gray owl.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to hydrologic conditions in meadows would continue on routes identified as needing mitigation, causing a potential degradation of meadow habitat.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near great gray owl activity centers, PACs, and emphasis habitat. This would reduce the risk of direct and indirect effects to the great gray owl from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-42). Direct and

indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. There would be an additional 1.76 miles of routes added to the NFTS within great gray owl emphasis habitat. GIS analysis indicated that this route would not cross any streams nor would it impact the hydrology of the meadow.

Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. The loss of habitat from these routes has already occurred. Because no new routes are being proposed for construction, there would be little change in the amount of habitat or on habitat fragmentation. Vegetation along unauthorized routes that are not added to the NFTS or existing NFTS routes that would be closed would, over time, grow into the road. So there would be a minor increase in habitat quantity and a decrease in fragmentation.

Season of Use: Although the exact timing may vary, great gray owls start nesting near the month of March. Since seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period and approximately 90% of the great gray owl PACs would be within these Zones, these closures would reduce disturbance to those individuals returning to their breeding territories and starting to nest. The season of use would not apply to WOS routes (see Table 2.02-2), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-42 Alternative 4: Direct and Indirect Effects Indicators (great gray owl)

Indicators	
Net change from existing NFTS in miles of routes within great gray owl PACs[1]	+ 0.69
Net change from existing NFTS in number of great gray owl PACs affected by NFTS routes (Percentage of all PACs in Project Area)	+ 3 (+ 14%)
Net change from existing NFTS in miles of routes within 400 meters of documented great gray owl activity centers[1]	+ 0.37
Net change from existing NFTS in miles of routes within great gray owl emphasis habitat[1]	+ 2.54

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near great gray owl activity centers, PACs, and emphasis habitat. This would reduce the risk of direct and indirect effects to the great gray owl from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-43). This alternative would not result in the addition of any routes to the NFTS within great gray owl PACs, within 400 meters (0.25 mile) of Activity Centers, or within emphasis habitat. The net changes would be a reduction in miles of routes within PACs and within 400 meters of Activity Centers, and a reduction in the number of PACs affected, from the existing NFTS.

Season of Use: Although the exact timing may vary, great gray owls start nesting near the month of March. Since seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period and approximately 90% of the great gray owl PACs would be within these Zones, these closures would reduce disturbance to those individuals returning to their breeding territories and starting to nest.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-43 Alternative 5: Direct and Indirect Effects Indicators (great gray owl)

Indicators	
Net change from existing NFTS in miles of routes within great gray owl PACs[1]	-- 0.23
Net change from existing NFTS in number of great gray owl PACs affected by NFTS routes (Percentage of all PACs in Project Area)	-- 1 (-- 5%)
Net change from existing NFTS in miles of routes within 400 meters of documented great gray owl activity centers[1]	-- 0.52
Net change from existing NFTS in miles of routes within great gray owl emphasis habitat[1]	+ 0.10

[1] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS miles of routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])

CUMULATIVE EFFECTS

Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the Stanislaus National Forest and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects upon great gray owls. Factors responsible for low numbers of great gray owls breeding in the Sierra Nevada are not fully known. During the past century, the widespread removal of large trees from mature and old growth forest has reduced the abundance of potential nest trees. Fire suppression has allowed meadow foraging habitats to decrease in size, and livestock grazing has altered meadow hydrology, potentially reducing prey abundance (Verner 1994).

Livestock grazing occurs on 35 active grazing allotments on the Stanislaus National Forest, totaling approximately 792,042 acres of NFS and private lands. In some meadows, livestock grazing has reduced the suitability of meadow vegetation for microtine rodents and other great gray owl prey (USDA 2001). On the Stanislaus National Forest, the impacts of livestock grazing on meadows is variable between years, but has been steadily decreasing as forage utilization levels are being reduced by stricter standards established by the SNFPA. Furthermore, some meadows within PACs are protected by grazing exclosures designed to reduce the impacts of grazing and improve cover for great gray owl prey. Although improvements have been made, livestock grazing has historically and may continue to have cumulative effects on cover for great gray owl prey within meadows in the project area.

Forest vegetation/fuels thinning projects (designed to reduce the risk of additional habitat loss to wildfires) have affected great gray owl habitat, primarily through effects on nesting and roosting stands. CDF currently lists a total of 2,365 acres of private land within the Stanislaus National Forest administrative boundary for which timber harvest plans have been submitted. Timber harvest on private lands is generally more intensive and does not typically maintain nesting or roosting habitat suitability for great gray owls. These fuels treatment and timber harvest projects have resulted in reduction in the amount and quality of nesting and roosting habitat within the Stanislaus National Forest boundary.

Vegetation/fuels reduction projects will continue to be the primary activity affecting nesting and roosting habitat on the Stanislaus National Forest (Appendix B). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Although these treatments will degrade nesting and roosting habitat in the short term, it is anticipated that, over time, the amount of habitat removed in stand replacing wildfires will be reduced as a result of these treatments (USDA 2004c).

Recreation use has increased and is expected to continue to increase on the Stanislaus National Forest (see 3.04 Recreation Resources), resulting in greater likelihood and magnitude of human disturbance to wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation based upon State figures for OHV sales (see 3.04 Recreation Resources). The project alternatives would contribute to these past and current conditions with added displacement due to noise and human activity, and indirect effects to habitat. Approximately 5 miles of new trail construction, as well as numerous short route segments for dispersed camping access, have been proposed for the

future (separate from this project). These trails are proposed to provide "connector routes" between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes would be similar to those described under direct and indirect effects of the alternatives: changes in behavior; and habitat modification through loss of habitat and further fragmentation of habitat.

Table 3.11-44 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. Although human disturbance has not been recognized as a significant threat to great gray owls, the use of motorized vehicles in meadow habitats can have significant impacts to meadow hydrology and the associated flora and fauna. Disturbance in forested stands (nesting and roosting habitat) probably does have an effect on individuals. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would cause the most disturbance to individuals. Because this alternative does not restrict vehicles to designated routes, there is a high degree of uncertainty about future route proliferation in great gray owl habitat, foraging as well as nesting and roosting habitats, which may have disturbance and habitat effects beyond the effects of routes open to motorized use. Meadows in particular are often easily accessed by vehicles. Therefore, the direct and indirect effects of Alternative 2 and the effects of continued livestock grazing may have significant impacts to individuals. Although the population of great gray owls within the project area is not precisely known, it is known to be relatively small with a limited distribution. Impacts to meadows that may be associated with unabated cross country travel would likely impact enough individuals to result in measurable reductions to the population size within the project area.

The direct and indirect effects of motorized routes within habitat used by great gray owls in Alternatives 1, 3, 4 and 5, combined with the effects of past and continued livestock grazing, may adversely affect meadow habitats and associated species (as described above) and forested habitats. Since these alternatives would result in disturbance to only some individuals and would not further impact meadow hydrology, they would not likely result in impacts to any individual's fitness or to populations within the project area.

Table 3.11-44 Drivable Routes in great gray owl habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Miles of routes within PACs[1]	8.13	9.85	7.3	8.13	7.07
PACs intersected by all routes [1]	16	17	15	16	15
Percentage of PACs intersected by all routes[1]	76%	81%	71	76%	71%
Miles of routes within 400 meters of documented great gray owl activity centers[1]	9.07	11.19	8.66	9.07	8.14
Miles of routes within great gray owl emphasis habitat[1]	81.41	90.92	78.78	81.70	79.12

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.

SUMMARY OF EFFECTS

Since great gray owls have limited distribution within the project area and within the Sierra Nevada, population level impacts associated with Alternative 2 may result in a trend toward listing and may impact the viability of the species. The direct and indirect effects of the action alternatives (1, 3, 4 and 5) combined with the cumulative effects to habitat are not likely to result in a trend toward Federal listing or a loss of viability for the great gray owl. As can be seen from Table 3.11-45, of the alternatives, Alternative 5 would have the least negative impact on the species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Table 3.11-45 Ranking of Alternative Indicators (great gray owl)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Miles of routes within PACs[2,3]	3	1	4	3	5
PACs intersected by all routes[2,3]	3	1	5	3	5
Miles of routes within 400 meters of documented great gray owl activity centers[2,3]	3	1	4	3	5
Miles of routes within great gray owl emphasis habitat[2,3]	3	1	5	2	4
Average	**3.00**	**1.00**	**4.50**	**2.75**	**4.75**

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2] Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes known at the time the data base was last updated and routes where this is no public right-of-way.
[3]Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 is less than the miles of open routes under Alternative 3.

Aquatic Biota

Effects Common to all Aquatic Wildlife

Due to their limited distribution on the landscape and their life history requirements, most species of aquatic wildlife are similarly affected by motorized travel. Although Gaines et al. (2003) categorized the effects of recreation routes on “riparian species,” the effects to aquatic species are very similar and can be categorized in much the same way. Therefore, the effects of motorized travel on aquatic species may be categorized by human-caused mortality, changes in behavior, and habitat modification. Generally, site-specific studies on the species interaction with road- and trail-associated factors is lacking in the literature. Where site-specific information or literature on road- and trail-associated factors to aquatic species is unavailable, general information on potential impacts is presented. Additional information on the effects to the aquatic environment is presented in Chapter 3.10, Water Resources.

Human-Caused Mortality: Allowing cross country travel or adding routes to the NFTS may result in human-caused mortality to aquatic species in a variety of ways including the following: collisions, introduction of non-native species, parasites, or disease vectors. Collisions with vehicles have not only been documented in numerous different herpetofaunal species, they may be particularly vulnerable to it (Trombulak and Frissell 2000). Mass mortalities of several species of frogs during dispersal have been documented where roads intersect natal/breeding habitat and non-breeding foraging habitat (Hine et al. 1981, Fahrig et al. 1995). Mortality from vehicles can reduce population size and reduce movement between resources and conspecific populations (Carr and Fahrig 2001).Stream crossings are areas of particular concern for collisions. Although some stream crossings have culverts or bridges, fords or low-water crossings are very typical along trails. Some roads also have fords or low-water crossings. Locations of fords vary widely, but often occur along a relatively low gradient stretch of stream. When a ford is created in these areas, it often creates a small pool where different life history stages (fingerling fish or tadpoles) of some species may congregate. Increased densities of these species may result in higher rates of collisions. Some species may be more prone to crushing at crossings. However, numerous herpetofaunal species migrate from aquatic to terrestrial environments to complete their life histories. These species are even more vulnerable to motorized travel, because routes may parallel water bodies. Since herpetofaunal species tend to be slow-moving and may migrate across a motorized route that is near a water body, they may have a relatively higher risk of being crushed by vehicles.

Introduction of toxins, non-native organisms, parasites, and disease vectors are also ways in which motorized travel may result in human-caused mortality. When vehicles travel along a route near a stream or cross a stream at a ford, small amounts of toxins may be introduced to the environment. Although there is a low risk that individuals will be exposed to lethal levels of any of these toxins, small exposures may elicit immune responses within individuals. McCallum and Trauth (2007) found

that male northern cricket frogs in which immune responses were elicited had reduced fertility rates. Therefore, introduction of toxins at low levels may result in reduced reproductive fitness of some aquatic species.

The movement and introduction of non-native organisms, parasites, and disease vectors between water bodies has been recognized as a significant threat to numerous different aquatic species. When traveling roads or trails throughout the course of a day, a vehicle may cross numerous streams. When a vehicle crosses a stream through a low-water crossing or a ford it may capture soil and/or debris in the tread of the tires or on the body of the vehicle. Non-native organisms, parasites, and disease vectors may be captured in the soil and/or debris on the vehicle. When crossing subsequent streams, soil and/or debris may then be deposited, potentially spreading non-native organisms, parasites, and disease vectors between water bodies. The risk of adverse effects to individuals and populations is highly variable among species and will be discussed further below.

Changes in Behavior: Although it is not well documented in the literature, it is reasonable to assume that aquatic species may be affected by motorized vehicles through changes in behavior. The presence of routes results in increased access of vehicles and human visitors to aquatic species habitat. As with individuals of terrestrial species, individuals of aquatic species are likely to exhibit a predator avoidance response when they become disturbed by humans. Direct effects of disturbance to an individual's fitness are commonly measured through increases in stress hormone levels. Significant increases in stress hormone levels have been found to reduce reproductive success of individuals of some species.

Indirect effects of disturbance are commonly displayed through changes in an individual's time and energy budget. As a vehicle or human approaches an individual, the most obvious and common disturbance response is for that individual to avoid the threat and seek cover. After an individual exhibits the disturbance response, a period of time will elapse until that individual resumes pre-disturbance behavior. Since this change in an individual's time budget may result in less time feeding or resting, the disturbance may result in changes to the individual's energy budget. If an individual is repeatedly disturbed in an area, they may avoid the area, essentially being displaced from the habitat. Significant changes to an individual's energy budget or displacement from its habitat may result in impacts to the individual's fitness. Rodriguez-Prieto and Fernandez-Juricic (2005) found that increases in disturbance from human visitation resulted in significant reductions in the use of stream banks by Iberian frogs. They further concluded that disturbance from recreational activities negatively affected Iberian frogs through spatial and temporal losses in resources.

Habitat Modification: Motorized travel may result in numerous different impacts to aquatic species habitat quality and quantity. Since many of these species are amphibians, they are acutely prone to changes in aquatic and adjacent terrestrial habitats. Alterations to terrestrial habitat may include, but are not limited to the following: direct reductions in cover (vegetative and underground), introductions of non-native plant species, and impacts to meadow hydrology. Alterations to aquatic habitat may include, but are not limited to the following: reductions in shade, increased water temperatures, increased sedimentation, and altered hydrology and geomorphology.

The transfer of sediment to streams and other water bodies at route crossings is 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). Various studies have demonstrated that sediment delivery to stream channels in a forested environment is correlated to road surface type, physical characteristics of the adjacent areas (e.g., litter depth, coarse wood), soils (erodibility), the steepness of slope below the road, and vehicle usage (Chin et al. 2004, Clinton and Vose 2003). The knowledge of the impact of increased sediment load on amphibians is limited (Gillespie 2002). However, the negative impacts of increased sediments on other aquatic species, including fish, macroinvertebrates, and periphyton, are well known (Power 1990, Newcombe

and MacDonald 1991, Waters 1995). High concentrations of suspended sediment may directly kill aquatic organisms and impair aquatic productivity (Newcombe and Jensen 1996). Egg survival may be impacted by roads and trails through increases in fine sediments. 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 decreasing 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 effects are heightened if the sediments contain toxic materials (Maxell and Hokit 1999). At least five different general classes of chemicals are transferred into the environment from maintenance and use of roads: heavy metals, salt, organic molecules, ozone, and nutrients (Trombulak and Frissell 2000). The changes to water chemistry by road runoff 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.

Roads can also influence both peak flows (floods) and debris flows (rapid movements of soil, sediment, and large wood in 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). Numerous frog species breed in streams which can be adversely affected by fluctuations in the frequency or magnitude of peak flows, thereby adversely affecting recruitment.

The amphibian species and habitat accounts below were summarized from Lannoo (2005). Additional references are cited to address specific elements of the species and habitat accounts for all species below.

California Red-legged Frog – Affected Environment

Species and Habitat Account

The California red-legged frog (CRLF) historically occurred from the California coast, throughout the Central Valley, and into the Sierra Nevada foothills. Currently, the CRLF occupies approximately 70% of their historic range and are primarily located in streams and wetlands in coastal drainages (71 FR 19244). There are no recent (<40 years) occurrences on the Stanislaus National Forest (USDI 2002). However, historic records for this species exist in the California Natural Diversity Data Base (CNDDB) at Jordan Pond (1967) and Woods Creek (1950). Herpetofauna surveys have occurred extensively throughout the Stanislaus National Forest, but surveys have used a generalized visual encounter method (Fellers and Freel 1995) and the majority has not been conducted according to the most recent CRLF protocol (USDI 2005), nor have they covered all aquatic habitat within the project area. Between 1995 and 2005, USFWS protocol-level surveys were conducted for CRLF within the project area in the following areas: Bull Creek (in Anderson Valley), Rush Creek, Jordan Pond, Bean Creek, and Smith Creek. Despite significant survey efforts, there have been no recent observations of the CRLF within the project area. Although there have not been any observations of the CRLF in the project area, all suitable habitat has not been surveyed within the last two years to the most recent protocol (USDI 2005). The FWS, in the recovery plan for the CRLF (USDI 2002), stated that, for the South Fork of the Calaveras River and the Tuolumne River, in both of which drainages the Stanislaus National Forest partially lays, “Extirpated [the CRLF] but represents historic range.” In the Federal Register addressing proposed designation of critical habitat for this species (Federal Register 2004), the FWS stated, “. . . this unit [the Yosemite Unit, which consists of drainages found in the tributaries of the Tuolumne River and Jordan Creek, a tributary to the Merced River, in Tuolumne and Mariposa Counties, and includes National Forest System lands on the Stanislaus National Forest] is currently

considered unoccupied." This analysis takes a conservative approach in assuming that there is a low possibility that suitable habitat is occupied.

The CRLF is a highly aquatic species typically found in cold water ponds and stream pools with depths exceeding 0.7 meters (approximately 2.3 feet) and with overhanging vegetation such as willows, as well as emergent and submergent vegetation (Hayes and Jennings 1988). Suitable habitat on the forest is defined as areas on the landscape that meet the definition of a primary constituent element (PCE) as defined in Federal Register and is comprised of aquatic breeding habitat, non-breeding aquatic habitat, upland habitat, and dispersal habitat. Aquatic habitat consists of low-gradient fresh water bodies, including natural and manmade ponds, and backwaters within streams and creeks. Non-breeding aquatic habitat consists of the aquatic habitat elements identified above, and also includes, but is not limited to, other wetland habitats such as intermittent creeks, seeps, and springs. Upland habitat consists of natural areas within 60 meters of the edge of the riparian vegetation or dripline, or the edge of the watershed boundary, whichever is closer. Dispersal habitat consists of upland and riparian habitat contiguous with breeding and nonbreeding aquatic habitat, that is free of barriers, and, that connects two or more patches of aquatic breeding habitat within 0.7 mi of one another (71 FR 19244).

California Red-legged Frog – Environmental Consequences

Indicators

To assist with the Travel Management Planning process, Region 5 USFS entered into programmatic consultation with the USFWS for motorized vehicle route designation. On December 27, 2006, the USFWS issued a Letter of Concurrence for 14 National Forests in California, including the Stanislaus National Forest. The Letter of Concurrence approved the Project Design Criteria (PDC) as outlined in the document entitled "Route Designation: Project Design Criteria for 'No Effect' or 'May Affect Not Likely to Adversely Affect' Determination for TE Species – October 2006 version 1". If the routes proposed for designation follow the PDC, no further consultation with the USFWS is required. Based upon these PDC and upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the CRLF. Although biological thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

- Number of additional routes that have the potential to capture surface run-off and then deliver sediment into a stream associated with the CRLF.
- Number of additional routes that do not avoid Riparian Reserve (RR) and RCAs except where necessary to cross streams.
- Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat.
- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within 300 feet of suitable aquatic habitat.
- Net change from existing NFTS in miles of routes within dispersal habitat.

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the CRLF through the following activities:

- Prohibiting cross country travel off of the NFTS,

- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on CRLFs through the following: human-caused mortality, changes in behavior, and habitat modification (see Effects Common to all Aquatic Wildlife). Furthermore, these frogs may be more prone to the effects of motorized travel because they utilize upland habitats, frequently at considerable distances from aquatic features. Bulger et al. (2003) and Fellers and Kleeman (2007) reported terrestrial movements up to 1.7 miles before and after the breeding period as adults dispersed into other non-breeding aquatic habitats. Fellers and Kleeman (2007) also reported that a large portion of the population (35%) can move during single rainfall events and a majority of all frogs in a population migrate during the breeding season. The CRLF can also move in excess of 150 yards from aquatic habitat to seek cover in upland habitats and remain for up to three weeks (Bobzien and DiDonato 2007).

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally-created routes near suitable CRLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-46). This alternative would result in the addition to the NFTS of several routes with 20 stream crossings within suitable CRLF habitat. These stream crossings would likely result in direct and indirect effects to some individuals of all CRLF life history stages. The addition of routes to the NFTS and conversion of roads to trails within 300 feet of suitable aquatic habitat may result in direct effects to some juvenile and adult frogs and indirect effects to all life history stages. The addition of routes to the NFTS and conversion of roads to trails within dispersal areas may also result in direct effects to some adults dispersing between breeding sites.

Table 3.11-46 Alternative 1: Direct and Indirect Effects Indicators (California red-legged frog)

Indicators	
Additional routes which may capture surface run-off and then deliver sediment into a stream associated with the CRLF	+ 7
Additional routes that do not avoid RCAs except where necessary to cross streams	+ 12
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 24
Net change from existing NFTS in miles of routes within 300 feet of suitable aquatic habitat[2]	+ 4.21
Net change from existing NFTS in miles of routes within dispersal habitat[2]	+ 2.30

[1] Number of crossings from routes added to the NFTS PLUS number of crossings from routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS number of crossings from routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status MINUS miles of routes converted from open to closed status

There are 12 routes proposed as additions under this alternative that don't follow the PDC for the red-legged frog. The following table shows those routes, and indicates which of the PDC they don't meet. As can be seen from the table, none of the routes listed comply with PDC 2. They do not avoid RCAs, and they aren't necessary to cross streams. (Riparian Reserves is not a land designation category used on the Stanislaus National Forest.) The total miles of routes proposed to be added to the system in RCAs are 2.86 miles. This would be a minor addition to the total mileage within RCAs if this alternative were implemented (318.87 miles—this mileage includes the routes that are necessary to cross streams).

Table 3.11-47 Route compliance with USFWS PDC for the California red-legged frog

Route Number	Length	Mitigation	PDC Number[1]	
			1[2]	2[3]
17EV192	0.63	Y	N	N
17EV192A	0.06	N	N	N
17EV192B	0.15	Y	N	N
17EV194	0.39	Y	N	N
1S17M	1.13	Y	N	N
FR98508	0.06	N	Y	N
FR98509	0.03	N	Y	N
FR98510	0.04	N	Y	N
FR98511	0.15	N	Y	N
FR98514	0.04	Y	Y	N
FR98566	0.05	N	Y	N
FR98575	0.13	Y	N	N

[1] "Y" indicates that the route complies with the specified Project Design Criterion (PDC). "N" indicates that the route does not comply with the specified PDC.
[2] PDC 1: Unauthorized routes or areas proposed for designation do not have the potential to capture surface run-off and then deliver sediment into a stream associated with the CRLF.
[3] PDC 2: In suitable CRLF habitat, unauthorized routes proposed for designation avoid Riparian Reserve (RR) and Riparian Conservation Areas (RCAs) 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.

Six routes don't comply with PDC 1. In their present condition, they have the potential to capture surface run-off and then deliver sediment into a stream that provides habitat for the red-legged frog. It was determined that one of these routes (17EV192A) did not need mitigation to reduce the amount of sediment that might enter the stream. The route is 0.06 mile in length. Five of these routes would have mitigation measures implemented to reduce the amount of sediment that might enter the associated stream.

The proposed additions to the system would have very little effect on red-legged frog habitat, and are therefore unlikely to adversely affect the species.

Season of Use: The CRLF primarily inhabits lower elevations throughout its range and are not known to overwinter or enter into torpor. Suitable habitat within the project area is located within Zone 1 and Zone 2 of the seasonal closures (as identified for each route in Appendix I). Since Zone 1 is open to year-round use, there would not be any beneficial impacts to the CRLF or its habitat within this zone. Since breeding typically occurs in late winter and early spring, restrictions on the season of use within Zone 2 would likely reduce direct effects to breeding adults and those that may be migrating between breeding sites. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and subsequent sedimentation routing into streams associated with all life history stages of the CRLF.

Mitigation Measures: Types of mitigation measures proposed on routes associated with suitable CRLF habitat include the following: barriers, tread hardening, drain dips, and hardened stream crossings. The installation of a hardened stream crossing would likely result in a short-term increase in sedimentation which may impact some individuals. The installation of all mitigation measures may result in short-term disturbance to some individual frogs, but will limit trail widening, reduce soil perturbation, and reduce sedimentation, providing beneficial effects over the long term.

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. All suitable red-legged frog habitat on NFS lands is currently open to cross country travel.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to these frogs. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to individual frogs.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to stream conditions would continue on routes identified as needing mitigation, causing a potential degradation of habitat.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable CRLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the CRLF.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to stream conditions would continue on routes identified as needing mitigation, causing a potential degradation of habitat.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near suitable CRLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-48). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within 300 feet of suitable aquatic habitat, there would be a slight increase in the direct and indirect effects to these frogs' habitat within the project area.

The same 12 routes proposed as additions under Alternative 1 that don't follow the PDC for the red-legged frog are proposed under Alternative 4 (see Table 3.11-47). As can be seen from that table, none of the listed routes comply with PDC 2. They do not avoid RCAs, and they aren't necessary to cross streams. (Riparian Reserves is not a land designation category used on the Stanislaus National Forest.) The total miles of routes proposed to be added to the system in RCAs are 2.86 miles. This would be a minor addition to the total mileage within RCAs if this alternative were implemented (326.69 miles—this mileage includes the routes that are necessary to cross streams).

The proposed additions to the system would have very little effect on red-legged frog habitat, and are therefore unlikely to adversely affect the species.

Table 3.11-48 Alternative 4: Direct and Indirect Effects Indicators (California red-legged frog)

Indicators	
Additional routes which may capture surface run-off and then deliver sediment into a stream associated with the CRLF	+ 7
Additional routes that do not avoid RCAs except where necessary to cross streams	+ 12
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 25
Net change from existing NFTS in miles of routes within 300 feet of suitable aquatic habitat[2]	+ 5.30
Net change from existing NFTS in miles of routes within dispersal habitat[2]	+ 2.56

[1] Number of crossings from routes added to the NFTS PLUS number of crossings from routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS number of crossings from routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])
[2] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status MINUS miles of routes converted from open to closed status

Season of Use: The CRLF primarily inhabits lower elevations throughout its range and are not known to overwinter or enter into torpor. Suitable habitat within the project area is located within Zone 1 and Zone 2 of the seasonal closures (as identified for each route in Appendix I). Since Zone 1 is open to year-round use, there would not be any beneficial impacts to the CRLF or its habitat within this zone. Since breeding typically occurs in late winter and early spring, restrictions on the season of use within Zone 2 would likely reduce direct effects to breeding adults and those that may be migrating between breeding sites. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and subsequent sedimentation routing into streams associated with all life history stages of the CRLF.

Mitigation Measures: The types and effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near suitable CRLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-49). Routes added to the NFTS within this alternative would not likely result in disturbance or crushing of any individuals or contribute sediment to steams associated with the CRLF. Therefore, this alternative would not result in the addition of any routes to the NFTS that would have direct or indirect effects to the CRLF.

Season of Use: The CRLF primarily inhabits lower elevations throughout its range and are not known to overwinter or enter into torpor. Suitable habitat within the project area is located within Zone 1 and Zone 2 of the seasonal closures (as identified for each route in Appendix I). Since Zone 1 is open to year-round use, there would not be any beneficial impacts to the CRLF or its habitat within this zone. Since breeding typically occurs in late winter and early spring, restrictions on the season of use within Zone 2 would likely reduce direct effects to breeding adults and those that may be migrating between breeding sites. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and subsequent sedimentation routing into streams associated with all life history stages of the CRLF.

Mitigation Measures: The types and effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-49 Alternative 5: Direct and Indirect Effects Indicators (California red-legged frog)

Indicators	
Additional routes which may capture surface run-off and then deliver sediment into a stream associated with the CRLF	+ 7
Additional routes that do not avoid RCAs except where necessary to cross streams	+ 12
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	0
Net change from existing NFTS in miles of routes within 300 feet of suitable aquatic habitat[2]	0
Net change from existing NFTS in miles of routes within dispersal habitat[2]	0

[1] Number of crossings from routes added to the NFTS PLUS number of crossings from routes converted from closed to open status (ML1 roads or administrative roads [closed] converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open]) MINUS number of crossings from routes converted from open to closed status (all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails [open] converted to ML1 roads or administrative roads [closed])

[2] Miles of routes added to the NFTS PLUS miles of routes converted from closed to open status MINUS miles of routes converted from open to closed status

CUMULATIVE EFFECTS

The CRLF was once numerous and widely distributed in California. Initial declines of the CRLF are attributed to over-harvesting (Jennings and Hayes 1985), followed by the loss and alteration of habitat (USDI 2002). Other important factors attributed to the decline of the CRLF include the introduction of non-native species (bullfrogs, centrarchid fish, crayfish) which have predated on and out-competed the CRLF, and agricultural practices which modify aquatic and upland habitats (Davidson et al. 2002, USDI 2002) . Additional stressors that may have affected the distribution and abundance of the CRLF on the Stanislaus National Forest include historic mining, livestock grazing, vegetation management, recreation, and water diversions (USDI 2002). All these activities have the potential to alter CRLF habitat through disturbance to vegetation, soils, and hydrology.

On the Stanislaus National Forest, a majority of the land containing suitable habitat for the CRLF is within active livestock allotments. The presence of livestock in near-stream environments can result in physical disturbance. Livestock in aquatic habitats present a low risk of trampling individuals, particularly tadpoles who have lower mobility and tend to escape into fine sediments. Excessive livestock grazing can impact terrestrial habitats directly from browsing on obligate riparian vegetation that provides cover and feeding habitats for the frog. Excessive livestock grazing can affect aquatic habitats indirectly primarily through erosion and sedimentation processes if the activity occurs in near-stream environments. Secondarily, the livestock's metabolic waste products may cause minor nutrient enrichment (nitrogen and phosphorus) of aquatic habitats. On the Stanislaus National Forest, the impacts of livestock grazing on meadows is variable between years, but has been steadily decreasing as forage utilization levels are being reduced by stricter standards established by the SNFPA. At present, it is assumed that livestock are having negligible to minor impacts to the frog and its habitats.

Recreational mining activities (suction dredging) have the potential to adversely affect individuals directly from disturbance and possible mortality if tadpoles are entrained by the dredge. Suction dredging involves the modification of aquatic habitat directly from the movement of streambed materials and from riparian area disturbances. Suction dredging occurs in several streams that provide suitable habitat for the frog including but not limited to Bean Creek, Bull Creek, Moore Creek, Rose Creek, and Smith Creek. At present, it is assumed that recreational mining activities are having minor impacts to individuals and habitats.

Timber harvest and other vegetation management projects are occurring on private lands and on lands administered by the Stanislaus National Forest. A majority of the commercial timber lands are outside of the elevation range of the frog. Harvest on these lands has the potential to impact habitat indirectly primarily through erosion and sedimentation of aquatic habitats. Other vegetation management projects (fuel reduction projects) do occur within the elevation range of the frog and could affect aquatic and terrestrial habitats through sedimentation and modification of dispersal and upland

habitats. On NFS land, activities in or near RCAs are mitigated by applying best management practices (BMPs) where equipment and activities are prohibited or minimal. Stream protection measures are also required on private land. Both public and private timber lands use herbicides for site preparation and to alleviate competition from non-desirable vegetation. The Stanislaus National Forest has developed a five-year plan for managing vegetation on its lands. There are 10 to 15 projects that are planned or in planning that overlap with areas of suitable habitat. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. At present, vegetation management activities on private and public lands are having minor impacts to individuals and habitats.

Development of lands adjacent to the Stanislaus National Forest is also expected to elevate the potential for the introduction of non-native (exotic) species into aquatic systems. Introduced non-native aquatic predators such as centrarchid fishes, crayfish, and bullfrogs are believed to have affected herpetofauna populations in and adjacent to the Forest.

Water development projects have resulted in the loss in some areas of suitable habitat and have reduced the suitability of habitat for the frog in some areas. Hydroelectric projects or impoundments are present on all major rivers on the Stanislaus National Forest with the exception of the Clavey River. The New Melones Reservoir and Don Pedro Reservoir effectively eliminated dozens of miles of suitable habitat when they were impounded. These reservoirs also effectively eliminated the potential for individuals to move between watersheds. Several impoundments located upstream of suitable habitat have modified stream discharge patterns and water temperatures. Reduced water temperatures may delay breeding or may delay the development of tadpoles which may affect survivorship upon metamorphosis. Water developments have had a large impact on individuals and habitat in the past.

Recreation use has increased and is expected to continue to increase on the Stanislaus National Forest (see 3.04 Recreation Resources), resulting in greater likelihood and magnitude of human disturbance to aquatic wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation based upon State figures for OHV sales (see 3.04 Recreation Resources). The project alternatives would contribute to these past and current conditions with added displacement due to noise and human activity, and indirect effects to aquatic habitat. Approximately 5 miles of new trail construction, as well as numerous short route segments for dispersed camping access, have been proposed for the future (separate from this project). These trails are proposed to provide “connector routes” between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes could be similar to those described under direct and indirect effects of the alternatives: changes in behavior and loss of habitat.

Table 3.11-50 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. The direct and indirect effects of the project alternatives would likely contribute to cumulative effects for this species. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would have the most impact on individuals. Because this alternative does not prohibit cross country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon the red-legged frog. Alternative 3 would prohibit cross country travel and would not add any routes to the NFTS. Alternatives 1, 3, 4, and 5 contribute cumulatively to the disturbance and habitat alteration from activities described above. Alternatives 4, 1, 5, and 3 would result in progressively lower risk to these frogs due to the amount of motorized routes being added to the system. These alternatives do not result in a loss of habitat (no route construction), but would likely influence habitat suitability. Although the action alternatives may result in additional cumulative impacts, they are very minor in comparison to other factors affecting this species.

Table 3.11-50 Drivable Routes in California red-legged frog habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Routes proposed to be added to NFTS which may capture surface run-off and then deliver sediment into a stream associated with the CRLF[1,2,3]	6	0	0	6	0
Routes proposed to be added to NFTS that do not avoid RCAs except where necessary to cross streams[1,2,3]	12	0	0	12	0
Stream crossings on all routes within suitable aquatic habitat[1,2]	45	47	21	47	21
Miles of routes within 300 feet of suitable aquatic habitat[1,2]	27.96	31.18	22.41	29.2	23.41
Miles of routes within dispersal habitat[1,2]	85.88	105.64	75.69	94.49	74.21

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.
[2] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 are less than the miles of open routes under Alternative 3.
[3] This indicator relates directly to the PDC for the red-legged frog. Since the PDC apply only to unauthorized routes proposed for designation to the NFTS, the indicator is used only for additions to the system.

SUMMARY OF EFFECTS

The CRLF is not known to occur within the project area, but protocol-level surveys have not been completed in all suitable habitat (USDI 2005). Alternative 2 would not prohibit cross country travel; therefore, this alternative would not comply with USFWS PDC and would likely adversely affect the CRLF. Alternatives 1 and 4 would prohibit cross country travel. While they would add routes that would not comply with USFWS PDC, they may affect the CRLF but would not likely adversely affect it. Therefore, further informal consultation with FWS will have to occur for these alternatives. Alternative 3 would prohibit cross country travel and would not result in more stream crossings or more miles in aquatic and dispersal habitat. Alternative 5 would comply with USFWS PDC. It would prohibit cross country travel and, would not add any routes that would have any direct or indirect effects. Therefore, these two alternatives would have no effect on the CRLF. As can be seen from Table 3.11-51, of the alternatives, Alternative 3 would have the least negative impact on the species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Table 3.11-51 Ranking of Alternative Indicators (California red-legged frog)

Indicators	Rankings by Alternative [1]				
	1	2	3	4	5
Routes proposed to be added to NFTS which may capture surface run-off and then deliver sediment into a stream associated with the CRLF[1,2,3]	3	1	5	3	5
Routes proposed to be added to NFTS that do not avoid RCAs except where necessary to cross streams[1,2,3]	3	1	5	3	5
Stream crossings on all routes within suitable aquatic habita[1,2]	3	1	5	2	4
Miles of routes within 300 feet of suitable aquatic habitat[1,2]	3	1	5	2	4
Miles of routes within dispersal habitat[1,2]	3	1	4	2	5
Average	**3.00**	**1.00**	**4.80**	**2.40**	**4.60**

[1] A score of 5 indicates the alternative has the least impact for aquatic biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2] Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes and routes where this is no public right-of-way.
[3]Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 is less than the miles of open routes under Alternative 3.
[3] This indicator relates directly to the PDC for the red-legged frog. Since the PDC apply only to unauthorized routes proposed for designation to the NFTS, the indicator is used only for additions to the system.

Foothill Yellow-legged Frog – Affected Environment

Species and Habitat Account

The foothill yellow-legged frog (FYLF) was historically found throughout much of California and southwestern Oregon, but currently occupies only a small portion of its historical range (Amphibiaweb 2009, Jennings and Hayes 1994). Lind (2005) estimated FYLF populations (prior to 1980) have disappeared from approximately 51% of their historic range. These frogs have been

extirpated from at least two thirds of their historic localities over their entire Sierran range (Jennings 1996, Lind 2005). Herpetofauna surveys have occurred extensively throughout the Stanislaus National Forest, but have not covered aquatic habitat within the project area in its entirety. Approximately 20% of all perennial streams and 6% of all seasonal streams have been surveyed. Through these surveys these frogs have been detected in approximately 18 separate streams throughout the Stanislaus National Forest. There are many "subpopulations" associated with multiple breeding/occupancy locales in several of these streams.

The FYLF is a highly aquatic amphibian that prefers streams with a rocky substrate. Most occurrences of the frog on the Stanislaus National Forest occur at elevations below 3,000 feet (Aquasurv, Stanislaus National Forest database updated as of 2008), though historic occurrences occurred at elevations up to 4,200 feet (CDFG 2009). FYLFs breed at locations with substrates and channel shapes that provide suitable velocities and depths over a relatively broad range of discharge volumes (Kupferberg 1996). Locally, breeding occurs in late May or early June when water levels become stable enough to reduce the risk of stranding or scour. These frogs prefer partial shade, shallow riffles, and cobble-sized or greater substrate (Hayes and Jennings 1988). Kupferberg (1996) reported adult frogs may disperse into small tributary streams with persistent water following breeding, and personal observations on the Stanislaus National Forest are similar. During all seasons, these frogs are rarely encountered far from permanent water, though FYLFs have been observed in abandoned rodent burrows and under logs as far as 100 meters (approximately 325 feet) from a stream (Zeiner et al. 1988, Welsh 1994). Tadpoles typically use shallow water habitats where warmer water and food resources (diatoms, algae) are plentiful. Adults are likely to use exposed streambeds and riparian areas to forage for a variety of terrestrially- and aquatically-derived insects.

Since surveys of all aquatic habitats have not been conducted systematically for this project, suitable aquatic habitat was conservatively estimated. For the purposes of this analysis, suitable FYLF aquatic habitat has been defined and mapped as all perennial and intermittent streams within the Stanislaus National Forest below 4,500 feet in elevation. Since field surveys have not been completed on all areas adjacent to suitable aquatic habitat, this analysis assumes that all land within 30 meters (approximately 100 feet) of suitable aquatic habitat may provide suitable terrestrial habitat. Since the FYLF is primarily stream dwelling the potential for impacts beyond 30 meters of suitable aquatic habitat is very low and would likely result in negligible effects to the species.

Foothill Yellow-legged Frog – Environmental Consequences

Indicators

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

The data shown in the tables for suitable habitat is the data for suitable habitat of unknown occupancy.

- Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat.
- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within 30 meters (approximately 100 feet) of known occupied habitat.

- Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status
- Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat.
- Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat.
- Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the FYLF through the following activities:

- Prohibiting cross country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on FYLFs through the following: human-caused mortality, changes in behavior, and habitat modification (see Effects Common to all Aquatic Wildlife). Furthermore, these frogs may be less prone to the effects of motorized travel because they are rarely found far from water, the timing and location of breeding suggests they will select a favorable breeding site in highly dynamic stream environments where localized sedimentation may be less important, and they tend to be very dispersed in their distribution within any given stream. However, recently metamorphosed individuals show a strong tendency to migrate away from the natal pool prior to the onset of winter. During this time they would be more vulnerable to vehicle collisions.

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable FYLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-52). This alternative would result in the addition to the NFTS of one route with one stream crossing within known occupied FYLF habitat and several routes with 61 stream crossings within suitable habitat. These stream crossings would likely result in direct and indirect effects to some individuals of all FYLF life history stages. The addition of routes to the NFTS and conversion of roads to trails within 100 meters (approximately 325 feet) of known occupied and suitable aquatic habitat would likely result in direct effects to a few juvenile and adult FYLF and would result in indirect effects to both aquatic and terrestrial habitat over the short and long term. Since these impacts would affect a very small percentage of suitable and known occupied habitat (Table 3.11-52), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Season of Use: The FYLF is not known to enter into torpor, but has been found overwintering as far as 100 meters (approximately 325 feet) from aquatic habitat. Approximately 73% of suitable FYLF habitat is within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix

I). Therefore, this would reduce the potential direct effects to a significant portion of potential overwintering juveniles and adults. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the FYLF.

Mitigation Measures: The only type of mitigation measure proposed on routes that are associated with known occupied FYLF habitat are log/rock barriers. Types of mitigation measures proposed on routes associated with suitable FYLF habitat include the following: barriers, tread hardening, drain dips, a hardened stream crossing, and a small bridge. The installation of a hardened stream crossing and a small bridge would likely result in a short-term increase in sedimentation which may impact some individuals. The installation of all mitigation measures may result in short-term disturbance to some individual frogs, but will limit trail widening, reduce soil perturbation, and reduce sedimentation, providing beneficial effects over the long term.

Table 3.11-52 Alternative 1: Direct and Indirect Effects Indicators (foothill yellow-legged frog)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	+ 1
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat	+ 0.27
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	+ 44
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat	6.89
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. All suitable and occupied foothill yellow-legged frog habitat on NFS lands is currently open to cross country travel.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to these frogs. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to individual frogs.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to stream conditions would continue on routes identified as needing mitigation, causing a potential degradation of habitat.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable FYLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the FYLF.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to stream conditions would continue on routes identified as needing mitigation, causing a potential degradation of habitat.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable FYLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-53). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within suitable FYLF habitat, there would be a slight increase over Alternative 1 in the direct and indirect effects to these frogs within the project area. Although these increases would result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to FYLF populations within the project area.

Season of Use: The FYLF is not known to enter into torpor, but has been found overwintering as far as 100 meters (approximately 325 feet) from aquatic habitat. Approximately 73% of suitable FYLF habitat is within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Therefore, this would reduce the potential direct effects to a significant portion of potential overwintering juveniles and adults. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the FYLF.

Mitigation Measures: The types and effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-53 Alternative 4: Direct and Indirect Effects Indicators (foothill yellow-legged frog)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	+ 1
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat	+ 0.27
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	+ 73
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat	+ 8.69
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable FYLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-54). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a decrease from Alternative 1 in the number of routes added to the system or converted to a trail within suitable and known occupied FYLF habitat, there would be a decrease in the direct and indirect effects to these frogs within the project area. The impacts from this alternative would affect a very small percentage of suitable and known occupied habitat (Table 3.11-54). Thus, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Season of Use: The FYLF is not known to enter into torpor, but has been found overwintering as far as 100 meters (approximately 325 feet) from aquatic habitat. Approximately 73% of suitable FYLF habitat is within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Therefore, this would reduce the potential direct effects to a significant portion of potential overwintering juveniles and adults. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the FYLF.

Mitigation Measures: The types and effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-54 Alternative 5: Direct and Indirect Effects Indicators (foothill yellow-legged frog)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	0
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat	0
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	0%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	+ 7
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat	-- 1.03
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	-- <1%

CUMULATIVE EFFECTS

Many past cumulative impacts have likely contributed to the decline in FYLF numbers and distribution. The reduction in FYLF distribution and population numbers has largely been attributed to loss or alteration of habitats and increased competition/predation from introduced species. Habitat loss and alteration is associated with the following management activities on the Stanislaus National Forest: livestock grazing, mining, water development projects, vegetation management, and pesticide exposure.

Historic livestock grazing likely had a significant cumulative impact to FYLF and their habitat. Historic livestock grazing evidence indicates that heavy livestock use in the Sierra Nevada led to riparian habitat degradation across much of the Sierra Nevada. Livestock trampling has the potential to directly kill most life stages of FYLF. The mortality risk from livestock trampling is greatest for tadpoles and recently metamorphosed frogs. Tadpoles have limited mobility and have a tendency to seek cover in the spaces between streambed substrates. By seeking cover in this manner, tadpoles may be unaware of the potential peril from trampling. The risk is particularly high in intermittent streams where water resources may be limited and livestock have few options for accessing water. Risk is also higher following metamorphosis when metamorphs are concentrated along aquatic margins. Sedimentation arising from concentrated livestock use areas is considered to be the biggest impact to FYLF habitat. Ten active livestock allotments overlap known localities of the FYLF, and

suitable FYLF habitat (no known detections) overlaps with an additional 4 allotments. On the Stanislaus National Forest, the impacts of livestock grazing on meadows is variable between years, but has been steadily decreasing as forage utilization levels are being reduced by stricter standards established by the SNFPA. Livestock grazing is considered to currently have a very minor impact on individuals and habitat on the Stanislaus National Forest.

As with the CRLF, recreational gold mining activities overlap with known occupied FYLF sites and the activity has the potential to impact individuals and habitat. Tadpoles are potentially vulnerable to being sucked into the dredge and mortality or injury could result. Suction dredging also presents a physical disturbance to frogs and prolonged dredging could affect the distribution of individuals in a stream. Some of the actions involved with suction dredging include moving streambed substrates, digging into streambanks, and loss of riparian vegetation. At some locations, there has been a modification of rearing habitat resulting in the loss of shallow, warm-water foraging habitat for tadpoles. Also, the rearrangement of streambed substrates has the potential to change the streamflow patterns thereby affecting the suitability of habitat for deposition of egg masses. Suction dredging occurs at six to ten of the known occupied streams. Suction dredging is considered to currently have a minor impact on individuals and a moderate impact on habitat.

Water development projects have resulted in the loss in some areas of suitable habitat and have reduced the suitability of habitat for the frog in some areas. Hydroelectric projects or impoundments are present on all major rivers on the Stanislaus National Forest with the exception of the Clavey River. The New Melones Reservoir and Don Pedro Reservoir effectively eliminated dozens of miles of suitable habitat when they were impounded. These reservoirs also effectively eliminated the potential for individuals to move between watersheds. Several impoundments located upstream of suitable habitat have modified stream discharge patterns and water temperatures. Lind et al. (1996) and Bobzien and DiDonato (2007) documented reduced breeding success downstream of dams due to releases of water that either strand or scour egg masses from their attachment sites. Reduced water temperatures may delay breeding or may delay the development of tadpoles, which in turn may affect survivorship upon metamorphosis. Water developments have had a major impact on individuals and habitat in the past. Currently, water developments are having a moderate impact on individuals and habitat.

Vegetation management activities have the potential to impact individuals and habitat if activities occur in close proximity to occupied habitat. Ground-disturbing activities, including timber harvest, have the potential to result in sedimentation of habitats with primary implications for tadpole survivorship and fitness. Prescribed fire in riparian areas may result in mortality of individuals or a disturbance of behavior. Prescribed fire also has the potential to modify riparian habitats if the fire is severe enough to consume woody and herbaceous species. Modification of habitat may locally reduce the suitability of riparian habitat for refuge and foraging activities. However, fire may be beneficial in providing a diversity of conditions that may meet the needs of the frog. In general, current vegetation and fuels projects are designed to reduce potential impact on FYLF habitats and minimize disturbance to the species. Best management practices are implemented and monitored to minimize sediment delivery to streams and to prevent unexpected consequences to riparian habitats. Stream protection measures are also required on private land. The Stanislaus National Forest has developed a five-year plan for managing vegetation on public lands. There are 10 to 15 projects that are planned or in planning that overlap with areas of known occupied/suitable habitat. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. CDF currently lists approximately 2,365 acres of private land within the Stanislaus National Forest administrative boundary for which timber harvest plans have been submitted. The portion of these projects occurring within this frog's range has not been determined. Timber harvest on private lands is generally more intensive. At present, vegetation management activities on private and public lands are having minor impacts to individuals and habitats. Historically, vegetation management and fuels reduction projects

likely had minor to moderate impacts on FYLF and habitats, especially if project activities occurred in or immediately adjacent to FYLF aquatic habitats.

Exposure to a variety of pesticides has the potential to impact individuals. Pesticides are introduced into the aquatic environment either through direct application, groundwater contamination, and/or drift. Herbicides are commonly used in forestry to establish plantations and to release the growing conifers from competition. The Stanislaus National Forest and private forestry have applied herbicides extensively across the forest and in proximity to known occupied and suitable habitat for the FYLF. Monitoring on the Stanislaus National Forest has shown that herbicide applications have resulted in very low concentrations of herbicide contaminating aquatic habitats in the past. One project on the Stanislaus National Forest in the planning stage proposes to apply herbicides for site preparation and release in close proximity to known occupied FYLF habitat. Herbicides are and have been extensively used on private forest lands. Lenoir et al. (1999) and Sparling et al. (2001) showed a variety of pesticides are present in precipitation falling in the Sierra Nevada, a result of drift from agricultural applications in the Central Valley of California. The implications of this drift are poorly understood. However, Davidson et al. (2002) used spatial tests to link upwind herbicide application with the decline of the FYLF. Pesticide exposure is currently having a very minor impact on individuals, but historic applications likely had a minor to moderate impact on individuals.

Introduced species have the potential to impact the FYLF primarily through increased competition and predation. Kupferberg (1997) showed grazing competition from bullfrog tadpoles reduced the survivorship and mass at metamorphosis of FYLF tadpoles. Kupferberg (1997) also reported FYLFs were rarely encountered in areas invaded by bullfrogs, suggesting a population-level impact. Bullfrogs have been observed across the Stanislaus National Forest, typically at lower elevations (<3,000 feet) and within the range of the FYLF (Aquasurv, Stanislaus National Forest database updated as of 2008). Moyle (1973) reports non-native bullfrogs are predators on the FYLF. As Moyle (1973), Jennings and Hayes (1994), and Jennings (1996) suggest, water developments (dams and diversions) may be responsible for the introduction of non-native game fish and for modifying habitats that facilitate the invasion of aquatic habitats by non-native species. Non-native game fish are found below and above many low elevation impoundments on the Stanislaus National Forest. Introduced species have had a minor to moderate impact on FYLF populations in the past, and the expectation is that competition from bullfrogs will increase as this species expands its range on the forest.

Recreation use has increased and is expected to continue to increase on the Stanislaus National Forest (see 3.04 Recreation Resources), resulting in greater likelihood and magnitude of human disturbance to aquatic wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation, based upon State figures for OHV sales (see 3.04 Recreation Resources). The project alternatives would contribute to these past and current conditions with added displacement due to noise and human activity, and indirect effects to aquatic habitat. Approximately 5 miles of new trail construction, as well as numerous short route segments for dispersed camping access, have been proposed for the future (separate from this project). These trails are proposed to provide “connector routes” between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes could be similar to those described under direct and indirect effects of the alternatives: changes in behavior and loss of habitat.

Table 3.11-55 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. The direct and indirect effects of the project alternatives would likely contribute to cumulative effects for this species. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would have the most impact on individuals. Because Alternative 2 does not prohibit cross country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts on FYLF. Alternatives 1, 3, 4, and 5 contribute cumulatively to the disturbance and habitat alteration

from activities described above. Alternatives 4, 1, 5, and 3 would result in progressively lower risk to these frogs due to the amount of motorized routes resulting under each alternative. These alternatives do not result in a loss of habitat (no route construction), but would likely influence habitat suitability. Although the action alternatives may result in additional cumulative impacts, they are very minor in comparison to other factors affecting this species.

Table 3.11-55 Drivable Routes in foothill yellow-legged frog habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Stream crossings (perennial and intermittent) on all routes within known occupied aquatic habitat[1,2]	7	8	6	9	6
Miles of routes within 30 meters of known occupied aquatic habitat[1,2]	1.70	1.79	1.43	1.70	1.43
Percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by all routes[1,2]	<1%	<1%	<1%	<1%	<1%
Stream crossings (perennial and intermittent) on all routes within suitable aquatic habitat[1,2]	400	480	350	423	341
Miles of routes within 30 meters of suitable aquatic habitat[1,2]	53.68	65.33	47.01	56.67	47.17
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by all routes[1,2]	<1%	<1%	<1%	<1%	<1%

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.
[2] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 are less than the miles of open routes under Alternative 3.

SUMMARY OF EFFECTS

The FYLF was historically found throughout much of California and southwestern Oregon, but currently occupies only a small portion of its historical range (Amphibiaweb 2009, Jennings and Hayes 1994).The direct and indirect effects of the project alternatives (1, 2, 3, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. As can be seen from Table 3.11-56, of the alternatives, Alternative 3 would have the least negative impact on the species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Table 3.11-56 Ranking of Alternative Indicators (foothill yellow-legged frog)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Stream crossings (perennial and intermittent) on all routes within known occupied aquatic habitat [1,2,3]	3	1	5	3	5
Miles of routes within 30 meters of known occupied aquatic habitat [1,2,3]	3	1	5	3	5
Percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by all routes [1,2,3]	3	1	5	3	5
Stream crossings (perennial and intermittent) on all routes within suitable aquatic habitat [1,2,3]	3	1	4	2	5
Miles of routes within 30 meters of suitable aquatic habitat [1,2,3]	3	1	5	2	4
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by all routes [1,2,3]	3	1	5	2	4
Average	**3.00**	**1.00**	**4.83**	**2.50**	**4.67**

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2] Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes known at the time the data base was last updated and routes where this is no public right-of-way.
[3] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 is less than the miles of open routes under Alternative 3.

Mountain Yellow-legged Frog – Affected Environment

Species and Habitat Account

Historically the mountain yellow-legged frog (MYLF) was extremely abundant within high elevation aquatic ecosystems of the Sierra Nevada Mountains (Grinnell and Storer 1924, Zweifel 1955). Beginning around the 1970s, the MYLF has undergone dramatic population declines throughout the Sierra Nevada (Knapp and Matthews 2000), and has disappeared from a significant portion of its range (USDA 2004c). Although they are found throughout most of their historic range, many populations within their range have become extirpated (Amphibiaweb 2009). Previously the MYLF in the Sierra Nevada was considered to be one species, *Rana muscosa*. Recent genetic studies indicate MYLFs in the Sierra Nevada are actually comprised of two species: *R. sierrae*, with a distribution in the northern and central Sierra Nevada, and *R. muscosa*, with a distribution in the southern Sierra Nevada and southern California. The contact zone for these two newly recognized species is in the vicinity of Mather Pass and the Monarch Divide, Fresno County (Vredenburg et al. 2006). Though the Regional Forester's list of sensitive species has not been revised to specifically address this apparent change in taxonomy, this analysis pertains to *R. sierrae*, the Sierra Nevada yellow-legged frog.

Over the last 15 years herpetofauna surveys have provided broad spatial coverage of aquatic habitat within the Stanislaus National Forest, but surveys were not systematic nor did they cover all potential MYLF habitat. Approximately 10-15% of all perennial streams, and 40-60% of lakes/ponds, within the elevational range of this species have been surveyed. Frogs have been found in at least 40 distinct sites forest-wide, most of which are located in designated wilderness areas.

MYLFs in the Sierra Nevada inhabit high mountain lakes, ponds, tarns, and streams, largely in areas that were glaciated (Zweifel 1955). These frogs occur in the Sierra Nevada from 4,500 feet to over 12,000 feet elevation (Jennings and Hayes 1994). However, local observations have all occurred above 5,400 feet and 95% of all observations are above 7,000 feet (Aquasurv, Stanislaus National Forest database updated as of 2008).

MYLFs are seldom far from water, although they have been observed moving overland to disperse to other pond habitats. In some areas, there is a seasonal movement from lakes that are more favorable for overwintering (e.g., deeper water) to nearby areas that are more favorable for breeding. As the temperatures drop to freezing or below (generally October to November), frogs enter torpor for the winter. Adults emerge from torpor as soon as the ponds and lakes begin to thaw and ice is clear from at least part of the water surface (Amphibiaweb 2009). They have been found to move 200 to 900 meters () along streams or across dry land (Knapp et al. 2006). Out of 500 frogs tagged in one study, one moved 1 kilometer () in the fall to over-wintering habitat (Pope and Matthews 2001).

Typically, these frogs prefer well-illuminated, sloping banks of meadow streams, riverbanks, isolated pools, and lake borders with vegetation that is continuous to the water's edge (Zeiner et al. 1988). Most of the populations on the Stanislaus National Forest occur within fish-free lakes and ponds within wilderness areas and in fish-free lakes and ponds above 5,500 feet in elevation, but they are known to occur within some streams as well. Since systematic surveys of all aquatic habitats have not been conducted as a part of this project, suitable aquatic habitat was conservatively estimated. For the purposes of this analysis, suitable MYLF aquatic habitat has been defined and mapped as all perennial streams, lakes, and ponds above 5,500 feet in elevation. Since field surveys have not been completed on all areas adjacent to suitable aquatic habitat, this analysis assumes that all land within 30 meters (approximately 100 feet) of suitable aquatic habitat may provide suitable terrestrial habitat. Since the MYLF is highly aquatic and is typically seen within one meter (approximately 40 inches) of the water's edge, the potential for impacts beyond 30 meters of suitable aquatic habitat is very low and would likely result in negligible effects to the species.

Mountain Yellow-legged Frog – Environmental Consequences

Indicators

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

The data shown in the tables for suitable habitat is the data for suitable habitat of unknown occupancy.

- Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat.
- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within 30 meters (approximately 100 feet) of known occupied habitat.
- Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status
- Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat.
- Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat.
- Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the MYLF through the following activities:

- Prohibiting cross country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on MYLFs through the following: human-caused mortality, changes in behavior, and habitat modification (see Effects Common to all Aquatic Wildlife). These frogs may be less prone to adverse effects from motorized travel because they are closely associated with aquatic features and less likely to be exposed to direct mortality. They presumably do not make long-distance migrations outside of the breeding season, remaining close to suitable aquatic habitat. In streams, the larvae of the MYLF are typically associated with deeper pool habitats that have limited potential for direct mortality.

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable MYLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-57). This alternative would not result in the addition to the NFTS of any stream crossings within known occupied MYLF habitat, but would result in the addition to the NFTS of 8 stream crossings within suitable habitat. These stream crossings may result in direct and indirect effects to some individuals of all MYLF life history stages. The addition to the NFTS of routes and conversion of roads to trails within 30 meters (approximately 100 feet) of known occupied and suitable aquatic habitat would likely result in direct effects to a few juvenile and adult MYLF and would result in indirect effects to both aquatic and terrestrial habitat over the short and long term. Impacts from this alternative would affect a very small percentage of suitable and known occupied habitat. Thus, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Season of Use: The MYLF inhabits higher elevations and spends the cold winter months in torpor. All known occupied and suitable MYLF habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Although impacts would be minimal during the winter because most of the habitat is inaccessible due to snow during the torpor period and during most of the times of seasonal movement (immediately prior to and after torpor), the seasonal closures may provide some additional protection prior to the frogs entering torpor in fall and after emergence in the spring. The season of use would not apply to 10 WOS routes (see Table 2.02-2). , Since these frogs typically overwinter in aquatic habitat (mountain lakes or deep pools), the use of WOS vehicles during the winter months would have very little impact on them. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the MYLF.

Mitigation Measures: There would not be any mitigation measures proposed on routes that are associated with known occupied MYLF habitat. Types of mitigation measures proposed on routes associated with suitable MYLF habitat include the following: barriers, tread hardening, drain dips, and a hardened stream crossing. The installation of a hardened stream crossing would likely result in a short-term increase in sedimentation which may impact some individuals. The installation of all mitigation measures may result in short-term disturbance to some individual frogs, but will limit trail widening, reduce soil perturbation, and reduce sedimentation, providing beneficial effects over the long term.

Table 3.11-57 Alternative 1: Direct and Indirect Effects Indicators (mountain yellow-legged frog)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	0
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat	0
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	0
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	+ 7
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat	+ 1.66
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. Of the 27,700 acres of suitable MYLF habitat on the Stanislaus National Forest, 14,500 acres are open to cross country travel.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to these frogs. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to these frogs.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to stream conditions would continue on routes identified as needing mitigation, causing a potential degradation of habitat.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable MYLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the MYLF.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to stream conditions would continue on routes identified as needing mitigation, causing a potential degradation of habitat.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable MYLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-58). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of ML1 roads converted to a trail within suitable MYLF habitat, there would be a slight increase over Alternative 1 in the direct and indirect effects to these frogs within the project area. Although these increases may result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to MYLF populations within the project area.

Under this alternative the total number of stream crossings in known occupied habitat would be 4, and 164 in suitable habitat. There would be 0.86 mile of trails within 30 meters of known occupied habitat and 28.00 within 30 meters of suitable habitat.

Season of Use: The effects of the seasons of use in this alternative would be similar to those discussed for Alternative 1.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-58 Alternative 4: Direct and Indirect Effects Indicators (mountain yellow-legged frog)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	0
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat	0
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	0
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	+ 7
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat	+ 1.66
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable MYLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-59). This alternative would not result in the addition to the NFTS of any stream crossings within known occupied or suitable MYLF habitat. The conversion of approximately 0.26 miles of roads to trails within 30 meters (approximately 100 feet) of suitable aquatic habitat may result in direct effects to very few juvenile and adult MYLF. The conversion of this route to trail may result in minor indirect effects to both aquatic and terrestrial habitat over the short and long term. Impacts under this alternative would affect a very small percentage of suitable and known occupied habitat. Thus, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Table 3.11-59 Alternative 5: Direct and Indirect Effects Indicators (mountain yellow-legged frog)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	0
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat	0
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	0
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	-- 1
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat	+ 0.17
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%

Season of Use: The effects of the seasons of use in this alternative would be similar to those discussed for Alternative 1.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

CUMULATIVE EFFECTS

Many past and current cumulative impacts have contributed to the decline in MYLF numbers and distribution. One factor attributed to wide-scale population declines of the MYLF has been the introduction of salmonid fishes during the last century (Bradford et al. 1993, Knapp 1996). Recently, it has been determined that a chytridomycete fungus has been associated with numerous MYLF die-offs in the Sierra Nevada of California (Rachowicz 2006). Other factors that may contribute to cumulative impacts to the species and its habitat include the following: pesticides; ultraviolet radiation; bacterial, fungal, and viral pathogens; acidification from atmospheric deposition; nitrate deposition; livestock grazing; recreational activities; and drought (USDA 2001).

Introduced trout species within high mountain lakes have severely affected MYLF population trends in the Sierra Nevada including the Stanislaus National Forest. In recent years, the California Department of Fish and Game has been actively addressing this issue to proactively manage for MYLF restoration opportunities while still providing a recreational fishery within high mountain lakes. Recent experimental efforts to remove introduced trout species from high mountain lakes has shown that MYLF populations may positively respond. Non-native game fish are found in many high mountain lakes on the Stanislaus National Forest and have likely had a major impact on MYLF populations in the past. Although some actions are presently being taken to mitigate the impacts of introduced game fish, it is costly, labor intensive, and difficult to remove fish populations from some high mountain lakes. Therefore, they will likely continue to have significant impacts on the ability of MYLF populations to grow and expand on the Stanislaus National Forest in the future.

The chytrid fungus, *Batrachochytrium dendrobatidis*, has recently been determined to be common within MYLF populations within the Sierra Nevada, and it has likely played a significant role in population declines (Fellers et al. 2001, Rachowicz et al. 2006). Although it is well documented that this fungus may play such a role, its dispersal ability is not currently well understood (Rachowicz 2006). Without further research, it is difficult to determine the level of risk motorized use and access may have on the dispersal of this disease.

Historic livestock grazing likely had a significant cumulative impact to this species and their habitat. Historic livestock grazing evidence indicates that heavy livestock use in the Sierra Nevada led to riparian habitat degradation across much of the Sierra Nevada. Livestock trampling has the potential to directly kill all life stages of MYLF. The greatest potential of mortality risk from livestock trampling is expected to occur when adult MYLF aggregate and lay egg masses in the early season, and during metamorphosis, when juveniles are metamorphosing along aquatic margins. Current standards and guidelines in the SNFPA were implemented to reduce the risk of trampling by livestock (USDA 2004). Known MYLF habitat sites currently overlap with 9 active livestock grazing allotments. Potential MYLF habitat overlaps with approximately 18 additional allotments. Management direction including standards and guidelines for grazing should reduce potential grazing impacts from livestock grazing over the long term.

Historic vegetation management and fuels reduction projects have likely contributed to past and present cumulative effects, especially if projects occurred adjacent to MYLF aquatic habitats. Ground-disturbing activities including timber harvest and fuels treatment projects (burning and mastication projects) potentially caused direct mortality to this species which may have affected the abundance of the species on the Stanislaus National Forest. Projects in the planning stage on the Stanislaus National Forest will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. CDF currently lists approximately 2,365 acres of private land within the Stanislaus National Forest administrative boundary for which timber harvest plans have been submitted. The portion of these projects occurring within this frog’s range has not been determined.

Timber harvest on private lands is generally more intensive. In general, current vegetation and fuels projects on public land are designed to reduce potential impacts on MYLF habitats, and, therefore, minimize disturbance to the species. However, as MYLF migrate between breeding sites, and between breeding sites and overwintering sites (usually in or very near water), there is some potential for direct impacts from being crushed or burned from vegetation and fuels projects. The magnitude of this happening across the range of the MYLF frog habitats on the Stanislaus National Forest should be limited given the timing of MYLF migration (in the spring), with the exception of spring prescribed burning projects. The adverse impacts of spring burning is expected to be low given the relatively low amount that occurs on the Forest within an average year, particularly within the range of this frog.

Recreation use has increased and is expected to continue to increase on the Stanislaus National Forest (see 3.04 Recreation Resources), resulting in greater likelihood and magnitude of human disturbance to aquatic wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation, based upon State figures for OHV sales (see 3.04 Recreation Resources). Approximately 5 miles of new trail construction, as well as numerous short route segments for dispersed camping access, have been proposed for the future (separate from this project). These trails are proposed to provide “connector routes” between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes could be similar to those described under direct and indirect effects of the alternatives: changes in behavior and loss of habitat.

Although motorized vehicle use has not been identified as one of the major contributing factors to MYLF declines, the direct and indirect effects of the project alternatives would likely contribute to cumulative effects for this species with added displacement due to noise and human activity, and indirect effects to aquatic habitat. Table 3.11-60 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would have the most impact on individuals. Because Alternative 2 does not prohibit cross country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon MYLF. Alternatives 1, 3, 4, and 5 contribute cumulatively to the disturbance and habitat alteration from activities described above. Alternatives 4, 1, 5, and 3 would result in progressively lower risk to these frogs due to the amount of motorized routes resulting from each alternative. These alternatives do not result in a loss of habitat (no route construction), but would likely influence habitat suitability. Although the action alternatives may result in additional cumulative impacts, they are very minor in comparison to other factors affecting this species.

Table 3.11-60 Drivable Routes in mountain yellow-legged frog habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Stream crossings (perennial) on all routes within known occupied aquatic habitat[1,2]	4	4	4	4	4
Miles of routes within 30 meters of known occupied aquatic habitat[1,2]	0.86	1.00	0.54	0.86	0.54
Percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by all routes[1,2]	<1%	<1%	<1%	<1%	<1%
Stream crossings (perennial) on all routes within suitable aquatic habitat[1,2]	168	208	161	169	161
Miles of routes within 30 meters of suitable aquatic habitat[1,2]	27.96	33.04	25.84	28.00	26.10
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by all routes[1,2]	<1%	<1%	<1%	<1%	<1%

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.
[2] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 are less than the miles of open routes under Alternative 3.

Table 3.11-61 Ranking of Alternative Indicators (mountain yellow-legged frog)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Stream crossings (perennial) on all routes within known occupied aquatic habitat[1,2,3]	3	3	3	3	3
Miles of routes within 30 meters of known occupied habitat[1,2,3]	3	1	5	3	5
Percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by all routes[1,2,3]	3	1	5	3	5
Stream crossings (perennial) on all routes within suitable aquatic habitat[1,2,3]	3	1	5	2	4
Miles of routes within 30 meters of suitable aquatic habitat[1,2,3]	3	1	5	2	4
Percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by all routes[1,2,3]	3	1	5	3	3
Average	**3.00**	**1.33**	**4.67**	**2.67**	**4.00**

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2] Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes known at the time the data base was last updated and routes where this is no public right-of-way.
[3] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 is less than the miles of open routes under Alternative 3.

SUMMARY OF EFFECTS

Historically the MYLF was extremely abundant within high elevation aquatic ecosystems of the Sierra Nevada Mountains, but has recently undergone dramatic population declines throughout the Sierra Nevada (Grinnell and Storer 1924, Zweifel 1955, Knapp and Matthews 2000, USDI 2004). The direct and indirect effects of the project alternatives (1, 2, 3, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. As can be seen from Table 3.11-61, of the alternatives, Alternative 3 would have the least negative impact on the species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Western Pond Turtle – Affected Environment

Species and Habitat Account

The western pond turtle (WPT) is the only extant aquatic turtle native to California and ranges from Washington to southern California (Stebbins 1985, Reese and Welsh 1997). They have been found throughout lower elevations of the Stanislaus National Forest, but are primarily located on the southern portions of the project area at elevations less than 4,500 feet (Aquasurv, Stanislaus National Forest database updated as of 2008). While herpetofauna surveys have occurred extensively throughout the Stanislaus National Forest, surveys have not been conducted systematically as part of this project nor have they covered aquatic habitat within the project area in its entirety. Approximately 20% of all perennial streams, 6% of all seasonal streams, and approximately 20% of all lakes and ponds have been surveyed. Through these surveys and various other efforts pond turtles have been detected at more than 20 locations throughout the Stanislaus National Forest.

WPTs are habitat generalists, occurring in a wide variety of permanent and intermittent aquatic habitats and using terrestrial habitats extensively. Although they may occur up to 6,000 feet in elevation, they have rarely been observed above 5,000 feet within the project area (Stebbins 1985, Aquasurv, Stanislaus National Forest database updated as of 2008). Individual WPTs (usually males) may have large home ranges and may wander within a given watercourse for several kilometers on a regular basis (Holland 1994, Reese and Welsh 1997). In streams, Reese (1996) found that all turtles in the study used terrestrial habitats during the course of the year. Terrestrial habitats are needed for nesting, overwintering, and for seasonal uses. WPT nests have been found as far as 435 yards from a stream (Reese and Welsh 1997) in open sunny areas on hillslopes, generally with a south to southwest facing aspect. Nest sites typically occur in open areas dominated by grasses or herbaceous annuals on dry, well-drained soils with high clay/silt content and low (less than 15-degree) slope (Holland 1994).

There is some indication that most nesting excursions occur at night (Rathbun et al. 2002). WPTs also move into upland slopes while overwintering or during periods when aquatic habitats become unsuitable (i.e., dry). The timing of overwintering movements is poorly understood, but generally occurs within the project area from the fall (October) to early spring (April).

There are 18 streams occupied by the western pond turtle on the Stanislaus National Forest as determined by formal visual encounter surveys (Aquasurv, Stanislaus National Forest database updated as of 2008). Additionally, there are approximately 10 other known occurrences as determined by incidental observations by Forest biologists. A conservative estimate is that 30 populations of the turtle exist on lands administered by the Stanislaus National Forest (S. Holdeman, personal communication, August 11, 2009).

Since systematic surveys for the project were not conducted for pond turtles in all potentially suitable aquatic habitat, suitable aquatic habitat was conservatively estimated. For the purposes of this analysis, suitable WPT aquatic habitat has been defined and mapped as continuous (minimum of 200 feet) perennial and intermittent streams with less than 6% gradient and all lentic habitats below 5,000 feet in elevation. These estimates were determined based on the most current recorded sightings of pond turtles. Since locations of pond turtles were often associated with a specific point on land, all adjacent potentially suitable aquatic habitats were assumed occupied. Suitable stream habitat was assumed occupied upstream and downstream of the sighting until a reach of unsuitable (> 6% gradient) stream habitat greater than 400 meters (0.25 mile, or 440 yards) in length was encountered. Further, this analysis assumes that all land within 400 meters of suitable aquatic habitat may provide suitable nesting habitat. Although pond turtles may travel further than 400 meters from aquatic habitat for overwintering purposes, these movements appear to be far less frequent. Since nesting primarily occurs within 400 meters of aquatic habitat (Holland 1994, Rathbun et al. 1992, Reese 1996, Reese and Welsh 1997, Rathbun et al. 2002), potential for impacts beyond 400 meters of suitable aquatic habitat is very low and would likely result in negligible effects to the species.

Western Pond Turtle – Environmental Consequences

Indicators

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

The data shown in the tables for suitable habitat is the data for suitable habitat of unknown occupancy.

- Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat.
- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within 400 meters (0.25 mile) of known occupied habitat.
- Net change from existing NFTS in percentage of upland habitat (within 400 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status
- Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat.

- Net change from existing NFTS in miles of routes within 400 meters (0.25 mile) of suitable aquatic habitat.
- Net change from existing NFTS in percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the WPT through the following:

- Prohibiting cross country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on pond turtles through the following: human-caused mortality, changes in behavior, and habitat modification (see Effects Common to all Aquatic Wildlife). Furthermore, pond turtles may be more prone to the effects of motorized travel because essentially all individuals use terrestrial habitats extensively throughout the year and they are wary of human presence. During nesting excursions, females are very sensitive to disturbance and will abandon the nesting effort (Reese 1996, Rathbun et al. 2002). The WPT also uses upland habitats extensively as overwintering habitat (Holland 1994, Rathbun et al. 2002), a period of reduced activity partially in response to cold weather and limited availability of food resources.

Some WPT populations occur in a relatively discrete area (e.g., Big Kibbie Ridge pond) whereas others are more extensive, occupying several miles of a stream (eg., Rose Creek). It is assumed that the impacts at a discrete area are potentially more influential because the turtles are confined to a relatively small area and may not have sufficient alternative habitat in close proximity to which to disperse if disturbance becomes too great. It is also assumed that the impacts at a more extensively occupied location are less influential because the turtle has more habitat available to which to disperse if excessively disturbed.

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable WPT habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-62). This alternative would result in the addition to the NFTS of several routes and 22 stream crossings within known occupied WPT habitat and several routes with 38 stream crossings within suitable habitat. These routes and stream crossings would likely result in direct and indirect effects to some juvenile and adult individual WPTs. The addition to the NFTS of routes and conversion of roads to trails within 400 meters (0.25 mile) of known occupied and suitable aquatic habitat may result in direct effects to adults (females) moving overland to find suitable nesting locations. Since nests are prepared in terrestrial habitat with vegetation providing some cover, it is unlikely that nests would be built directly in routes. Therefore, motorized use on routes would not likely result in the destruction of pond turtle nests. In areas where routes intersect suitable nesting habitat, hatchlings may be disturbed or crushed as they leave the nest to find suitable aquatic habitat.

Alternative 1 would add routes to the NFTS within ¼ mile of occupied WPT habitat that were not approved by a Wildlife Biologist. Therefore, these routes would not comply with the S&G which

states, "Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist." These routes would be exempted from this S&G through a minor Forest Plan amendment. Following is a discussion of the effects of amending the Forest Plan with regards to the WPT.

There are six known occurrences of western pond turtles where routes proposed to be added to the NFTS would occur within one-quarter mile buffer of the aquatic feature, affecting 20% of the known occurrences on the forest. The relative risk at both the individual and population level for the affected populations ranges from very low to moderate-high. The risk for several of these occurrences is considered to be very low to low because the routes would either add a very small amount of mileage in the buffer or the routes would occur in a physical location that would make the effect of any direct or indirect impacts relatively minor. These occurrences include Hull Creek, Big Creek, North Fork Merced River, and the South Fork Tuolumne River. The route added near Hull Creek (FR98599) would only add 0.04 miles (211 feet) in a relatively large occupied area (3 miles of occupied habitat). The one route added near Big Creek (FR98575) would add 0.13 miles in the buffer along approximately five miles of occupied stream. One route (FR10178) is proposed adjacent to the North Fork Merced River that could have a localized effect. While this site is within 100 feet of the river and extends for 0.6 miles, it affects less than 3% of the suitable habitat provided in the river. Of the four routes added in the buffer of the South Fork Tuolumne River, two (FR98504 and 1S1929C) are within 0.25 miles of each other and two (FR98502 and FR98503) are at the very edge of the buffer on a small tributary that affords low suitability habitat for the turtle. There are over 14 miles of habitat on the South Fork Tuolumne on lands administered by the Forest Service.

For the occupied habitat at the Middle Fork Tuolumne River and Birch Lake area, the risk to individuals and populations for these localities is low-moderate to moderate. Six routes are proposed to be added in the buffer along the Middle Fork and four (FR98533, FR98537, FR98560, and FR5540) present low risk of direct or indirect impact to turtles because they are high up on a steep slope or are at the edge of the buffer. Two routes (FR98541 and FR98548) are located within 0.5 miles of each other and access dispersed recreation sites at the river's edge. There are over 14 miles of suitable habitat in the Middle Fork, making the impact at the two routes near the river a localized risk when considering the entire reach of river. In the Birch Lake area two routes are proposed within the 400 meter buffer (1S1902 and FR8601). As noted above, the risk is relatively greater (rated as moderate) due to the discrete nature of the habitat and the propensity of the turtle to remain in close proximity to the suitable habitat.

In the Bull Creek watershed, the risk is low in Montgomery Gulch and in lower Bull Creek, but is moderate to high in the Anderson Valley area. There is one route (FR98582) that would access a dispersed campsite high up Montgomery Gulch where habitat suitability is low. With low habitat suitability, the potential for encountering a turtle is relatively low. The route that would be added in lower Bull Creek (FR98566) represents a localized risk, but at a larger scale (two miles upstream or downstream) represents a low risk locally. The localized risk in Anderson Valley is higher because there are eight routes that would be added in one mile of stream. All of these routes access dispersed campsites and most are very close to the stream. The risk to individuals and the population at the upper end of Bull Creek is higher due to the high number of routes that would be added and the increased potential for direct effects (mortality, physical disturbance) and indirect effects to individuals and habitat. However, the relative risk to individuals and populations at the scale of the Bull Creek watershed is relatively low because there are over 10 miles of suitable habitat in the stream and the majority of the impact would occur on 10% of the available habitat.

The area of greatest concern for the western pond turtle is in the Moore Creek area on the Groveland District. Of the 8.7 miles of routes proposed within one-quarter mile of known occupied habitat, 5.3 miles cross or are adjacent to approximately seven miles of Moore Creek. At the site-specific scale, there could be significant impacts to the turtle population in this creek. Past survey efforts have

shown a small population (<20 individuals) dominated by adults with no apparent recruitment (Aquasurv, Stanislaus National Forest database updated as of 2008). This adult-skewed population may be an artifact of the lack of nesting habitat adjacent to the creek, particularly nesting habitat in close proximity to suitable hatchling habitat (S. Holdeman, personal communication, August 11, 2009). Aerial photograph interpretation and field visits indicated extensive brush fields adjacent to Moore Creek and very little open, herbaceous-dominated areas that are preferred for nesting. There is a higher mortality and injury risk from direct encounters with off-highway vehicles in the vicinity of Moore Creek due to the number and total length of routes being proposed within one-quarter mile of the aquatic habitat. In combination, the increased mortality risk and an apparently older population of turtles may lead to a reduced viability of the local population. If there is limited or no recruitment in this population and mortality occurs on an occasional or regular basis, there is the risk the population will become unsustainable. However, at the larger scale of the 6th Level Hydrologic Unit Code (Upper North Fork Merced River watershed) which includes Moore Creek, turtle populations are known from the North Fork Merced River, Jordan Creek, Smith Creek, and Bean Creek. All of these streams have connectivity with Moore Creek and this potential meta-population may serve as a source of recruitment of adult and subadult turtles to Moore Creek.

The addition of routes to the NFTS and conversion of ML1 roads to trails would result in indirect effects to both aquatic and terrestrial habitat over the short and long term. Indirect effects that are likely to occur to suitable and known occupied habitat include the loss of suitable nesting habitat and increased sedimentation into streams. Since the impacts from this alternative would affect a very small percentage of suitable and known occupied habitat, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Season of Use: WPTs generally move into upland terrestrial habitat to overwinter. Most of the known occupied and suitable pond turtle habitat in the project area is within Zone 2 or Zone 3 of the seasonal closures (as identified for each route in Appendix I). Limiting the season of use would likely reduce disturbance to some individual overwintering pond turtles. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the WPT.

Mitigation Measures: Types of mitigation measures proposed on routes associated with known occupied pond turtle habitat include the following: barriers, tread hardening, and drain dips. Types of mitigation measures proposed on routes associated with suitable pond turtle habitat include the following: barriers, tread hardening, drain dips, hardened stream crossings, water bars, a cattle guard, and a small bridge. The installation of hardened stream crossings and a small bridge would likely result in a short-term increase in sedimentation which may impact some individuals. The installation of all mitigation measures may result in short-term disturbance to some individual pond turtles, but would limit trail widening, reduce soil perturbation, and reduce sedimentation, providing beneficial effects over the long term.

Table 3.11-62 Alternative 1: Direct and Indirect Effects Indicators (western pond turtle)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	+ 26
Net change from existing NFTS in miles of routes within 400 meters (0.25 mile) of known occupied habitat	14.00
Net change from existing NFTS in percentage of upland habitat (within 400 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	+ 54
Net change from existing NFTS in miles of routes 400 meters (0.25 mile) of suitable aquatic habitat	+ 77.86
Net change from existing NFTS in percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. All suitable and occupied WPT habitat on NFS lands is currently open to cross country travel.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to pond turtles. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to pond turtles.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to stream conditions would continue on routes identified as needing mitigation, causing a potential degradation of habitat.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable WPT habitat. This would reduce the risk of direct and indirect effects to pond turtle from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in additions to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the WPT.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to stream conditions would continue on routes identified as needing mitigation, causing a potential degradation of habitat.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable WPT habitat. This would reduce the risk of direct and indirect effects to pond turtles from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-63). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1.

Alternative 4 would add the same routes to the NFTS within ¼ mile of occupied WPT habitat that were not approved by a Wildlife Biologist as under Alternative 1, plus one additional route. These routes would not comply with the S&G pertaining to routes within ¼ mile of occupied habitat and would be exempted from this S&G through a minor Forest Plan amendment. The additional route is 1S1907A, in the Middle Fork Tuolumne River watershed. There are 6 routes proposed to be added within ¼ mile of occupied habitat in this watershed under Alternative 1. Four (FR98533, FR98537,

FR98560, and FR5540) present low risk of direct or indirect impact to turtles because they are high up on a steep slope or are at the edge of the buffer. Two routes (FR98541 and FR98548) are located within 0.5 miles of each other and access dispersed recreation sites at the river's edge. 1S1907A connects to FR98541, and is within 170 feet of the river at its closest point. While there would be 3 routes in this drainage close to the aquatic habitat, the impact would still be considered localized because of the amount of suitable habitat (over 14 miles) in the Middle Fork. The risk would still be rated as moderate due to the discrete nature of the habitat and the propensity of the turtle to remain in close proximity to the suitable habitat.

Since there is an increase from Alternative 1 in the number of routes added to the system or converted to a trail within known occupied and suitable pond turtle habitat, there would be an increase in the direct and indirect effects to individuals within the project area. Although these increases would result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to WPT populations within the project area.

Season of Use: WPTs generally move into upland terrestrial habitat to overwinter. Most of the known occupied and suitable pond turtle habitat in the project area is within Zone 2 or Zone 3 of the seasonal closures (as identified for each route in Appendix I). Limiting the season of use would likely reduce disturbance to some individual overwintering pond turtles. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the WPT.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-63 Alternative 4: Direct and Indirect Effects Indicators (western pond turtle)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	+ 31
Net change from existing NFTS in miles of routes within 400 meters (0.25 mile) of known occupied habitat	+ 22.43
Net change from existing NFTS in percentage of upland habitat (within 400 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	+ 74
Net change from existing NFTS in miles of routes 400 meters (0.25 mile) of suitable aquatic habitat	+ 78.80
Net change from existing NFTS in percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable WPT habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-64). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a substantial decrease from Alternative 1 in the number of routes added to the system or converted to a trail within suitable and known occupied pond turtle habitat, there would be a substantial decrease from Alternative 1 in the direct and indirect effects to individuals within the project area. Since these impacts would affect a very small percentage of pond turtle habitat (Table 3.11-64), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Season of Use: WPTs generally move into upland terrestrial habitat to overwinter. Most of the known occupied and suitable pond turtle habitat in the project area is within Zone 2 or Zone 3 of the

seasonal closures (as identified for each route in Appendix I). Limiting the season of use would likely reduce disturbance to some individual overwintering pond turtles. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the WPT.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-64 Alternative 5: Direct and Indirect Effects Indicators (western pond turtle)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	0
Net change from existing NFTS in miles of routes within 400 meters (0.25 mile) of known occupied habitat	+ 0.36
Net change from existing NFTS in percentage of upland habitat (within 400 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	+ 2
Net change from existing NFTS in miles of routes 400 meters (0.25 mile) of suitable aquatic habitat	+ 4.19
Net change from existing NFTS in percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%

CUMULATIVE EFFECTS

Like the amphibians discussed above, the WPT has experienced dramatic declines within its range. The Federal Register (57 FR 45761) listed habitat destruction as the primary cause for the decline of the species. Within the analysis area, livestock grazing, suction dredge mining, water developments, vegetation management activities, and recreation activities have impacted or have the potential to impact individuals or modify habitat.

Grazing has the potential to affect the WPT. Livestock may injure or kill individuals through trampling, particularly on hatchlings in the nest or in shallow water habitats. Sediment arising from areas of high use by livestock may impact pool habitat (reduction in volume). Grazing likely does not have a major influence on upland habitat attributes, such as vegetation composition or availability of overwintering sites. When livestock access water, there is the potential that their presence will result in a physical disturbance to individual turtles and cause them to seek refuge in aquatic habitat. The consequence of this disturbance is likely very minor in that it may interrupt an activity like basking that is necessary for basic metabolism. Basking is tied to metabolism which is linked with food intake and growth. If the interruptions are occasional, then the effect on metabolism is likely to be negligible. Extended disturbance may result in dispersal from the affected area or in loss of body mass (Cadi and Joly 2003). Nine active allotments overlap known populations of WPT and six other allotments overlap suitable habitat. Current standards and guidelines in the SNFPA were implemented to reduce the risk of habitat degradation by livestock (USDA 2004). Historic grazing likely had a minor impact on individuals and habitats, and current livestock grazing also has a minor impact on individuals and habitats.

Suction dredge mining can result in disturbance to individuals and modification of habitat. The presence of people operating dredges in known occupied habitat can cause physical disturbance to individuals, thereby interrupting their normal activity pattern. As with livestock disturbance, if the disturbance is occasional then the effect on metabolism is assumed to be negligible. However, if the disturbance is excessive then physiological effects on growth are expected. Dredging can also alter habitats, possibly favoring the turtle. On the Stanislaus National Forest, observations have indicated that pool habitats are frequently deepened by dredging and WPT take advantage of this “improved” pool habitat. It is unlikely that dredgers unintentionally suck turtles into the dredge because the turtles are relatively conspicuous and typically attempt to avoid capture. The impact of past and current suction dredging is minor to individuals and negligible to the aquatic habitats needed by the species.

Water developments have the potential to impact the WPT through loss and/or modification of habitat. As noted above, several impoundments have been constructed on rivers across the Stanislaus National Forest, resulting in a direct loss of habitat. Holland (1994) found that large impoundments are largely unsuitable for the WPT. Indirect impacts to habitat include loss of habitat complexity and alterations in water temperatures. Reese and Welsh (1998) investigated the impacts of regulated streamflow downstream of an impoundment and found that habitat suitability was reduced in a dammed stream because there were fewer slow-velocity and warm water habitats than in an undammed stream. The implication of reduced habitat suitability was more time spent basking for thermoregulation which increased predation risk (Reese and Welsh 1998). Dams also physically interrupt the continuity of aquatic habitats which can effectively separate populations of turtles and limit genetic dispersal. The impact of past and current water developments on the Stanislaus National Forest have had, and continue to have, moderate to major impacts on the WPT and its habitats.

Vegetation management activities have the potential to impact individuals and the habitats required by the WPT. Since the turtle uses upland habitats extensively, there is the potential that timber harvest, fuel reduction activities, and prescribed fire can impact individuals directly. Mechanical operations (harvest, shredding) and prescribed fire frequently occur within 100 meters (approximately 325 feet) of known occupied streams. These activities can injure or kill individual females attempting to nest or both sexes overwintering, or by impacting nests (eggs and hatchlings). Fuel reduction and prescribed fire have the potential to modify upland and riparian habitats directly by changing the composition and density of vegetation in upland habitats. The loss of leaf duff from these activities may have detrimental effects on overwintering habitat. At the same time, the loss of leaf duff may have beneficial effects by increasing nesting habitat. Typically, the amount of sediment arising from vegetation management projects is minor and only has small and localized impacts to aquatic habitat (reduced pool volume). There are 10 to 15 projects that are planned or in the planning phase on the Stanislaus National Forest that could affect WPT habitats. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. CDF currently lists approximately 2,365 acres of private land within the Stanislaus National Forest administrative boundary for which timber harvest plans have been submitted. The portion of these projects occurring within the turtle's range has not been determined. Timber harvest on private lands is generally more intensive. Past activities likely had a greater impact (moderate) on the WPT because protections have only occurred in the last 10 years and management activities occurred close to streams. At present, mitigation measures are incorporated on public land to minimize effects at known occupied sites, and measures are incorporated on both public and private land to protect aquatic ecosystems. The current level of impact from vegetation management is minor on the turtle.

Recreation use has increased and is expected to continue to increase on the Stanislaus National Forest (see 3.04 Recreation Resources), resulting in greater likelihood and magnitude of human disturbance to aquatic wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation, based upon State figures for OHV sales (see 3.04 Recreation Resources). The project alternatives would contribute to these past and current conditions with added displacement due to noise and human activity, and indirect effects to aquatic habitat. Approximately 5 miles of new trail construction, as well as numerous short route segments for dispersed camping access, have been proposed for the future (separate from this project). These trails are proposed to provide "connector routes" between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes could be similar to those described under direct and indirect effects of the alternatives: changes in behavior and loss of habitat.

The direct and indirect effects of the project alternatives would likely contribute to cumulative effects for this species. Table 3.11-65 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would have

the most impact on individuals. Because Alternative 2 does not prohibit cross country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon the WPT. Alternatives 1, 3, 4, and 5 contribute cumulatively to the disturbance and habitat alteration from activities described above. Alternatives 4, 1, 3, and 5 would result in progressively lower risk to these frogs due to the amount of motorized routes under each alternative. These alternatives do not result in a loss of habitat (no route construction), but would likely influence habitat suitability. Although the action alternatives may result in additional cumulative impacts, they are very minor in comparison to other factors affecting this species.

Table 3.11-65 Drivable Routes in western pond turtle habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Number of stream crossings (perennial) on all routes within known occupied aquatic habitat [1,2]	92	101	67	98	66
Total miles of routes within 400 meters of known occupied aquatic habitat [1,2]	679.98	794.34	627.13	728.48	622.46
Percentage of upland habitat (within 400 meters of known occupied aquatic habitat) directly impacted by all routes [1,2]	<1%	<1%	<1%	<1%	<1%
Number of stream crossings (perennial) on all routes within suitable aquatic habitat [1,2]	478	611	430	503	420
Total miles of routes within 400 meters of suitable aquatic habitat [1,2]	699.53	889.97	649.97	735.67	633.74
Percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by all routes [1,2]	<1%	<1%	<1%	<1%	<1%

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.
[2] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 are less than the miles of open routes under Alternative 3.

SUMMARY OF EFFECTS

The WPT is the only extant aquatic turtle native to California and ranges from Washington to southern California (Stebbins 1985, Reese and Welsh 1997). The direct and indirect effects of the project alternatives (1, 2, 3, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. As can be seen from Table 3.11-66, of the alternatives, Alternative 5 would have the least negative impact on the species. For further discussion of the effects analysis and determinations, see the project BA/BE (project record).

Table 3.11-66 Ranking of Alternative Indicators (western pond turtle)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Stream crossings (perennial) on all routes within known occupied aquatic habitat [1,2,3]	3	1	4	2	5
Miles of routes within 400 meters of known occupied aquatic habitat [1,2,3]	3	1	4	2	5
Percentage of upland habitat (within 400 meters of known occupied aquatic habitat) directly impacted by all routes [1,2,3]	3	1	5	2	5
Stream crossings (perennial) on all routes within suitable aquatic habitat [1,2,3]	3	1	4	2	5
Miles of routes within 400 meters of suitable aquatic habitat [1,2,3]	3	1	4	2	5
Percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by all routes [1,2,3]	3	1	4	2	5
Average	**3.00**	**1.00**	**4.17**	**2.00**	**5.00**

[1] A score of 5 indicates the alternative has the least impact for terrestrial biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2] Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes known at the time the data base was last updated and routes where this is no public right-of-way.
[3] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 is less than the miles of open routes under Alternative 3.

Yosemite Toad – Affected Environment

Species and Habitat Account

The Yosemite toad is an endemic species to the state of California and is found at high elevations in the Sierra Nevada Mountains. Although they occur in habitats that are less impacted by humans, they currently only occupy approximately 50% of their historic range (Lannoo 2005). Herpetofauna surveys have occurred throughout the Stanislaus National Forest, but surveys have not been conducted systematically for this project nor have they covered Yosemite toad habitat within the project area in its entirety. Approximately 55% of all wet meadows within the range of the toad have been surveyed. Through these surveys and various other efforts these toads have been detected at approximately 65 to 70 locations throughout the Stanislaus National Forest.

The Yosemite toad inhabits high elevation meadows that are typically associated with a water source and a willow component. Upon snowmelt, the toad moves from a hibernaculum to a breeding site typically located in a meadow. Shallow water sheeting across/through vegetation appears to be favored for breeding because water temperatures are very warm and allow for rapid development of the eggs and tadpoles. However, tadpoles have also been observed in small streams in wet meadows. Females may breed once every two to three years. Following breeding, the adults move into the rest of the meadow, into willow thickets, and into the uplands surrounding the meadow to forage (Martin 2008). Dispersal distance from the breeding site to foraging habitat is variable, but Martin (2008) reports movements exceeding 600 meters (approximately 1,960 feet, or 0.4 mile) are possible. At the end of the season, toads seek underground refugia (e.g., rodent burrows) to overwinter. Morton (1981) reported toads may overwinter up to 750 meters (approximately 2,460 feet, or nearly ½ mile) from the nearest breeding site. Many researchers have found the toad to be diurnal (Kagarise Sherman and Morton 1993, Mullallay and Cunningham 1956). However, Martin (2008) reported most longer-distance movements occurred at night. Although the elevation range of the species begins at approximately 6,400 feet, they have only been found within the project area above 7,200 feet. For the purposes of this analysis, potentially suitable Yosemite toad habitat has been defined and mapped as the Wet Willow and Wet Other CWHR types above 7,000 feet in elevation.

Yosemite Toad – Environmental Consequences

Indicators

Based upon the available literature, the following indicators were chosen to provide a relative measure of the direct and indirect effects to the Yosemite toad. Although biological thresholds for these indicators have not been established, they provide general measures by which the effects of the project alternatives may be compared.

The data shown in the tables for suitable habitat is the data for suitable habitat of unknown occupancy.

- Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat.
- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within known occupied habitat.
- Net change from existing NFTS in percentage of known occupied habitat directly impacted by routes added to the NFTS or routes converted from closed to open status
- Net change from existing NFTS in miles of routes within 100 meters (approximately 325 feet) of suitable aquatic habitat.

- Net change from existing NFTS in miles of routes within 400 meters (approximately 325 feet) of suitable aquatic habitat.
- Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat.
- Net change from existing NFTS in miles of routes within suitable habitat.
- Net change from existing NFTS in percentage of suitable habitat directly impacted by routes added to the NFTS or routes converted from closed to open status

DIRECT AND INDIRECT EFFECTS

General – All Alternatives

The project alternatives could result in direct and indirect effects to the Yosemite toad through the following activities:

- Prohibiting cross country travel off of the NFTS,
- Adding facilities to the NFTS,
- Changing the type of use on NFTS routes,
- Changing the season of use on NFTS routes,
- Implementing mitigation measures.

These actions may have direct and indirect effects on toads through the following: human-caused mortality, changes in behavior, and habitat modification (see Effects Common to all Aquatic Wildlife). Furthermore, Yosemite toads may be less prone to motorized travel because breeding movements typically occur when roads near breeding sites are impassable due to snow, because few trails or roads are located within meadows within the toad's elevational range, and because most post-breeding movements occur in the breeding meadow or upland habitats adjacent to the breeding meadow. However, the dispersal and overwintering movements are large (exceeding 600 meters [approximately 0.4 mile]), making it possible that toads may have to cross roads to reach preferred foraging or overwintering sites.

Alternative 1 (Proposed Action)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable Yosemite toad habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 3.11-67). This alternative would result in the addition to the NFTS of zero stream crossings in known occupied habitat and three stream crossings within suitable habitat. These stream crossings may result in direct and indirect effects to some individuals of all Yosemite toad life history stages. Routes being added to the system within or near known occupied and suitable Yosemite toad habitat may result in direct effects to some juveniles and adults and indirect effects to all life history stages of this toad. Since these impacts would affect a very small percentage of suitable and known occupied habitat, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Field surveys were completed on all routes that were proposed to be added to the NFTS within meadows. The purpose of the field surveys was to determine whether the route would have the potential to affect hydrology within the meadow. These surveys indicated that the routes that were proposed to be added within meadows would not significantly alter their hydrology (see 3.10 Water and RCO Analysis in project record). However, some routes were identified as needing mitigation to improve hydrologic conditions. Effects of the mitigation measures on this species are discussed below.

Season of Use: The Yosemite toad inhabits higher elevations and spends the cold winter months in torpor. All known occupied and suitable Yosemite toad habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these toads entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the Yosemite toad. Since these frogs typically overwinter in earthen cavities (rodent burrows, rock crevices) the use of wheeled over-snow motor vehicles on designated routes (11 in number—see Table 2.02-2) during the winter months would have very little impact on them.

Mitigation Measures: The only type of mitigation measure proposed on routes that are associated with known occupied Yosemite toad habitat is a drain dip. Types of mitigation measures proposed on routes associated with suitable Yosemite toad habitat include barriers and drain dips. The installation of all mitigation measures may result in short-term disturbance to some individual toads, but will limit trail widening, reduce soil perturbation, and reduce sedimentation, providing beneficial effects over the long term.

Table 3.11-67 Alternative 1: Direct and Indirect Effects Indicators (Yosemite toad)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	0
Net change from existing NFTS in miles of routes within known occupied habitat	+ 0.19
Net change from existing NFTS in percentage of known occupied habitat directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%
Net change from existing NFTS in miles of routes within 100 meters (approximately 325 feet) of suitable aquatic habitat	+ 0.30
Net change from existing NFTS in miles of routes within 400 meters (approximately 325 feet) of suitable aquatic habitat	+ 0.30
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	0
Net change from existing NFTS in miles of routes within suitable habitat	+ 0.22
Net change from existing NFTS in percentage of suitable habitat directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%

Alternative 2 (No Action)

Cross Country Travel: Cross country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. Of the 9,000 acres of suitable Yosemite toad habitat on the Stanislaus National Forest, 3,500 acres are open to cross country travel.

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to these toads. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to these toads.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to stream conditions and hydrologic conditions in meadows would continue on routes identified as needing mitigation, causing a potential degradation of habitat.

Alternative 3 (Cross Country Prohibited)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable Yosemite toad. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 2.02-7). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the Yosemite toad.

Mitigation Measures: No mitigation measures would be implemented as part of this alternative. Any damage to stream conditions and hydrologic conditions in meadows would continue on routes identified as needing mitigation, causing a potential degradation of habitat.

Alternative 4 (Recreation)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable Yosemite toad. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 3.11-68). Direct and indirect effects of the actions proposed in this alternative would be the same as those discussed in Alternative 1.

Table 3.11-68 Alternative 4: Direct and Indirect Effects Indicators (Yosemite toad)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	0
Net change from existing NFTS in miles of routes within known occupied habitat	+ 0.19
Net change from existing NFTS in percentage of known occupied habitat directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%
Net change from existing NFTS in miles of routes within 100 meters (approximately 325 feet) of suitable aquatic habitat	+ 0.30
Net change from existing NFTS in miles of routes within 400 meters (approximately 325 feet) of suitable aquatic habitat	+ 0.30
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	+ 1
Net change from existing NFTS in miles of routes within suitable habitat	+ 0.56
Net change from existing NFTS in percentage of suitable habitat directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%

Season of Use: The Yosemite toad inhabits higher elevations and spends the cold winter months in torpor. All known occupied and suitable Yosemite toad habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these toads entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the Yosemite toad. Since these frogs typically overwinter in earthen

cavities (rodent burrows, rock crevices) the use of wheeled over-snow motor vehicles on designated routes (11 in number—see Table 2.02-2) during the winter months would have very little impact on them.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Alternative 5 (Resources)

Cross Country Travel: Cross country travel would be prohibited, limiting the proliferation of illegally created routes near known occupied and suitable Yosemite toad. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 3.11-69). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight decrease from Alternative 1 in the amount of routes added to the system or converted to a trail within suitable habitat, there would likely be a slight decrease in the direct and indirect effects to individuals within the project area. Since these impacts would affect a very small percentage of suitable and known occupied habitat (Table 3.11-69), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Season of Use: The Yosemite toad inhabits higher elevations and spends the cold winter months in torpor. All known occupied and suitable Yosemite toad habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these toads entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the Yosemite toad. Since these frogs typically overwinter in earthen cavities (rodent burrows, rock crevices) the use of wheeled over-snow motor vehicles on designated routes (11 in number—see Table 2.02-2) during the winter months would have very little impact on them.

Mitigation Measures: The effects of mitigation measures in this alternative would be similar to those discussed for Alternative 1.

Table 3.11-69 Alternative 5: Direct and Indirect Effects Indicators (Yosemite toad)

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat	0
Net change from existing NFTS in miles of routes within known occupied habitat	+ 0.19
Net change from existing NFTS in percentage of known occupied habitat directly impacted by routes added to the NFTS or routes converted from closed to open status	+ <1%
Net change from existing NFTS in miles of routes within 100 meters (approximately 325 feet) of suitable aquatic habitat	+ 0.30
Net change from existing NFTS in miles of routes within 400 meters (approximately 325 feet) of suitable aquatic habitat	+ 0.30
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat	+ 0
Net change from existing NFTS in miles of routes within suitable habitat	-- 0.34
Net change from existing NFTS in percentage of suitable habitat directly impacted by routes added to the NFTS or routes converted from closed to open status	-- <1%

CUMULATIVE EFFECTS

While the causes of decline for Yosemite toad are unclear, several past and current stressors have contributed to the decline in Yosemite toad numbers and distribution. The decline of the Yosemite

toad has largely been hypothesized to include factors such as livestock grazing, disease, and pesticide drift. Recreational activities also affect the toad.

Martin (2008) associated declines in Yosemite toad populations primarily with livestock grazing. Beginning in the 1860s, high elevation meadows were heavily impacted by unrestricted, large numbers of sheep. Cattle were introduced in the early 1900s and large numbers were allowed unrestricted access to the high-elevation meadows that provide suitable habitat for the toad. Primary impacts to individuals include the trampling of tadpoles in breeding habitat, of adults and subadults in upland habitats, and of recent metamorphs who have limited mobility. Impacts to habitat may have been more severe, with many meadows losing hydrologic function when streams incised and widened, thereby preventing annual flood waters from inundating the meadow and lowering the water table. Lowered water tables may be important in the persistence of breeding habitat (by causing early desiccation), which is naturally vulnerable in a Mediterranean climate. Livestock have the tendency to linger in the wet habitats in late summer because these habitats frequently support palatable forage. As such, breeding habitats tend to be heavily trampled and pocked by hooves. Livestock also graze the vegetation that may be important to toads for cover, foraging, and creating a cool, moist microclimate at the ground surface. There is also some speculation that the metabolic waste products degrade breeding habitats occupied by tadpoles through exposure to nitrogen (nitrates, nitrites, and ammonium) and phosphorus compounds. On the Stanislaus National Forest, livestock allotments overlap a majority of the known occupied Yosemite toad habitat. Approximately 45% of the known occupied sites occur outside of livestock allotments, primarily in the Emigrant Wilderness area. Historic livestock grazing likely had major impacts to individuals and habitat. Current impacts are considered to be moderate, since livestock numbers have steadily declined over the last 80 years and because restrictions on utilization and the timing of grazing have been recently tightened.

Kagarise Sherman and Morton (1993) documented declines of Yosemite toad populations in and near Yosemite National Park. Using pathological examinations of toads collected during this die-off, Green and Kagarise Sherman (2001) found disease may have been critical in the declines of Yosemite toad populations within protected areas. Several diseases and parasites were detected in preserved specimens, including the chytrid fungus (Batrachochytrium dendrobatidis) suspected in many amphibian die offs (Berger et al. 1998, Lips 1998, Fellers et al. 2001, Daszak et al. 2003). This fungus is apparently widespread and has the potential to affect every population of Yosemite toad on the Stanislaus National Forest. While the past and present impact of disease on Yosemite toad populations is unknown, it is assumed that diseases (in general) and chytridiomycosis (in specific) have a major potential to impact the remaining populations on the Stanislaus National Forest.

Davidson et al. (2002) used spatial tests to determine that windborne contaminants were consistent with Yosemite toad declines because historic sites where Yosemite toads are absent had twice as much agricultural land upwind compared to historic sites that still have toads. Fellers et al. (2004) found elevated levels of DDE and other organochlorines in frog tissues in an area upwind of extensive agriculture. Fellers et al. (2007) and Davidson and Knapp (2007) both suggested airborne agrochemical deposition in the Sierra Nevada are contributing to declines of amphibians in relatively undisturbed environments. It is not known how pesticide contamination has affected the Yosemite toad on the Stanislaus National Forest in the past or currently. It is assumed that airborne contaminants are having a minor to moderate effect on Yosemite toad populations and habitat on the Forest.

Recreation use has increased and is expected to continue to increase on the Stanislaus National Forest (see 3.04 Recreation Resources), resulting in greater likelihood and magnitude of human disturbance to aquatic wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation, based upon State figures for OHV sales (see 3.04 Recreation Resources). The project alternatives would contribute to these past and current conditions with added displacement due to noise and human activity, and indirect effects to aquatic habitat. Approximately 5 miles of new trail

construction, as well as numerous short route segments for dispersed camping access, have been proposed for the future (separate from this project). These trails are proposed to provide "connector routes" between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes could be similar to those described under direct and indirect effects of the alternatives: changes in behavior and loss of habitat.

The project contributes cumulatively to the disturbance and habitat alteration from activities described above. Table 3.11-70 shows the drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would have the most impact on individuals. Because Alternative 2 does not prohibit cross country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts on the toad. Alternatives 4, 1, 5, and 3 would result in progressively lower risk to these frogs due to the amount of motorized routes under each alternative. These alternatives do not result in a loss of habitat (no route construction), but would likely influence habitat suitability. Although the action alternatives may result in additional cumulative impacts, they are very minor in comparison to other factors affecting this species.

Table 3.11-70 Drivable Routes in Yosemite toad habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Number of stream crossings on all routes within known occupied habitat[1,2]	2	2	2	2	2
Total miles of routes within known occupied habitat[1,2]	4.38	4.38	3.45	4.38	4.38
Percentage of known occupied habitat directly impacted by all routes[1,2]	<1%	<1%	<1%	<1%	<1%
Total miles of routes within 100 meters of known occupied habitat[1,2]	25.09	25.19	23.53	25.09	25.09
Total miles of routes within 400 meters of known occupied habitat[1,2]	62.72	65.70	60.46	62.72	62.72
Number of stream crossings on all routes within suitable habitat[1,2]	2	2	1	2	1
Total miles of routes within suitable habitat[1,2]	5.92	6.83	5.70	5.92	5.70
Percentage of suitable habitat directly impacted by all routes[1,2]	<1%	<1%	<1%	<1%	<1%

[1] For Alternatives 1, 3, 4, and 5, includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. For Alternative 2, also includes NFTS routes not open to the public and all unauthorized routes known at the time the data base was last updated.
[2] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 are less than the miles of open routes under Alternative 3.

SUMMARY OF EFFECTS

The Yosemite toad is an endemic species to the state of California and is found at high elevations in the Sierra Nevada Mountains. Although they occur in habitats that are less impacted by humans, they currently only occupy approximately 50% of their historic range (Lannoo 2005).

Table 3.11-71 Ranking of Alternative Indicators (Yosemite toad)

Indicators	Rankings by Alternatives [1]				
	1	2	3	4	5
Stream crossings on all routes within known occupied habitat[1,2,3]	3	1	5	3	3
Miles of routes within known occupied habitat[1,2,3]	3	1	5	3	3
Percentage of known occupied habitat directly impacted by all routes[1,2,3]	3	1	5	3	3
Miles of routes within 100 meters of known occupied habitat[1,2,3]	3	1	5	3	3
Miles of routes within 400 meters of known occupied habitat[1,2,3]	3	1	5	3	3
Stream crossings on all routes within suitable habitat[1,2,3]	3	1	5	3	5
Miles of routes within suitable habitat[1,2,3]	4	1	3	4	5
Percentage of suitable habitat directly impacted by all routes[1,2,3]	5	1	3	5	5
Average	**3.38**	**1.00**	**4.50**	**3.38**	**3.75**

[1] A score of 5 indicates the alternative has the least impact for aquatic biota related to the indicator; A score of 1 indicates the alternative has the most impact for terrestrial biota related to the indicator. If both Alternatives were equal they were both given the same (higher of the two) ranking.
[2] Includes any routes that can be driven, such as other public, private, permitted routes, administrative routes, and NFTS routes open to the public. Alternative 2 also includes unauthorized routes and routes where this is no public right-of-way.
[3] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 is less than the miles of open routes under Alternative 3.

The direct and indirect effects of the project alternatives (1, 2, 3, 4 and 5) combined with the cumulative effects are not likely to result in a trend toward Federal listing or a loss of viability for this species. As can be seen from Table 3.11-71, of the alternatives, Alternative 3 would have the least negative impact on the species. For further discussion of the analysis and determinations, see BA/BE (project record).

Compliance with Forest Plan and Other Direction

American Marten

The American marten was identified by the Regional Forester as a Sensitive Species and MIS on the Stanislaus National Forest (USDA 2007c; USDA 2007e). The FSEIS amended the Forest Plan with updated guidelines for managing furbearers, including the marten (USDA 2004).

Forest Plan Direction

1. Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (particularly fisher and marten) in biological evaluations.
2. Mitigate impacts where there is documented evidence of disturbance to the den site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites.
3. Within Fisher/Marten reproductive areas in Forest Plan Near Natural and Wildlife management areas (see Forest Plan Wildlife Maps). Construct new roads or trails or use existing off-road routes for motorized vehicles only where compatible with road/trail density standards, and where approved in the fisher/marten area management plan.

Forest Plan Compliance

1. Alternative 2 would not prohibit cross country travel; therefore, this alternative would not minimize old forest habitat fragmentation and would not comply with the above mentioned S&G. Alternatives 1, 3, 4, and 5 would prohibit cross country travel. Therefore, they would minimize old forest habitat fragmentation and would comply with the above mentioned S&G.
2. There are no known marten den sites within the project area. Therefore, none of the project alternatives would have the potential to disturb known den sites, and all would comply with the above mentioned S&G.
3. Road/trail density standards are not given in the Forest Plan. Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. Disturbance from these routes is on-going. No new trails are being constructed. Every alternative except Alternative 2 reduces the density of routes in marten habitat. Under Alternative 2, there is a likelihood of route density being increased because cross country travel would be allowed to continue. Therefore, all alternatives except Alternative 2 comply with the above mentioned S&G.

Pacific Fisher

The Pacific fisher was identified by the Regional Forester as a Sensitive Species on the Stanislaus National Forest (USDA 2007c). The FSEIS amended the Forest Plan with updated guidelines for managing furbearers, including the fisher (USDA 2004).

Forest Plan Direction

1. Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (particularly fisher and marten) in biological evaluations.
2. Mitigate impacts where there is documented evidence of disturbance to the den site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites.

3. Within Fisher/Marten reproductive areas in Forest Plan Near Natural and Wildlife management areas (see Forest Plan Wildlife Maps). Construct new roads or trails or use existing off-road routes for motorized vehicles only where compatible with road/trail density standards, and where approved in the fisher/marten area management plan.

Forest Plan Compliance

1. Alternative 2 would not prohibit cross country travel. Therefore, this alternative would not minimize old forest habitat fragmentation and would not comply with the above mentioned S&G. Alternatives 1, 3, 4, and 5 would prohibit cross country travel. Therefore, they would minimize old forest habitat fragmentation and would comply with the above mentioned S&G.
2. There are no known fisher den sites within the project area. Therefore, none of the project alternatives would have the potential to disturb known den sites, and all would comply with the above mentioned S&G.
3. Road/trail density standards are not given in the Forest Plan. Only unauthorized routes, created through cross country travel, are being considered for inclusion into the system. Disturbance from these routes is on-going. No new trails are being constructed. Every alternative except Alternative 2 reduces the density of routes in marten habitat. Under Alternative 2, there is a likelihood of route density being increased because cross country travel would be allowed to continue. Therefore, all alternatives except Alternative 2 comply with the above mentioned S&G.

California Spotted Owl

The California spotted owl was identified by the Regional Forester as a Sensitive Species and MIS on the Stanislaus National Forest (USDA 2007c, USDA 2007e).

Forest Plan Direction

Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites.

Forest Plan Compliance

The Stanislaus National Forest does not monitor spotted owl nest sites for disturbance from motorized recreation; therefore, there is not any documented disturbance to spotted owl nest sites from existing recreation. All routes that have been proposed as additions to the NFTS have been evaluated as part of this planning process.

Northern Goshawk

The northern goshawk was identified by the Regional Forester as a Sensitive Species on the Stanislaus National Forest (USDA 2007c).

Forest Plan Direction

Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites.

Forest Plan Compliance

The Stanislaus National Forest does not monitor goshawk nest sites for disturbance from motorized recreation; therefore, there is not any documented disturbance to goshawk nest sites from existing recreation. All routes that have been proposed as additions to the NFTS have been evaluated as part of this planning process.

Mule Deer

The mule deer was identified by the Regional Forester as a MIS on the Stanislaus National Forest (USDA 2007e).

Forest Plan Direction

1. Deer winter concentration areas or critical winter range may be closed to motorized use from 11/15 – 4/15.
2. Deer summer concentration areas or critical summer range may be closed to motorized use from 4/15 – 8/1.

Forest Plan Compliance

1. Alternatives 2 and 3 would maintain the existing seasonal closures. These are route specific and inconsistent between administrative units. Alternatives 1, 4 and 5 would implement Forest-wide winter seasonal closures for varying lengths of time (between alternatives) that are close to the dates mentioned above on the majority of winter concentration areas and critical winter range. Because the Forest Plan allows seasonal closures for deer, but does not require them, all alternatives are in compliance with this S&G.
2. None of the project alternatives would result in closures on deer summer concentration areas or critical summer range during the season in which deer would be using those areas. The Forest Plan does not require a closure in summer concentration areas or critical summer range for deer: it allows such closures. Therefore, all of the alternatives are in compliance with this S&G.

Bald Eagle

The bald eagle was listed by the USFWS as a federally endangered species in 1978 and was removed from the federal list of Threatened and Endangered Species on June 28, 2007. The bald eagle was identified by the Regional Forester as a Sensitive Species on the Stanislaus National Forest (USDA 2007c). Since 1978 populations have increased nationwide as well as in the Sierra Nevada (USDA 2001). Management direction for the bald eagle is now provided by the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) of 1990 and the Migratory Bird Treaty Act (16 USC 703-712) of 1972. Under these acts, disturbance that is likely to cause injury, substantial interference with normal breeding, feeding or sheltering behavior, or nest abandonment is prohibited (USDI 2007).

USFWS Management Guidelines

1. Off-road vehicle use (including snowmobiles). No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within 330 feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet.
2. Minimize potentially disruptive activities and development in the eagles' direct flight path between their nest and roost sites and important foraging areas.

USFWS Compliance

1. Alternative 2 would not prohibit cross country travel. Therefore, this alternative would not prevent disturbance to nest sites during the breeding season and would not comply with the above mentioned management guideline. Alternatives 1, 3, 4, and 5 would prohibit cross country travel and would not add any routes within 660 feet of nest sites. Therefore, these alternatives would prevent disturbance from motorized vehicles to nest sites during the breeding season and would comply with the above mentioned management guideline.
2. Alternative 2 would not prohibit cross country travel. Therefore, this alternative would not "minimize potentially disruptive activities… between the eagles' nest and roost sites and important foraging areas" and would not comply with the above mentioned management guideline. Alternatives 1, 3, 4, and 5 would prohibit cross country travel and would not add any

routes between the eagles' nest and roost sites and important foraging areas. Therefore, these alternatives would comply with the above mentioned management guideline.

Forest Plan Direction

1. Within Designated Territories (delineated bald eagle management areas, or additional territories, based on nesting occupancy):
    - Implement a Limited Operating Period (LOP) from January 1 through August 31.
    - Apply LOP restrictions to motor vehicle activities on Level 1 roads and OHV routes open to the general public.
    - Prohibit motor vehicle activity in wetlands, streamside management zones, and within 200 feet of lake shorelines that are used by bald eagles.
2. Outside Designated Territories (new active bald eagle nests outside of designated management territories):
    - From January 1 through August 31, implement the following restriction around the nest for a distance determined by the Wildlife Biologist on a site-specific basis.
    - Re-route existing OHV use to routes at a safe distance from the nest.
    - Close or detour existing roads in the proximity of the nest site.
    - Prohibit motor vehicle activities in the roost area.

Forest Plan Compliance

1. Since Alternative 2 would not prohibit cross country travel, this alternative would not prevent disturbance within Designated Territories. Therefore, this alternative would not comply with the above mentioned S&G. Alternatives 1, 3, 4, and 5 would prohibit cross country travel and would not add any routes within Designated Territories. Therefore, these alternatives would comply with the above mentioned S&G.
2. Since Alternative 2 would not prohibit cross country travel, this alternative would not prevent disturbance outside Designated Territories. Therefore, this alternative would not comply with the above mentioned S&G. Alternatives 1, 3, 4, and 5 would prohibit cross country travel and would not add any routes near nest sites outside of Designated Territories. Therefore, these alternatives would comply with the above mentioned S&G.

Peregrine Falcon

The peregrine falcon was listed as a federally endangered species from 1970 through 1999. On August 25, 1999 the final rule was published to de-list the peregrine falcon (USDI 1999) and it was then identified by the Regional Forester as a Sensitive Species on the Stanislaus National Forest (64 FR 46542, USDA 2007c).

Forest Plan Direction

Implement a limited operating period (LOP), from February 1 through July 31, on all peregrine falcon territories active within the preceding five years, for at least 0.5 miles from the nest.

- Restrict motor vehicle activities and new road construction; during this LOP, according to a management plan for the area.
- Prohibit motor vehicle activity within 200 feet of lake shorelines that are used by peregrine falcons.

Forest Plan Compliance

Alternative 2 would not prohibit cross country travel; thus this alternative would not prevent disturbance within peregrine falcon territories. Therefore, this alternative would not comply with the above mentioned S&G. Alternatives 1, 3, 4, and 5 would prohibit cross country travel and would not

add any routes within peregrine falcon territories. Therefore, these alternatives would comply with the above mentioned S&G.

Valley Elderberry Longhorn Beetle

On August 8, 1980, the valley elderberry longhorn beetle (VELB) was listed as a threatened species (45 FR 52803). Critical habitat was also designated at this time, but does not occur on the Stanislaus National Forest. To assist with the Travel Management Planning process, the Forest Service entered into programmatic consultation with the USFWS for designation of unauthorized or unclassified routes and areas for recreational use by wheeled motorized vehicles. On December 27, 2006, the USFWS issued a Letter of Concurrence for 14 National Forests in California, including the Stanislaus National Forest. The Letter of Concurrence approved the PDC as outlined in the document entitled "Route Designation: Project Design Criteria for 'No Effect' or 'May Affect Not Likely to Adversely Affect' Determination for TE Species – October 2006 version 1." Therefore, if all actions proposed within the Travel Management Plan alternatives (analyzed in detail) comply with the PDC to reach a determination of "No Effect" or "May Affect Not Likely to Adversely Affect" for TE species, no further consultation is required. If the PDC are not followed, further consultation is required.

USFWS Project Design Criteria

1. Unauthorized staging areas proposed for designation are not within 100 feet of occupied VELB sites or suitable habitat of elderberry plants containing stems measuring 1.0 inches or greater in diameter at ground level.
2. Unauthorized routes or areas proposed for designation are not within 20 feet of occupied VELB sites or suitable habitat of elderberry plants containing stems measuring 1.0 inches or greater in diameter at ground level.

Project Design Criteria Compliance

1. The project alternatives do not propose to add any staging areas. Therefore, all project alternatives would be in compliance with the above mentioned PDC.
2. The project alternatives do not propose to add any staging areas. Alternative 2 would not prohibit cross country travel; thus this alternative would not prevent the creation of routes within 20 feet of occupied VELB sites or suitable habitat. Therefore, this alternative would not comply with the above mentioned PDC. Field surveys were completed on all routes below 3000 feet in elevation that were proposed to be added within Alternatives 1, 4, and 5. Alternatives 1, 3, 4, and 5 would prohibit cross country travel and would not add any routes within 20 feet of occupied VELB sites or suitable habitat. Therefore, these alternatives would comply with the above mentioned PDC.

If either Alternatives 1, 3, 4 or 5 is selected, no further consultation with USFWS is required for this species.

Lahontan Cutthroat Trout

The Lahontan cutthroat trout (LCT) was listed by the USFWS as an endangered species in 1970 (35 FR 13520). The listing was reclassified to threatened status in 1975 to facilitate recovery and management efforts and authorize regulated angling (40 FR 29864). Critical Habitat has not been designated for the LCT (USDI 1995). To assist with the Travel Management Planning process, the Forest Service entered into programmatic consultation with the USFWS for designation of unauthorized or unclassified routes and areas for recreational use by wheeled motorized vehicles. On December 27, 2006, the USFWS issued a Letter of Concurrence for 14 National Forests in California, including the Stanislaus National Forest. The Letter of Concurrence approved the PDC as outlined in the document entitled "Route Designation: Project Design Criteria for 'No Effect' or 'May Affect Not Likely to Adversely Affect' Determination for TE Species – October 2006 version 1." Therefore, if all actions proposed within the Travel Management Plan alternatives (analyzed in detail) comply with the PDC to reach a determination of "No Effect" or "May Affect Not Likely to Adversely

Affect" for TE species, no further consultation is required. If the PDC are not followed, further consultation is required.

USFWS Project Design Criteria

1. Unauthorized routes and areas proposed for designation do not cross any stream within the occupied range of LCT.
2. Unauthorized routes and areas proposed for designation are not located on active landslides and do not re-route surface water onto active landslides within watersheds that provide habitat for LCT.
3. Within watersheds that provide habitat for LCT, unauthorized routes or areas proposed for designation do not have the potential to capture surface run-off and then deliver sediment into a stream.
4. Unauthorized areas proposed for designation are located outside of RCAs that are within watersheds that provide habitat for LCT.
5. Within watersheds that provide habitat for LCT, unauthorized routes proposed for designation avoid RCAs.

Project Design Criteria Compliance

1. The project alternatives do not propose to add any staging areas. Alternative 2 would not prohibit cross country travel; thus this alternative would not prevent the creation of routes and stream crossings within the occupied range of LCT. Therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, and 5 would prohibit cross country travel and would not add any routes or stream crossings within the occupied range of LCT. Therefore, these alternatives would comply with the above mentioned PDC.
2. The project alternatives do not propose to add any staging areas. Alternative 2 would not prohibit cross country travel; thus this alternative would not prevent the creation of routes on active landslides nor would it prevent the creation of routes that could potentially divert surface water onto active landslides within watersheds that provide habitat for LCT. Therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, and 5 would prohibit cross country travel and would not add any routes on active landslides nor would they add any routes that could potentially divert surface water onto active landslides within watersheds that provide habitat for LCT; therefore, these alternatives would comply with the above mentioned PDC.
3. The project alternatives do not propose to add any staging areas. Alternative 2 would not prohibit cross country travel; thus, this alternative would not prevent the creation of routes that may have the potential to capture surface run-off and then deliver sediment into a stream that provides habitat for LCT. Therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, and 5 would prohibit cross country travel and would not add any routes that may have the potential to capture surface run-off and then deliver sediment into a stream that provides habitat for LCT. Therefore, these alternatives would comply with the above mentioned PDC.
4. The project alternatives do not propose to add any staging areas. Therefore, all project alternatives would be in compliance with the above mentioned PDC.
5. Alternative 2 would not prohibit cross country travel; thus, this alternative may result in the creation of routes that do not avoid RCAs within watersheds that provide habitat for LCT. Therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, and 5 would prohibit cross country travel and would not add any routes within RCAs that are within watersheds that provide habitat for LCT. Therefore, these alternatives would comply with the above mentioned PDC.

If either Alternatives 1, 3, 4 or 5 is selected, no further consultation is required for this species.

California Red-legged Frog

On May 23, 1996, the CRLF was listed as a threatened species (61 FR 25813). On April 13, 2006, critical habitat was designated, but does not exist on the Stanislaus National Forest (71 FR 19244). To assist with the Travel Management Planning process, the Forest Service entered into programmatic consultation with the USFWS for designation of unauthorized or unclassified routes and areas for recreational use by wheeled motorized vehicles. On December 27, 2006, the USFWS issued a Letter of Concurrence for 14 National Forests in California, including the Stanislaus National Forest. The Letter of Concurrence approved the PDC as outlined in the document entitled "Route Designation: Project Design Criteria for 'No Effect' or 'May Affect Not Likely to Adversely Affect' Determination for TE Species – October 2006 version 1." Therefore, if all actions proposed within the Travel Management Plan alternatives (analyzed in detail) comply with the PDC to reach a determination of "No Effect" or "May Affect Not Likely to Adversely Affect" for TE species, no further consultation is required. If the PDC are not followed, further consultation is required.

USFWS Project Design Criteria

1. Unauthorized routes or areas proposed for designation do not have the potential to capture surface run-off and then deliver sediment into a stream associated with the CRLF.
2. In suitable CRLF habitat, unauthorized routes proposed for designation avoid Riparian Reserve (RR) and Riparian Conservation Areas (RCAs) except where necessary to cross streams. Crossing approaches get the riders in and out of the stream channel and riparian area in the shortest distance possible while meeting the gradient and approach length standards.
3. Unauthorized routes or areas proposed for designation do not cross any stream or waterbody within 500 feet of known occupied sites of CRLF; and no route or area is within a distance of 500 feet from wetland (i.e. springs, wet meadows, ponds, marshes).
4. In habitat occupied by CRLF, unauthorized routes or areas proposed for designation 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.
5. Unauthorized areas proposed for designation are located outside of RR and RCAs, meadows, and wetlands, within CRLF habitat.
6. No unauthorized route or areas proposed for designation are within CARs for CRLF.

Project Design Criteria Compliance

1. The project alternatives do not propose to add any staging areas. Alternative 2 would not prohibit cross country travel; thus, this alternative would not prevent the creation of routes that may have the potential to capture surface run-off and then deliver sediment into a stream associated with the CRLF. Therefore, this alternative would not comply with the above mentioned PDC. Alternative 3 would prohibit cross country travel and would not add any routes to the NFTS. Therefore, this alternative would comply with the above mentioned PDC. Alternatives 1 and 4 would prohibit cross country travel but would add routes that may have the potential to capture surface run-off and then deliver sediment into a stream associated with the CRLF. Therefore, these alternatives would not comply with the above mentioned PDC (Table 3.11-72). Alternative 5 would prohibit cross country travel and would not add routes that may have the potential to capture surface run-off and then deliver sediment into a stream associated with the CRLF. Therefore, this alternative would comply with the above mentioned PDC (Table 3.11-72).
2. Alternative 2 would not prohibit cross country travel; thus, this alternative would not prevent the creation of routes that avoid RCAs except where necessary to cross streams in suitable CRLF habitat. Therefore, this alternative would not comply with the above mentioned PDC. Alternative 3 would prohibit cross country travel and would not add any routes to the NFTS. Therefore, this alternative would comply with the above mentioned PDC. Alternatives 1 and 4 would prohibit cross country travel but would add routes that do not avoid RCAs except where necessary to cross streams in suitable CRLF habitat. Therefore, these alternatives would not comply with the above

mentioned PDC (Table 3.11-72). Alternative 5 would prohibit cross country travel and would not add routes that do not avoid RCAs except where necessary to cross streams in suitable CRLF habitat. Therefore, this alternative would comply with the above mentioned PDC (Table 3.11-72).

3. As discussed in the Affected Environment section on CRLF, all suitable habitat has not been surveyed within the last two years to the most recent protocol. The FWS stated in 2002 that the CRLF has been extirpated from the part of its historic range which is on or adjacent to the Stanislaus National Forest (USDI 2002). In 2004 the FWS stated that drainages in the tributaries of the Tuolumne River and Jordan Creek are considered unoccupied (Federal Register 2004). This analysis takes a conservative approach in assuming that there is a low possibility that suitable habitat is occupied. This PDC addresses **known**, not assumed, occupied habitat. There are not any known occupied sites of CRLF within the project area. Therefore, all the project alternatives would comply with the above mentioned PDC.
4. See discussion under #3 above. There are not any known occupied sites of CRLF within the project area. Therefore, all the project alternatives would comply with the above mentioned PDC.
5. See discussion under #3 above. The project alternatives do not propose to add any staging areas. Therefore, all the project alternatives would comply with the above mentioned PDC.
6. There are not any CARs for CRLF within the project area. Therefore, all the project alternatives would comply with the above mentioned PDC.

Table 3.11-72 Routes inconsistent with USFWS PDC for the California red-legged frog

Route Number	PDC Consistency	Additions to the NFTS		
		ALT 1	ALT 4	ALT 5
17EV192	Inconsistent	Yes	Yes	No
17EV192A	Inconsistent	Yes	Yes	No
17EV192B	Inconsistent	Yes	Yes	No
17EV194	Inconsistent	Yes	Yes	No
1S17M	Inconsistent	Yes	Yes	No
FR98508	Inconsistent	Yes	Yes	No
FR98509	Inconsistent	Yes	Yes	No
FR98510	Inconsistent	Yes	Yes	No
FR98511	Inconsistent	Yes	Yes	No
FR98514	Inconsistent	Yes	Yes	No
FR98566	Inconsistent	Yes	Yes	No
FR98575	Inconsistent	Yes	Yes	No

If Alternatives 1, 2 or 4 is selected, further consultation with the USFWS is required.

Forest Plan Direction

Within 300 feet of streams or ponds that have potential suitable habitat:

- Construct new roads or trails or use off-road routes for motorized vehicles only after conducting amphibian surveys to the most recent protocol for the frog.
- Allow stream crossings only where the route, through the water, and the adjacent streamside areas are naturally resistant to tires or are hardened with rock or other materials.

Forest Plan Compliance

Alternative 2 would not prohibit cross country travel; thus, this alternative would not prevent the creation of routes or unhardened stream crossings within 300 feet of potential suitable habitat for the CRLF. Therefore, this alternative would not comply with the above mentioned S&G. Alternative 3 would prohibit cross country travel and would not add any routes to the NFTS. Therefore, this alternative would comply with the above mentioned S&G. Alternative 5 would prohibit cross country travel and would not add any routes within 300 feet of potential suitable CRLF habitat. Therefore, this alternative would comply with the above mentioned S&G. Alternatives 1 and 4 would prohibit cross country travel but would add routes and unhardened stream crossings within 300 feet of potential suitable habitat for the CRLF (Table 3.11-73). Management requirements (surveys

completed to protocol) and mitigation measures (hardened stream crossings) are proposed on these routes to ensure that Alternatives 1 and 4 would comply with the above mentioned S&G (see 2.03 Mitigation and Other Requirements Common to All Action Alternatives).

Table 3.11-73 Routes inconsistent with the Forest Plan for the California red-legged frog

Route Number	Forest Plan Consistency	Additions to the NFTS		
		ALT 1	ALT 4	ALT 5
17EV192	Inconsistent	Yes	Yes	No
17EV192A	Inconsistent	Yes	Yes	No
17EV192B	Inconsistent	Yes	Yes	No
17EV194	Inconsistent	Yes	Yes	No
17EV195	Inconsistent	Yes	Yes	No
17EV196	Inconsistent	Yes	Yes	No
17EV197	Inconsistent	Yes	Yes	No
1S1734A	Inconsistent	No	Yes	No
1S17E35B	Inconsistent	Yes	Yes	No
1S17M	Inconsistent	Yes	Yes	No
FR10178	Inconsistent	Yes	Yes	No
FR8516	Inconsistent	Yes	Yes	No
FR98481	Inconsistent	Yes	Yes	No
FR98508	Inconsistent	Yes	Yes	No
FR98509	Inconsistent	Yes	Yes	No
FR98510	Inconsistent	Yes	Yes	No
FR98511	Inconsistent	Yes	Yes	No
FR98513	Inconsistent	Yes	Yes	No
FR98514	Inconsistent	Yes	Yes	No
FR98566	Inconsistent	Yes	Yes	No
FR98575	Inconsistent	Yes	Yes	No

Western Pond Turtle

The WPT was identified by the Regional Forester as a Sensitive Species on the Stanislaus National Forest (USDA 2007c).

Forest Plan Direction

In areas adjacent to waters with known populations of WPT:

- Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist.

Forest Plan Compliance

Alternative 2 would not prohibit cross country travel. Therefore, this alternative would not prevent the creation of routes within ¼ mile of occupied pond turtle habitat and would not comply with the above mentioned S&G. Alternative 3 would prohibit cross country travel and would not add any routes to the NFTS. Therefore, this alternative would comply with the above mentioned S&G. Alternative 5 would prohibit cross country travel and would not add any routes to the NFTS within ¼ mile of occupied pond turtle habitat. Therefore, this alternative would comply with the above mentioned S&G. Alternatives 1 and 4 would prohibit cross country travel but would add routes within ¼ mile of occupied pond turtle habitat that were not approved by a Wildlife Biologist. Therefore, these routes would not comply with the above mentioned S&G (Table 3.11-74). These routes will be excepted from this S&G through a minor Forest Plan amendment. The effects of excepting these routes from this amendment are disclosed above under the WPT section and within the BA/BE (project record).

Table 3.11-74 Routes inconsistent with the Forest Plan for the western pond turtle

Route Number	Forest Plan Consistency	Additions to the NFTS		
		ALT 1	ALT 4	ALT 5
17EV192	Inconsistent	Yes	Yes	No
17EV192A	Inconsistent	Yes	Yes	No
17EV192B	Inconsistent	Yes	Yes	No
17EV194	Inconsistent	Yes	Yes	No
17EV195	Inconsistent	Yes	Yes	No
17EV196	Inconsistent	Yes	Yes	No
17EV197	Inconsistent	Yes	Yes	No
17EV197A	Inconsistent	Yes	Yes	No
17EV901	Inconsistent	Yes	Yes	No
1S1727	Inconsistent	Yes	Yes	No
1S17E35B	Inconsistent	Yes	Yes	No
1S17M	Inconsistent	Yes	Yes	No
1S1902	Inconsistent	Yes	Yes	No
1S1907A	Inconsistent	No	Yes	No
1S1929	Inconsistent	Yes	Yes	No
1S1929C	Inconsistent	Yes	Yes	No
FR10178	Inconsistent	Yes	Yes	No
FR8516	Inconsistent	Yes	Yes	No
FR8601	Inconsistent	Yes	Yes	No
FR98482	Inconsistent	Yes	Yes	No
FR98486	Inconsistent	Yes	Yes	No
FR98504	Inconsistent	Yes	Yes	No
FR98508	Inconsistent	Yes	Yes	No
FR98509	Inconsistent	Yes	Yes	No
FR98510	Inconsistent	Yes	Yes	No
FR98511	Inconsistent	Yes	Yes	No
FR98513	Inconsistent	Yes	Yes	No
FR98514	Inconsistent	Yes	Yes	No
FR98515	Inconsistent	Yes	Yes	No
FR98520	Inconsistent	Yes	Yes	No
FR98537	Inconsistent	Yes	Yes	No
FR98539	Inconsistent	Yes	Yes	No
FR98541	Inconsistent	Yes	Yes	No
FR98548	Inconsistent	Yes	Yes	No
FR98554	Inconsistent	Yes	Yes	No
FR98560	Inconsistent	Yes	Yes	No
FR98566	Inconsistent	Yes	Yes	No
FR98575	Inconsistent	Yes	Yes	No
FR98599	Inconsistent	Yes	Yes	No

Migratory Landbird Conservation on the Stanislaus National Forest

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

As part of the Travel Management process, the Stanislaus National Forest has conducted an assessment of existing roads and trails within Forest boundaries. Any new construction, reconstruction and maintenance of system roads or trails will be conducted under a separate NEPA analysis and decision. Because current travel management efforts are directed at identifying which existing unauthorized routes will be formally added to the NFTS while prohibiting cross country travel, and because there is no expectation of new construction or development, no changes in the distribution or abundance of habitats available to migratory birds are anticipated. Changes in authorization are not anticipated to contribute to a measurable increase in use levels, but the prohibition of cross country travel is expected to result in less use across the landscape. Therefore, habitat functionality is expected to remain similar or more than, and levels of disturbance related to use are expected to remain similar to or less than, pre-decisional levels.