Terrestrial Wildlife

Introduction

Management of terrestrial 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 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 to the degree consistent with multiple-use objectives established in each Forest Land and Resource Management Plan (LRMP). Management decisions related to motorized travel can affect terrestrial species by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat (Gaines et al. 2003, Trombulek and Frissell 2000, USDA Forest Service 2000). It is Forest Service policy to minimize damage to vegetation, avoid harassment to wildlife, and avoid significant disruption of wildlife habitat while providing for motorized 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 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 threatened or endangered (TE) species, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. Section 7 of the ESA, as amended, requires the responsible Federal agency to consult the 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 likely to jeopardize the continued existence of a TE species, or result in the destruction or adverse modification of habitat of such species that is determined to be critical. This assessment is documented in a Biological Assessment (BA) and is summarized or referenced in this chapter.

Forest Service Manual and Handbooks

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

Sierra Nevada Forest Plan Amendment (SNFPA)

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

- Wetland and Meadow Habitat (Management Standard & Guideline 70): See Water Resources section.
- California Spotted Owl and Northern Goshawk: Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb nest sites (Management Standard & Guideline 82).
- Fisher and Marten: Evaluate proposals for new roads, trails, off highway vehicle routes, and recreational and other developments for their potential to disturb den sites (Management Standard & Guidelines 87 and 89).
- Riparian Habitat (Management Standard & Guideline 92): See Water Resources section.
- Bog and Fen Habitat (SNFPA ROD page 65, Standard and Guideline #118): Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles.

The Northwest Forest Plan (NWFP)

The NWFP includes specific requirements for Survey and Manage species and areas such as aquatic conservation areas.

The Modoc National Forest Land and Resource Management Plan (MDF LRMP)

The MDF LRMP includes specific requirements for wildlife species (p. 4-27 to 4-28 – 3).

- C. Within designated golden eagle, Swainson's hawk, osprey, and prairie falcon habitat manage all currently active nest territories as directed in the following:

    - Golden Eagle – Such activities as OHV use and maintenance or construction of facilities, trails, and roads would be restricted within 1/4 – to ½ mile of the nest during the reproductive period, February to August, because they may be detrimental to nesting and fledging.

    - Swainson's Hawk – Prohibit disturbing management activities with (sic) 1/4 – mile of nest sites from March 1 through July 31. Disturbance from management activities include firewoodcutting; range habitat improvements; and construction or maintenance of facilities, trails or roads.

    - Osprey – Disturbance from human activities, including foot traffic and OHV use within 1/8- to ½ mile of the nest, may be detrimental to nesting and fledging during the reproductive period, March to August. Disturbing activities would be restricted.

    - Prairie Falcon - Disturbance from human activities, including foot traffic and OHV use within 1/8- to ½ mile of the nest, may be detrimental to nesting and fledging during the reproductive period, March 1 to August 1. Disturbing activities would be restricted.

K. Within mule deer habitat:

On deer winter ranges where OHV use is demonstrated to adversely affect deer, institute OHV closures from December 1 to March 31.

- The following guidelines are part of the Raptor Management Prescription – 9 of the MDF LRMP:
    - p. 4-85 - Off-highway vehicle use has seasonal restrictions.
    - p. 4-85 – 1. Within bald eagle nesting and wintering habitat:
        - b. New roads would not be constructed in winter roosts. Existing roads in winter roosts would be closed during the wintering period. New roads would not be constructed within primary zones of active nest territories. Construction within secondary zones would be determined on a case-by-case basis.
        - c. Seasonal or permanent road closures may be necessary to limit human disturbance during the reproductive or wintering period, depending on the area.
    - p. 4-86 – 2. Within goshawk habitat:
        - b. New roads should not be constructed within nest stands.
        - c. Roads may be maintained, constructed and reconstructed within ¼ mile of nest stands from August through February.
    - p. 4-88 – Recreation. Refer to OHV map for seasonal closure areas.
    - p. 4-88 - Recreation. 1. Within bald eagle nesting and wintering habitat:

      Motorized vehicles would be permitted September through December in nesting territories and April through October in wintering areas. Other times of the year these areas may be administratively closed.
    - p. 4-89 – 2. Within and near goshawk habitat:
        - Disturbance from recreational facilities may limit reproductive success. New or expanding facilities should be at least ½ mile from nest stands.
        - Within ¼ mile of nest stands, motorized vehicles would be permitted August through February. Other times of year these areas may be administratively closed.

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

Effects Analysis Methodology

This is a site-specific project, for which there are two levels of analysis. First, there is site-specific analysis of the individual routes proposed for addition. This detailed analysis is by route and will be included in an appendix (or the project record). The Forest has documented that each discipline has assessed each individual route (currently unauthorized roads, trails, areas) proposed for addition to the National Forest Transportation System (NFTS) at a level sufficient to support their effects analysis and identify any necessary site-specific mitigations.

Second, there is the analysis of each alternative as a whole, which is informed by the site-specific route analysis noted above and other information. The discussion of the direct, indirect, and cumulative effects of each alternative is in a summary form. For ease of understanding, the effects of the alternatives are described separately for three discreet actions, and then combined to provide the total direct and indirect effects of each alternative (see below). The combination of these discreet actions is then added to the past, present, and reasonably foreseeable actions in the cumulative effects analysis. The three discreet actions common to all action alternatives are (1) The prohibition of cross-country motorized vehicle travel; (2) The addition of facilities

(unauthorized routes, trails, or areas) to the National Forest Transportation System (NFTS), including identifying seasons of use and vehicle class; and (3) Changes to the existing NFTS .

Impacts Relevant to Terrestrial Biota

Vehicle use on and off established routes has affected or has the potential to affect terrestrial species, including threatened, endangered, and sensitive species, by increasing human-caused mortality, changing behavior due to disturbance, and modifying habitat.

Assumptions specific to the terrestrial biota analysis

See the chapter 3 Introduction for a list of common assumptions.

The focus of this analysis is on suitable habitat; suitable habitat is assumed occupied unless it has been surveyed to a standard that determines absence. Suitable habitat was defined using the California Wildlife Habitat Relationships (CWHR) system (see below for more information on the methodology used). Because the CWHR suitability may reflect slightly different definitions of suitability than more specific models of species habitat, the reader is cautioned that directly comparing acres of "suitable" habitat between this document and its CWHR-based definitions and other analysis documents that use other systems for defining suitability of habitat is inappropriate and may be misleading.

All vehicle types result in the same amount of disturbance effect to wildlife.

Location of a trail or route is equal to disturbance effects from that trail or route (i.e., it is assumed all trails provide the same level of disturbance), unless local data or knowledge indicate otherwise.

Habitat is already impacted in the short term. In the long term, habitat would remain the same on added trails or routes, but would increase to at least some degree on non-added trails with ban of cross-country travel and subsequent passive restoration. Routes not added to the NFTS under Alternatives 2 through 5 would slowly re-vegetate and regain the conditions that exist on adjacent lands. The low levels of public non-motorized use, permitted use, or administrative use would be insufficient to overcome the natural in-growth of vegetation and accumulation of organic material into the unauthorized routes.

For this analysis, all land managed by the Modoc National Forest was considered in the analysis of effects to habitat. Indexes and habitat analysis are specifically limited to habitat occurring on National Forest System lands. Habitat analysis is based on current vegetation data (USFS 2007) that was collected and processed in 2003. Earlier data sets are available that cover a more extensive area outside of the proclaimed National Forest boundary, but these data sets are older (based in early 1990s imagery), and not as well assigned to vegetation groups matching the California Wildlife Relationships System vegetation groups. Occupancy and occurrence of species on adjacent lands is included in the qualitative, population, or cumulative effects portions of the analysis.

Data Sources

- The California Wildlife Habitat Relationships program (CWHR version 8.0; Calif. Dept. of Fish and Game, 2002) was used to define suitability for the species analyzed by this document. Habitat conditions were considered as "suitable" if a particular size and stage class provided a combined rating of at least 0.75 for the three components of cover, feeding, and reproduction. This means any given stage had to provide at least one high rating and two medium ratings. This level was picked to select habitats that the biologist felt were key to persistence while excluding marginal or peripheral habitats.

- GIS layers with the following information: route, habitats, and "designated" or important wildlife areas (e.g., PACs; bald eagle nests; deer herd critical areas) as stored in Forest and district files.
- District and Forest information files and personal knowledge.

Terrestrial Biota Indicators

Each indicator was calculated using the sources of information above, using GIS queries.

Acres open to motorized use and miles of unauthorized routes within terrestrial biota habitat.

Miles of motorized routes at Forest-wide scale and within the habitat for each species group.

Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added route or area.

The proportion of a species (or species group's) habitat that is affected by motorized routes.

Terrestrial Biota Methodology by Action

Direct and Indirect Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

Short-term time frame: 1 year.

Long-term time frame: 20 years.

Spatial boundary: Forest.

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

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

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

Direct and Indirect Effects of Adding Facilities to the NFTS (presently unauthorized routes, trails, and areas), Including Identifying Seasons of use and Vehicle Class

Short-term time frame: 1 year.

Long-term time frame: 20 years.

Spatial boundary: Forest.

Indicator(s): (1) Miles of motorized routes; (2) Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added route or area; (3) 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 or sensitive terrestrial biota areas.

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

Changes to the Existing NFTS

Short-term time frame: 1 year.

Long-term time frame: 20 years.

Spatial boundary: Forest.

Indicator(s): (1) Miles of motorized routes; (2) Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added route or area; (3) 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 terrestrial biota areas.

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

Cumulative Effects

Short-term time frame: not applicable; cumulative effects analysis will be done only for the long-term time frame.

Long-term time frame: 20 years.

Spatial boundary: Forest

Indicator(s): (1) Miles of motorized routes; (2) Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added route or area; (3) The proportion of a species (or species group's) habitat that is affected by motorized routes.

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

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

Affected Environment and Environmental Consequences

Affected Environment – General Wildlife

The Modoc National Forest provides habitat for over 350 species of birds, mammals, amphibians, and reptiles (USFS 1991). One terrestrial wildlife species is currently listed as Endangered or Threatened under the ESA and 15 species listed as Forest Service Sensitive (Table 3-81). These species and their habitats on the Modoc National Forest are described in detail in the Modoc National Forest Motorized Travel Management EIS Biological Evaluation and the Biological Assessment (BE and BA), which can be found in the project record and is summarized in the next section. In addition, there are eight terrestrial Management Indicator Species (MIS) on the Modoc National Forest (Table 3-82).

Table 3-81. Threatened, Endangered, and Sensitive Terrestrial Species of the Modoc National Forest.

Threatened or Endangered species	
Birds	
Northern Spotted Owl	*Strix occidentalis caurina*
Forest Service sensitive species	
Birds	
Bald eagle	*Haliaeetus leucocephalus*
Northern goshawk	*Accipter gentilis*
Swainson's hawk	*Buteo swainsoni*
Greater sage-grouse	*Centrocercus urophasianus*
Willow flycatcher	*Empidonax traillii*
Greater sandhill crane	*Grus canadensis tabida*
Peregrine falcon	*Falco peregrinus*
Great gray owl	*Strix nebulosa*
California spotted owl	*Strix occidentalis occidentalis*
Mammals	
Pallid bat	*Antrozous pallidus*
Townsend's big-eared bat	*Corynorhinus townsendii*
California wolverine	*Gulo gulo luteus*
Marten	*Martes americana*
Sierra Nevada red fox	*Vulpes vulpes necator*

Table 3-82. Terrestrial Management Indicator Species (MIS) of the Modoc National Forest.

Management Indicator Species	
Birds	
Greater sage-grouse	*Centrocercus urophasianus*
Sooty grouse	*Dendragapus obscurus*
Hairy woodpecker	*Picoides villosus*
Yellow warbler	*Dendroica petechia*
Mountain quail	*Oreotyx pictus*
Black-backed woodpecker	*Picoides arcticus*
Mammals	
Marten	*Martes americana*
Northern flying squirrel	*Glaucomys volans*

Some of these species are currently being affected by cross-country motorized use of the Modoc National Forest. Literature describing the effects of motorized routes and trails upon wildlife have often grouped or categorized species in various ways to describe effects (Knight and Gutzwiller, eds. 1995, Gaines et al. 2003, Wisdom et al. 2000). Gaines et al. (2003) categorized species into six groups based upon a combination of their biology and interactions with route- and motorized trail-associated factors. For this analysis the following groups are used: (1) late-successional Forest, (2) wide-ranging carnivores, (3) ungulates, (4) riparian, (5) cavity dependent, (6) oak-woodland and oak-conifer associated species, (7) wetland, and (8) sage steppe. Threatened, Endangered, and Forest Service Sensitive species (TES) and MIS with habitat likely to be affected by motorized route or trail use, fall into these categories as shown in Table 3-83 (below).

Table 3-83. Wildlife group and focal species represented within groups

Wildlife group	Focal Species
Late-successional Forest	Northern spotted owl#, California spotted owl*, northern goshawk*, great gray owl*, American marten*+, sooty grouse+, northern flying squirrel+
Wide-ranging carnivores	Black bear, wolverine, Sierra Nevada red fox*
Ungulates	Mule deer, e k, bighorn sheep
Riparian	Bald eagle*, willow flycatcher*, yellow warbler+, osprey
Cavity-dependent	Pallid bat*, hairy woodpecker+, black-backed woodpecker+, pileated woodpecker, red-naped and red-breasted sapsuckers
Oak-woodland and oak-conifer	Western gray squirrel, wild turkey, mountain quail+
Wetland	Sandhill crane*, Canada goose, mallard
Sage Steppe	Pronghorn, Swainson's hawk*, greater sage-grouse*+, golden eagle

= Listed as "Proposed", "Threatened", or "Endangered" under the Endangered Species Act.

* = Listed as a "Sensitive" species in the Forest Service Pacific Southwest Region.

+ = Listed as a Management Indicator Species for the Modoc National Forest

Cumulative Effects Setting

The impacts to habitat are summarized in the table below. Of primary importance to wildlife is the amount of ongoing vegetation manipulation that is occurring and is reasonably foreseeable. Additional vegetation manipulation is occurring on private lands adjacent to the lands managed by the Modoc National Forest. Extensive tree thinning, as well as stand regeneration, are occurring on adjacent and nearby private lands. Additional adjacent lands are affected each year by extensive livestock grazing and, in some cases, conversion to intensive agriculture. Analysis of cumulative effects considers these impacts that are likely to occur on private lands as well as the foreseeable actions on public lands. Table 3-84 below details the reasonably foreseeable public land actions that may occur on or adjacent to the Modoc National Forest.

Table 3-84. Summary of Reasonably Foreseeable Vegetation Altering Actions on Public Land In and Adjacent to the Modoc National Forest

Type of Vegetation Change	Estimated average impact	Land Manager
Prescribed fire	4,000 acres/year	Modoc NF
Mechanical fuels treatment	6,000 acres/year	Modoc NF
Timber harvest	2,500 acres for sawlogs/year	Modoc NF

Type of Vegetation Change	Estimated average impact	Land Manager
	3,000 acres for wood fiber/year	Modoc NF
Sage-steppe restoration	15,000 acres first decade 19,000 acres second decade	Modoc NF & BLM Modoc NF & BLM
Grazing	122,500 AUMs/year[1] 54,800 AUMs/year	Modoc NF BLM (USDI 2008)
Power transmission corridor maintenance	3,000 acres/decade	Modoc NF
Road construction	0.95 mi/year (based on last 10 yrs.)	Modoc NF
Road decommissioning	7.68 miles/year (based on last 10 yrs.)	Modoc NF

[1]AUM—animal unit per month

Because private landowners do not typically publish their long-term management plans, actions on private land are more difficult to analyze. Varying amounts of timber harvest and grazing do occur annually on lands adjacent to National Forest System lands managed by the Modoc National Forest. The quantity in any given year is variable and driven by market conditions and events such as fire and insect outbreaks.

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

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one can not reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events; which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, “agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.” Also see CFR 220.4 (f). For these reasons, the analysis of past actions in this section is based on current environmental conditions.

Terrestrial Biota Affected Environment and Environmental Consequences

See the effects methodology section above regarding how the environmental consequences analysis was conducted.

Late-Successional, Forest-Associated Species: Affected Environment

Focal species within the group: northern spotted owl, California spotted owl, northern goshawk, great gray owl, marten, sooty grouse, and northern flying squirrel.

This species group is associated with mature to old Forests that contain characteristics of late-successional stages. These characteristics include large trees for a given growing site, relatively high canopy closure, elevated amounts of decadence in the form of snags (standing, dead trees), down logs, in-tree decay and deformity. Table 3-85 displays the CWHR vegetation type, size and stage classes that provide a cumulative habitat suitability value of at least 0.75 in the CWHR program. For this analysis, habitat conditions are considered as "suitable" if a particular size and stage class provides a combined rating of at least 0.75 for the three components of cover, feeding, and reproduction. This means any given stage had to provide at least one high rating and two medium ratings. This level was picked to select habitats that the biologist felt were key to persistence, while excluding marginal or peripheral habitats. Because special habitat elements that a species may require (e.g, large tree cavities) are not accounted for directly within the CWHR type it was felt that constraining the model to having at least one component in the high category would compensate for overestimation that appeared to occur if only moderate level suitability was included for all three stages. Conversely, requiring at least two high suitability ratings constrained habitat for some species to levels below known occurrence.

Table 3-85. For the late-Successional Group, the California Wildlife Habitat Relationship Stages and the Acres of Potential Habitat Occurring on the Modoc National Forest

Species	Habitat (CWHR) Suitability >0.75	Acres of habitat on the Modoc National Forest*
Northern goshawk	EPN: 4D, 5M, 5D JPN: 4M, 4D, 5M, 5D LPN: 4M, 4D, 5P, 5M, 5D MHW: 4M, 4D, 5M, 5D, 6 MRI: 4M, 4D, 5M, 5D, 6 PPN: 4M, 4D, 5M, 5D RFR: 5M, 5D SMC: 4M, 4D, 5P, 5M, 5D SCN: 4M, 4D, 5P, 5M, 5D WFR: 4M, 4D, 5M, 5D, 6	204,700
Northern spotted owl	MHW, 5M, 5D, 6 MRI: 5D, 6 PPN: 5M, 5D RFR: 5M, 5D SMC: 5M, 5D, 6 WFR: 5M, 5D, 6	9,210
California spotted owl	MHW, 5M, 5D, 6 MRI: 5D, 6 PPN: 5M, 5D RFR: 5M, 5D SMC: 5M, 5D, 6 WFR: 5M, 5D, 6	10,350
Great gray owl	LPN: 4M, 4D, 5M, 5D	74,820

Species	Habitat (CWHR) Suitability >0.75	Acres of habitat on the Modoc National Forest*
	RFR: 4M, 4D, 5M, 5D SMC: 4M, 4D, 5M, 5D, 6 WFR: 4M, 4D, 5M, 5D, 6	
Marten	LPN: 4M, 4D, 5M, 5D MRI: 5M, 5D, 6 RFR: 4M, 4D, 5M, 5D SCN: 4M, 4D, 5M, 5D	31,520
Sooty grouse	EPN: 4 (ALL), 5 (ALL) JPN: 4 (ALL), 5 (ALL) LPN: 4 (ALL), 5 (ALL) RFR: 4S, 4P, 5S, 5P SMC: 4 (ALL), 5 (ALL), 6 WFR: 4 (ALL), 5 (ALL), 6	439,280
Northern flying squirrel	ASP: 4D, 5P, 5M, 5D, 6 JPN: 5M, 5D LPN: 5M, 5D MHW: 5D, 6 MRI: 4D, 5M, 5D, 6 PPN: 5D RFR: 5M, 5D SMC:4D, 5M, 5D, 6 SCN: 5M, 5D WFR: 4D, 5M, 5D, 6	73,740

*acres are rounded to the nearest 10

These habitats provide conditions that support several species of public concern. The northern goshawk is well distributed across the Forest where aggregations of large trees with moderate to dense canopy cover provide suitable nesting and foraging conditions. Goshawks are managed through the provision of 200-acre protected activity centers around known territorial locations. Currently 190 polygons covering 25,280 acres are managed as goshawk protected activity centers (gPACs).

The spotted owl (both the northern subspecies and the California subspecies) is found within mountain top habitat islands on the west side of the Forest. There are at least three locations of known northern spotted owl occurrence and one location of California spotted owl occurrence. The northern spotted owl subspecies is listed as "Threatened" by the US Fish and Wildlife Service. The northern spotted owl is managed in accordance with the direction found within the Northwest Forest Plan (NWFP, USDA 1992 as amended). The California spotted owl is a Forest Service "Sensitive" species and is managed under the guidelines found within the Sierra Nevada Forest Plan Amendment ((USFS 2004) and the Modoc National Forest Land and Resource Management plan (USFS 1991). The single known California spotted owl site is managed with a 300-acre protected activity center (soPAC) as the focus for habitat protection. An additional 700 acres are managed as a Home Range Core Area (HRCA). This location has also been used by barred owls, and has produced hybrid spotted/barred owl young. This one location is separated from the bulk of the California spotted owl population in the northern Sierras by large expanses of unsuitable habitat (sparse pine stands, juniper Forest, open sage flats). The current status of California spotted owls on the Modoc can only be considered that of an outlier location that probably functions as a genetic sink for any individual found in the location.

American marten are also known to use late-successional conditions, particularly in the Medicine Lake Highlands on the northwest edge of the Forest. Marten within the Medicine Lake area are protected by the provisions in the NWFP that provide for retaining canopy cover and the provision of decadence in the form of large down logs and snags. Outside of the NWFP area marten are rare, but when located, den sites are protected.

Other species utilizing late-successional habitats include the sooty grouse, the northern flying squirrel and the great gray owl. The sooty grouse uses fir trees with dense foliage for roosts (Zeiner1990). The northern flying squirrel uses cavities in large snags and trees for nesting and cover (Zeiner 1990). Both of these species have no specific management guidelines but do benefit from other guidelines relating to snag retention and guidelines that provide general vegetative diversity. Great gray owls have occasionally been observed within the Forest. There have been intermittent surveys for great gray owls but no breeding has been detected and there are no confirmed observations of pairs of great gray owls within or adjacent to the MDF.

Late-Successional, Forest-Associated Species: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of Continuation of Cross-Country Motorized Vehicle Travel

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

A larger impact, both in the short term, and the long term, would be disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to focal species within this group. Table 3-86 displays the number of acres of habitat potentially available for cross-country travel under this alternative for each of the focal species within this group. Table 3-86 also displays the miles of route available for use that occurs within habitat on the National Forest. The California WHR sizes and stages that were considered as "suitable" are listed for each species in Table 3-85, above.

Table 3-86. Alternative 1: the Potential Late-Successional Habitat that Could be Impacted by Cross-Country, off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Northern goshawk	179,380	87.6%
Northern spotted owl	8,440	91.6%
California spotted owl	10,350	100.0%
Great gray owl	74,820	100.0%
Sooty grouse	418,500	95.3%
American marten	31,520	100.0%
Northern flying squirrel	63,140	85.6%

*Rounded to nearest 10 acres.

Included in cross-country travel are the effects from continuation of use on unauthorized routes. The linear effects of travel routes can include disturbance, displacement, microclimate changes, and increased mortality from hunting and trapping (Gaines et al. 2003). Disturbance can lead to physiological responses such as increased stress hormones (Wasser et al. 1997 as reported in Gaines et al. 2003). Table 3-87 displays the miles of routes available for use within habitats modeled to be used by the focal species in this group.

Table 3-87. Alternative 1: Miles of Routes Within Potential Habitat for the Late-Successional Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Northern goshawk	46.9	713.1
Northern spotted owl	0.7	27.4
California spotted owl	0.8	23.5
Great gray owl	38.5	255.7
Sooty grouse	136.0	1,886.4
American marten	16.5	120.5
Northern flying squirrel	25.9	212.2

Northern goshawks actively defend nest sites during portions of the breeding season. Cross-country travel could lead to disturbance that disrupts pair-bonding, causes exposure of eggs or young to inclement weather, and increases adult energy expenditures.

Goshawk habitat was examined in a manner similar to that used by Gaines et al. (2003) in order to assess the relative impact levels of routes on late-successional habitats; goshawk habitat was used as a proxy for the other late-successional species because goshawks are well distributed across the Forested area of the Modoc NF. Goshawk habitat consists of a structure (closed canopy, mature Forest, with adequate decadence) that incorporates most of the needs of the other late-successional species, making goshawk habitat a reasonable modeling tool. Goshawk habitat was examined at the level of 6th-order watersheds (sixth order hydrological unit of classification or HUCs). The relative amount of goshawk habitat within a HUC ranges from 72 percent of the National Forest within a HUC, to no goshawk habitat within a HUC. The mean proportion of goshawk habitat to National Forest in HUCs that contain goshawk habitat is 18 percent.

The habitat influence index is calculated by buffering the available routes (both unauthorized and NFTS) by 50 meters on both sides. The sum of this route buffer is then divided by the total amount of goshawk habitat within the 6th order watershed to determine the proportion of late-successional habitats that could be influenced by available routes. A ranking was assigned that follows the rankings developed by Gaines et al. (2003). The level of influence is as follows:

- Less than 30 percent within habitat influence buffer is a low level of human influence
- Thirty to 50 percent within the habitat influence buffer is a moderate level of human influence
- More than 70 percent within the habitat influence buffer is a high level of human influence

The acres and habitat influence index and rank for each HUC are displayed in appendix M. Only five of the HUCs had a moderate ranking. All other HUCs with habitat were ranked as low. The five HUCs with moderate rankings each had less than 100 acres of goshawk habitat within the

watershed. This would indicate a low level of impact from edge effects, snag and downed log reduction, and habitat loss and fragmentation resulting from route-associated factors (Gaines et al. 2003). Table 3-88 below summarizes this information for this and the other alternatives.

A second index to evaluate the effects of displacement, avoidance, and disturbance is the security habitat index (Gaines et al. 2003). For this analysis, routes (both unauthorized and NFTS) are buffered by 200 meters. The area outside this buffer is referred to as security habitat. Thus, total habitat minus habitat within the buffer area equals security habitat. The security habitat is divided by the total habitat within the HUC to determine the proportion that is in security habitat and that may provide refugia for the species. A ranking was assigned that follows the rankings developed by Gaines et al. (2003). The level of influence of human activities on habitat ranking is as follows:

- Less than 50 percent security habitat is a high level of human influence
- Fifty to 70 percent security habitat is a moderate level of human influence
- More than 70 percent security habitat is a low level of human influence

The security index and rank for each HUC are displayed in appendix L. In this alternative, 18 of the HUCs had a low ranking, 30 were ranked moderate and 53 were ranked high. When constrained to HUCs with at least 200 acres of goshawk habitat, 8 had a low rank, 23 moderate and 37 high. A low ranking indicates a low level of impact from edge effects, snag and downed log reduction, habitat loss and fragmentation resulting from route-associated factors. A "High" ranking occurs where there is limited interior area that remains unaffected by route-associated factors (Gaines et al. 2003).

When combined with the results of the habitat influence analysis, the security habitat analysis describes late-successional habitat on the Modoc National Forest as being generally influenced by the presence of routes, but not highly impacted by the actions that occur closest to routes (e.g., edge effects, snag and down log removal, habitat loss and fragmentation).

Another way to measure the impact of routes on goshawks is the miles of routes (both unauthorized and NFTS) within goshawk protected activity centers (gPACs). Under Alternative 1 there would be approximately 143 miles of routes within gPACs, of which approximately 10 miles is unauthorized routes. The unauthorized route mileage can be converted to equivalent-acres by assuming each mile of route is approximately 1.8 acres based on a 15-foot wide impact. These unauthorized routes within PACs are equivalent to approximately 18 acres or 0.7% of the total acres within PACs.

Most of the effects revealed by the habitat influence analysis and the security habitat analysis are from the existing approved transportation system. Unauthorized routes constitute 491 miles while the transportation system extends across approximately 4,580 miles.

Spotted owls could be disturbed during the nesting season by cross-country travel. Disturbance could lead to reduced time on the nest, thereby threatening eggs, or young, with exposure. Disturbance from off-road travel would typically occur in daylight when owls are in the resting portion of the diurnal cycle. Off-road disturbance impacts are limited by the heavily timbered areas where spotted owls nest. In general, these impacts are possible but not likely. The minor possibility of off-road disturbance impacts would have no measurable impact on long-term population parameters; therefore, the effect on northern spotted owls of continued cross-country travel is negligible and discountable. California spotted owls would have even less impact from vehicle use because of limited California spotted owl occurrence on the Forest and the dense nature of occupied stands. There are no signs of recent cross-country vehicle use by the public within the HRCA or California spotted owl PAC. Impacts to spotted owls from on-route

disturbance emanating from unauthorized routes appear to be so minor as to be discountable. The mean segment length for an unauthorized route within spotted owl habitat is 0.14 miles. These short spurs would receive little use during the breeding season when disturbance causes the most impact. The unauthorized routes within habitat equate to approximately 0.01% of the modeled northern spotted owl habitat. The unauthorized routes within California spotted owl habitat is about 0.01% of the modeled California spotted owl habitat. The potential impact to either subspecies of spotted owl is so small as to be discountable.

Great gray owls, if they occur, would be impacted by similar effects as northern and California spotted owls of disturbance to nesting birds. However, it does not appear that great gray owls regularly nest on the Modoc National Forest; therefore, impacts are minor to non-existent.

The marten could be affected by loss of dens, increased disturbance of individual martens, and by indirect impacts to prey. Vehicles have the potential to collapse den sites, resulting in the potential loss of adults or young. Vehicles can also increase disturbance, resulting in additional energy expenditures. Indirectly, vehicles can affect the squirrel populations that marten primarily feed on. Squirrel populations may be impacted by increased disturbance resulting in lowered energy reserves available for the production of young. If cross-country travel occurs to the extent that soil compaction was to occur, food resources for squirrels, particularly truffles, could be diminished. Reduced production of young and reduced production of food would reduce the size of squirrel populations available for marten to prey upon. The impacts to martens are limited by the limited amount of current cross-country use. Unauthorized routes within modeled marten habitat would equal approximately 30 acres. This is approximately 0.1% of the habitat on the Modoc National Forest. For marten the continuation of use of existing routes is unlikely to contribute to direct mortality or generate sufficient disturbance to affect marten population parameters such as fecundity or mortality rates.

The impacts to squirrels in general also apply to northern flying squirrels. Flying squirrels would probably not be affected by disturbance due to the diurnal nature of the disturbance and the nocturnal nature of flying squirrels. Because flying squirrels are arboreal nesters, they are unlikely to be disturbed or suffer from direct mortality from cross-country travel. However, flying squirrels heavily use truffles that occur in the Forest soil (Smith 2007). Changes to soils could affect truffle production and, if sufficiently widespread, result in reduced numbers of northern flying squirrels. Currently, soil changes due to cross-country recreational travel appear to be insufficient to impact truffle production at the level that flying squirrels would be impacted. Approximately 25.9 miles of unauthorized route would be available for use in this alternative. This would be equivalent to approximately 47 acres or 0.06% of the modeled northern flying squirrel habitat on the Modoc NF. Flying squirrels have probably already adjusted to this existing use by establishing dens and nests away from the unauthorized (and NFTS) routes. It appears unlikely that the continued use of the unauthorized routes would have a discernable effect on northern flying squirrels. Thus these effects are so minor as to be imperceptible.

The sooty grouse is susceptible to direct mortality of chicks from cross-country travel. Sooty grouse nest adjacent to or under old logs. Trampling of logs has the potential to destroy nests. Close passage of vehicles may result in flushing of incubating females, potentially resulting in nest loss. This impact should be considered a possibility, but not a known impact. Sooty grouse would not be directly affected by the continuation of use. The short nature of the unauthorized routes does not appear to provide sufficient use as to constitute a measurable effect. Additionally, when transformed into an acre equivalent the unauthorized routes within sooty grouse habitat would affect an area equivalent to 0.06% of the sooty grouse habitat on the Forest.

Effects of Adding Facilities (presently unauthorized roads, trails and/or areas) to the NFTS

This alternative would not add any facilities to the NFTS.

Effects of Changes in Existing Season and Class of Use

This alternative would not change any current season or class of use.

Cumulative Effects

The effects of this alternative would aggregate with the effects outlined above in table 3-85, above. Those effects include 2,500 acres of sawlog removal and 3,000 acres of wood for fiber on National Forest. There is also ongoing timber harvest and Forest regeneration on private lands within and adjacent to the proclaimed boundary of the Forest, as well as stochastic (random) events such as wildfires and catastrophic insect outbreaks. Removal of trees has the potential to impact species in this group. Generally, this group of species is affected negatively by actions that reduce the average tree size, or that reduce canopy closure. Long-term trends have generally been negative for this species group, as can be seen by the inclusion of the northern spotted owl, a species that is Federally listed as "Threatened" and includes Forest Service "Sensitive" species, such as northern goshawk, California spotted owl, great gray owl, and marten, for which viability has been a concern.

This alternative would continue cross-country travel, including continued public use of the unauthorized routes; therefore, the impacts to species in this group from vehicular travel would continue and aggregate with effects from vegetation management occurring elsewhere. Because the impacts from cross-country travel are estimated to be low, the continuation of cross-country travel under this alternative would add minimally to negative impacts from vegetation management activities. The continuation of public travel on the unauthorized routes would also continue to provide impacts. However, the size of the impact is small. The impact of the unauthorized routes can also be estimated by converting the miles of unauthorized route into equivalent acres by assuming each mile of route is approximately 1.8 acres based on a 15-foot wide impact. This means that the 47 miles of unauthorized route in northern goshawk habitat is equivalent to approximately 85 acres or less than two percent of the area impacted annually by timber harvest for sawlogs or fiber. For northern spotted owls, this equates to about one acre of unauthorized route, or 0.02 percent of the annual timber treatment. For sooty grouse, this equates to about 246 acres of unauthorized route, or less than five percent of the annual timber treatment. Furthermore, the unauthorized routes do not constitute a change to habitats but an existing condition whose vegetation-change impact has already occurred, and whose current conditions would continue into the future. Thus, the unauthorized routes have less impact than an acre of new vegetation manipulation. Therefore, the impacts from the unauthorized routes and the cross-country travel are so minor, when aggregated with other impacts occurring on the landscape, that they are imperceptible and discountable.

Alternative 2 (Proposed Action)

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group from cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling or indirect impacts to prey or food resources from cross-country vehicle travel.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add a total of 339 miles of unauthorized routes to the NFTS. Table 3-88 displays the route mileage of both the existing system roads and the proposed unauthorized additions within habitats used by the focal species. The addition of 339 miles of unauthorized routes would affect the late-successional focal species.

Table 3-88. Alternative 2: Miles of Routes Within Potential Habitat for the Late-Successional Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Northern goshawk	35.1	701.1
Northern spotted owl	0.7	27.4
California spotted owl	0	22.7
Great gray owl	9.0	226.2
American marten	8.4	112.4
Sooty grouse	115.8	1,866.3
Northern flying squirrel	6.6	192.9

This alternative would reduce the route mileage within northern goshawk habitat by 2 percent (approximately 12 miles) compared to Alternative 1. This Alternative would contain 7 percent more routes than Alternative 3, which adds no unauthorized routes to the NFTS, and about 2 percent more routes than Alternative 4. The NFTS mileage would be the same for all alternatives, and the unauthorized routes added to the system would be the same for both this alternative and Alternative 5. These small percentage differences between alternatives are essentially undetectable against the background fluctuations of weather and stochastic events such as fires. Alternative 2 would have approximately 139 miles of routes within the gPACs, of which about five miles are routes added to the NFTS. This compares to total miles within gPACs of 143, 134, and 137 for Alternatives 1, 3, and 4 respectively. The difference of plus or minus five miles or 3 percent difference is also essentially undetectable.

The habitat influence index and rank for each HUC are displayed in appendix M. Only five of the HUCs had a moderate ranking. All other HUCs with habitat were ranked as low. The five HUCs with moderate rankings each had less than 200 acres of goshawk habitat within the watershed. That all of the HUCs with more than 200 acres of habitat have low ranking would indicate a low level of impact from edge effects, snag and downed log reduction, habitat loss and fragmentation resulting from route-associated factors (Gaines et al. 2003). There is no difference between this alternative and Alternatives 3, 4, and 5 in the number of HUCs with a habitat influence ranking of low. Alternative 1 has one HUC with a rating of moderate with all other HUCs at a low ranking (among HUCs with at least 200 acres of habitat) which is one more watershed than Alternative2.

When constrained to HUCs with at least 200 acres of goshawk habitat, 14 had a low security rank, 19 moderate and 35 high. A low ranking indicates a low level of impact from edge effects, snag and downed log reduction and habitat loss and fragmentation resulting from route-associated factors. By contrast, a high ranking occurs where there is limited interior extent that remains unaffected by route-associated factors (Gaines et al. 2003). This compares with Alternative 1, which had only eight HUCs with a low ranking, 23 with a moderate ranking and 37 with a high human influence ranking (among HUCs with at least 200 acres of habitat). Alternative 3, which does not add any unauthorized routes to the NFTS, swings one additional HUC from the moderate to low category resulting in 15 low, 18 moderate and 35 high ranked HUCs with greater than 200 acres of goshawk habitat. This seems to validate the process whereby each individual route segment was evaluated by line officers and the interdisciplinary team for impacts. Even with adding 69 percent of the unauthorized routes in this alternative, almost all of the effect

attained by not adding any unauthorized routes in Alternative 3, was achieved in Alternative 2. Alternative 4, which differs in miles of route in habitat by approximately five miles, has the same distribution of rankings as this alternative (Alternative 2). Alternative 5 would have the same ratings as this alternative because there is no difference in the physical route system between the alternatives.

When combined with the results of the habitat influence analysis, the security habitat analysis describes late-successional habitat on the Modoc National Forest as being generally influenced by the presence of routes, but not highly impacted by the actions that occur closest to routes (e.g., edge effects, snag and down log removal, habitat loss and fragmentation).

Most of the effects revealed by the habitat influence analysis and the security habitat analysis are from the existing approved transportation system. Routes that potentially could have been added to the NFTS constitute 491 miles, while the existing transportation system extends across approximately 4,580 miles.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of routes. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair bonding and nest initiation may have less disturbance. However, this is also the period when routes are often blocked by snowdrifts and unavailable for wheeled travel. Therefore, the impact is expected to be variable by year and minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to provide the same magnitude of impact for this analysis. By allowing an additional 138 miles of mixed use, there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of this alternative would aggregate with the effects outlined above in table 3-84. Those effects include 2,500 acres of sawlog removal and 3,000 acres of wood for fiber on National Forest. There is also ongoing timber harvest and Forest regeneration on private lands within and adjacent to the proclaimed boundary of the Forest as well as stochastic events such as wildfires and catastrophic insect outbreaks. Removal of trees has the potential to impact species in this group. Generally, this group of species is affected negatively by actions that reduce the average tree size, or that reduce canopy closure.

This alternative would add approximately 339 miles of routes to the NFTS, and would discontinue cross-country travel which includes continued use of unauthorized routes. Some impacts to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere because of the additional 339 miles of unauthorized routes added to the NFTS. However, the impact would be small. The added routes can be converted to equivalent-acres by assuming each mile of route is approximately 1.8 acres based on a 15-foot wide impact. This means that the 35 miles of unauthorized routes added to the NFTS in northern goshawk habitat in this alternative is equivalent to approximately 64 acres, or about one percent of the area impacted annually by timber harvest for sawlogs or fiber. For northern spotted owls, the area affected by adding routes to the NFTS equates to about one acre, or 0.02 percent of the annual timber treatment across the Forest. For sooty grouse, the added routes within habitat equate to about 211 acres, or less than four percent of the annual timber treatment. These route additions are offset at the 20-year, long-term point by the amount of routes not added to the NFTS

that would have begun to move towards habitat for late-successional species. For northern goshawks, this means an equivalent of approximately 22 acres. For northern spotted owls, there would be no habitat added because all of the current existing unauthorized routes would be added to the system. For sooty grouse, an equivalent of 36 acres would begin moving toward late-successional conditions. All of these acres would have many decades of growth and recovery before they fully became suitable for the species in this group. Therefore, in this alternative the impacts from the route system are somewhat reduced compared to the impacts of Alternative 1, and countered additionally by the cessation of impacts from cross-country travel. Overall, impacts from this alternative appear to be so minor, that when aggregated with other impacts occurring on the landscape, they are imperceptible and discountable.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling or indirect impacts to prey or food resources.

The linear effects of routes would still occur on the 4,580 miles of NFTS roads open for use. Table 3-89 displays the amount of route mileage within habitats used by the focal species. The habitat influence index and rank for each HUC are displayed in appendix M. The five HUCs with moderate rankings each had less than 200 acres of goshawk habitat within the watershed. This would indicate a low level of impact from edge effects, snag and downed log reduction and habitat loss, and fragmentation resulting from route-associated factors (Gaines et al. 2003).

The security index and rank for each HUC are displayed in appendix L. When constrained to HUCs with at least 200 acres of goshawk habitat, 15 had a low rank, 18 moderate and 35 high. A low ranking indicates a low level of impact from edge effects, snag and downed log reduction and habitat loss and fragmentation resulting from route-associated factors. By contrast, a high ranking occurs where there is limited interior extent that remains unaffected by route-associated factors (Gaines et al. 2003).

When combined with the results of the habitat influence analysis, the security habitat analysis describes late-successional habitat on the Modoc National Forest under Alternative 3 as being generally influenced by the presence of routes, but not highly impacted by the actions that occur closest to routes (e.g., edge effects, snag and down log removal, habitat loss and fragmentation). All of the effects revealed by the habitat influence analysis and the security habitat analysis in this alternative are from the existing NFTS.

Table 3-89. Alternative 3: Miles of Routes Within Potential Habitat for the Late-Successional Group

Species	Miles Of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat On NF
Northern spotted owl	0	27.4
California spotted owl	0	22.7
Northern goshawk	0	701.1

Species	Miles Of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat On NF
Great gray owl	0	226.2
American marten	0	112.4
Sooty grouse	0	1,866.3
Northern flying squirrel	0	192.9

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of use

Changes to existing season of use would not occur under this alternative.

There would be no change of vehicle class in this alternative.

Cumulative Effects

The effects of this alternative would aggregate with the effects outlined above in **Error! Reference source not found.**3-83. This alternative would prohibit cross-country travel including the continued use of approximately 491 miles of unauthorized routes. The impacts to species in this group from cross-country travel and from unauthorized routes would cease, and may partially counter some of the effects from vegetation management occurring elsewhere. However, the size of the impact is small. The unauthorized routes that would not be added to the NFTS can be converted to equivalent-acres. For the 47 miles of unauthorized routes in northern goshawk habitat in this alternative, the equivalent area would be approximately 86 acres, or less than 2 percent of the area impacted annually by timber harvest for sawlogs or fiber, or 0.04 percent of the goshawk habitat on the Modoc National Forest. For northern spotted owls, the area affected by unauthorized routes equates to about 1 acre of roadway or 0.02 percent of the annual timber treatment, or 0.01% of the habitat. For sooty grouse, the unauthorized routes equate to about 246 acres or less than 4 percent of the annual Forest timber treatment, or about 0.06% of the Forest's sooty grouse habitat. The unauthorized routes' impact would begin to decrease at the 20-year long-term point as the routes begin to develop vegetation and downed woody debris and move towards habitat for late-successional species. For northern goshawks, this means an equivalent of approximately 86 acres. For northern spotted owls, there would be approximately 1 acre of additional habitat. For sooty grouse, an equivalent of 246 acres would begin moving toward late-successional conditions. All of these acres would have many decades of growth and recovery before they fully became suitable for the species in this group. Therefore, in this alternative, the impacts from cross-country use are reduced versus the impacts of Alternative 1, and reduced by the slow recovery toward suitability of the unauthorized routes. However, the low rate and intensity of impacts from cross-country travel do not appear to be sufficient to counter other impacts that are occurring from vegetation management and stochastic events such as insect outbreaks and stand-replacing fires. Overall, when aggregated with other impacts to the late-successional group, impacts from this alternative appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially

where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling, or indirect impacts to prey or food resources.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 286 miles of routes to the NFTS. Table 3-90 (below) displays the route mileage within habitats used by the focal species.

Table 3-90. Alternative 4: Miles of Routes within Potential Habitat for the Late-Successional Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Northern goshawk	30.0	696.1
Northern spotted owl	0.7	27.4
California spotted owl	0	22.7
Great gray owl	8.2	225.4
American marten	7.2	111.1
Sooty grouse	95.2	1845.7
Northern flying squirrel	5.5	191.8

This alternative would contain five percent more route mileage than Alternative 3, and about one percent less route mileage than Alternatives 2 and 5 within goshawk habitat. These small percentage differences between alternatives are essentially undetectable against the background fluctuations of weather and stochastic events such as fires. Alternative 4 would have approximately 137 miles of routes within the gPACs of which about three miles are routes proposed for addition to the NFTS. This compares to total miles within gPACs of 143, 139, and 134 for Alternatives 1, 2, and 3 respectively. Alternative 5 has the same route configuration as Alternative 2, and therefore the same mileage and acreage numbers. The difference of plus or minus five miles, or three percent difference, is undetectable in impact.

The habitat influence index and rank for each HUC are displayed in appendix M. Only five of the HUCs had a moderate habitat influence ranking. All other HUCs with habitat were ranked as low. The five HUCs with moderate rankings each had less than 200 acres of goshawk habitat within the watershed. That all of the HUCs with more than 200 acres of habitat have low habitat influence ranking would indicate a low level of impact from edge effects, snag and downed log reduction and habitat loss and fragmentation resulting from route-associated factors (Gaines et al. 2003). There is no difference between this alternative and Alternatives 2, 3, and 5 in the number of HUCs with a habitat influence ranking of low. Alternative 1 has one HUC with a rating of moderate, with all other HUCs at a low ranking (among HUCs with at least 200 acres of habitat).

The security index rank for each HUC is displayed in appendix L. When constrained to HUCs with at least 200 acres of goshawk habitat, 15 had a low security index rank, 18, moderate and 35 high. A low ranking indicates a low level of impact from edge effects, snag and downed log reduction and habitat loss and fragmentation resulting from route-associated factors. By contrast, a high ranking occurs where there is limited interior extent that remains unaffected by route-associated factors (Gaines et al. 2003). This compares with Alternative 1, which had only eight HUCs with a low ranking, 23 with a moderate ranking, and 37 with a high human influence ranking. Alternative 3, which does not add any unauthorized routes to the NFTS, has the same number of HUCs in the low category as alternative 4 resulting in 15 low, 18 moderate and 35 high ranked HUCs with greater than 200 acres of goshawk habitat. In this alternative, by not adding 43 percent of the unauthorized routes, the same general security index was achieved as in

the alternative that does not add any unauthorized routes (Alternative 3). Alternative 5 would have the same ratings as Alternative 2 because there is no difference in the physical route system between those two alternatives.

When combined with the results of the habitat influence analysis, the security habitat analysis describes late-successional habitat on the Modoc National Forest as being generally influenced by the presence of routes, but not highly impacted by the actions that occur closest to routes (e.g., edge effects, snag and down log removal, habitat loss and fragmentation). Most of the effects revealed by the habitat influence analysis and the security habitat analysis are from the existing NFTS. Unauthorized routes to be added to the NFTS in this alternative total 286 miles (or 6 percent) of the approximately 4,580 miles of NFTS roads.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route in this alternative. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair-bonding and nest initiation may have less disturbance. However, this is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, the seasonal closure impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. There would be no change in vehicle class proposed in this alternative. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 4 on the late-successional group would aggregate with the effects outlined above in table 3-84. This alternative would discontinue cross-country travel which includes approximately 213 miles of unauthorized routes. Some impacts to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere because of the additional 286 miles of unauthorized routes added to the NFTS. However, the size of the impact is small. The added routes in northern goshawk habitat for this alternative, when converted to equivalent-acres, convert to approximately 55 acres or about 1 percent of the area impacted annually by timber harvest for sawlogs or fiber. For northern spotted owls, the area affected by adding routes to the system equates to about one acre, or 0.02 percent of the annual Forest timber treatment. For sooty grouse, the added routes equate to about 173 acres or less than 3 percent of the annual Forest timber treatment. These NFTS additions are offset at the 20-year long-term point by the prohibition of cross-country travel and the unauthorized routes that have begun to move towards habitat for late-successional species. For northern goshawks, this means an equivalent of approximately 31 acres would be moving towards suitability. For northern spotted owls, there would be no additional habitat because all of the current unauthorized routes within northern spotted owl habitat would be added to the system. For sooty grouse, an equivalent of 74 acres would be moving toward late-successional conditions. All of these acres, and those for the other late-successional species, would have many decades of growth and recovery before they became fully suitable for the species in this group. Therefore, in this alternative, the impacts from cross-country use are reduced versus the impacts of Alternative 1, and further reduced by the slow recovery toward suitability of the 213 miles of unauthorized routes. Overall, impacts from this alternative appear to be so minor that when aggregated with other impacts occurring on the landscape, that they are imperceptible and discountable.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

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

Effects of Adding Unauthorized Routes to the NFTS

This alternative is the same as Alternative 2 in that it would add the same 339 miles of unauthorized routes to the NFTS. The effects of these changes to the NFTS are the same as those listed above for Alternative 2. The miles of unauthorized routes added to the system in this alternative are displayed in Table 3-91 below for each of the focal species.

Table 3-91. Alternative 5: Miles of Routes within Potential Habitat for the Late-Successional Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Northern goshawk	35.1	701.1
Northern spotted owl	0.7	27.4
California spotted owl	0	22.7
Great gray owl	9.0	226.2
American marten	8.4	112.4
Sooty grouse	115.8	1,866.3
Northern flying squirrel	6.6	192.9

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair bonding and nest initiation may have fewer disturbances. However, this is also the period when routes are often blocked by snowdrifts and unavailable for wheeled travel. Therefore, the impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to provide the same magnitude of impact for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel, but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to late-successional species as compared to Alternative 2. This alternative has the same imperceptible and discountable cumulative effects as Alternative 2.

Comparison of Effects on Late-Successional Species, by Alternative

This section provides tabular comparisons of the five alternatives. Tables 3-85 through 3-87 display the impacts to the northern goshawk, the species selected as best representing all of the focal species within the late-successional species group.* UA = unauthorized route miles that could continue to receive motorized use under continued cross-country travel (Alt 1), or (for all other Alternatives) that would be added to the NFTS
UA+NFTS = total miles of combined UA routes and NFTS routes

Table 3-95 displays a comparison of other habitat change metrics for other focal species in the late-successional species group. In general Alternative 1 shows the most impacts to the focal species and their habitats and Alternative 3 the least.

Table 3-92 displays a comparison of Habitat Influence Rank ratings, by alternative. A Habitat Influence Rank rating of "low" indicates less than 30 percent of a HUC is within a influence buffer. A rating of "high" indicates that more than 70 percent of the HUC is within a influence buffer.

Table 3-92. Habitat Influence Rank Ratings, by Alternative

Number of HUCs with each Habitat Influence Rank Rating, Where each HUC Contains some Suitable Habitat					
Ranking	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Low	95	96	96	96	96
Moderate	6	5	5	5	5
High	0	0	0	0	0
Number of HUCS with each Habitat Influence Rank Rating, Where each HUC Contains at Least 200 Acres of Suitable Goshawk Habitat					
Ranking	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Al t5**
Low	67	68	68	68	68
Moderate	1	0	0	0	0
High	0	0	0	0	0

* UA = unauthorized route miles that could continue to receive motorized use under continued cross-country travel (Alt 1), or (for all other Alternatives) that would be added to the NFTS
UA+NFTS = total miles of combined UA routes and NFTS routes

Table 3-95 displays a comparison of other habitat change metrics for other focal species in the late-successional species group. In general Alternative 1 shows the most impacts to the focal species and their habitats and Alternative 3 the least.

Table 3-93 displays a comparison of security index rank ratings by alternative. A Security Index Rank rating of "low" would indicate more than 70% of a HUC is in an area outside of a 200-meter disturbance zone. A rating of "high" would indicate less than 50 percent of a HUC is in an area outside of a 200-meter disturbance zone.

Table 3-93. Security Index Rank Ratings, by Alternative

Number of HUCs with each Security Index Rank Rating, where each HUC contains some suitable habitat					
Ranking	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Low	18	26	27	27	26
Moderate	30	26	26	26	26
High	53	49	48	48	49

Number of HUCs with each Security Index Rank Rating, where each HUC contains some suitable habitat					
Number of HUCS with each Security Index Rank Rating, where each HUC contains at least 200 Acres of suitable goshawk habitat					
Ranking	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**
Low	8	14	15	15	14
Moderate	23	19	18	18	19
High	37	35	35	35	35

* UA = unauthorized route miles that could continue to receive motorized use under continued cross-country travel (Alt 1), or (for all other Alternatives) that would be added to the NFTS
UA+NFTS = total miles of combined UA routes and NFTS routes

Table 3-95 displays a comparison of other habitat change metrics for other focal species in the late-successional species group. In general Alternative 1 shows the most impacts to the focal species and their habitats and Alternative 3 the least.

Table 3-94 displays a comparison of other habitat change metrics for goshawks. In general Alternative 1 shows the most impacts to goshawks and their habitats and Alternative 3 the least.

Table 3-94. Comparison of Other Goshawk Habitat Change Metrics Between Alternatives

Metric	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
% of HUCs with a low habitat influence index	94% (all) 99% (w 200ac)	96% (all) 100% (w 200ac)	95% (all) 100% (w 200ac)	95% (all) 100% (w 200ac)	96% (all) 100% (w 200ac)
% of HUCs with a low security index rating	18%(all) 12% (w >200ac habitat)	26%(all) 21% (w >200ac)	27%(all) 22% (w >200ac)	27%(all) 22% (w >200ac)	26%(all) 21% (w >200ac)
Area available for cross-country travel	179,380 ac	0 ac	0 ac	0 ac	0 ac
Miles of routes in habitat	UA* : 47.0 miles UA + NFTS: 713	UA: 35.1 UA + NFTS: 701 2%< A-1	UA: 0 UA + NFTS: 666 7%< A-1 5%< A-2	UA: 30.0 UA + NFTS: 696 2%< A-1 0.7%<A-2 5%> A-3	UA: 35.1 UA + NFTS: 701 2%< A-1
Miles of routes in PACs	UA: 9.8 UA + NFTS: 143	UA: 4.9 UA + NFTS: 139	UA: 0 UA + NFTS: 134	UA: 3.0 UA + NFTS: 137	UA: 4.9 UA + NFTS: 139
Equivalent acres of UA routes in habitat (% of MDF Habitat)	UA: 85.5 (.04%) UA + NFTS: 1,298 (0.6%)	UA: 63.9 (.03%) UA + NFTS: 1,276 (0.6%)	UA: 0 (0%) UA + NFTS: 1,212 (0.6%)	UA: 54.6 (.03%) UA + NFTS: 1,267 (0.6%)	UA: 63.9 (.03%) UA + NFTS: 1,276 (0.6%)
Equivalent acres of UA routes in PAC (% of MDF PAC acres)	UA: 17.8 (.07%) UA + NFTS: 260 (2.8%)	UA: 8.9 (.04%) UA + NFTS: 253.0 (1.0%)	UA: 0 (0%) UA + NFTS: 243.9 (1.0%)	UA: 5.5 (.02%) UA + NFTS: 249.3 (1.0%)	UA: 8.9 (.04%) UA + NFTS: 253.0 (1.0%)

* UA = unauthorized route miles that could continue to receive motorized use under continued cross-country travel (Alt 1), or (for all other Alternatives) that would be added to the NFTS
UA+NFTS = total miles of combined UA routes and NFTS routes

Table 3-95 displays a comparison of other habitat change metrics for other focal species in the late-successional species group. In general Alternative 1 shows the most impacts to the focal species and their habitats and Alternative 3 the least.

Table 3-95. Comparison of Selected Habitat Change Metrics by Alternative for Other Late-Successional Focal Species

Species	Metric	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Northern spotted owl (Modeled habitat on the MDF: 9,210 ac)	NF habitat available for cross-country travel	8,441.6 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	0.7 UA UA+NFTS: 27.4	0.7 UA UA+NFTS: 27.4 0%< A-1	0 UA UA+NFTS: 26.7 2%< A-1 2%< A-2	0.7 UA UA+NFTS: 27.4 0%< A-1 0%< A-2 2%> A-3	0.7 UA UA+NFTS: 27.4 0%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	1.3 acres (0.01%)	1.3 acres (0.01%)	0 acres (0%)	1.3 acres (0.01%)	1.3 acres (0.01%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	49.9 acres (0.5%)	49.9 acres (0.5%)	48.6 acres (0.5%)	49.9 acres (0.5%)	49.9 acres (0.5%)
California spotted owl (Modeled habitat on the MDF: 10,350 ac)	MDF habitat available for cross-country travel	10,346 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 0.8 UA+NFTS: 24	UA: 0 UA+NFTS: 23 3%<A-1	UA: 0 UA+NFTS: 23 3%< A-1 0%< A-2	UA: 0 UA+NFTS: 23 3%< A-1 0%< A-2 0%< A-3	UA: 0 UA+NFTS: 23 3%<A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	1.5 ac (0.01%)	0 ac (0%)	0 ac (0%)	0 ac (0%)	0 ac (0%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	43.7 ac (0.4%)	41.9 ac (0.4%)	41.9 ac (0.4%)	41.9 ac (0.4%)	41.9 ac (0.4%)
	Miles of route in PAC and equivalent acres	UA: 0 UA+NFTS: 2.2 UA+NFTS: 4 ac	UA: 0 UA+NFTS: 2.2 UA+NFTS: 4 ac	UA: 0 UA+NFTS: 2.2 UA+NFTS: 4 ac	UA: 0 UA+NFTS: 2.2 UA+NFTS: 4 ac	UA: 0 UA+NFTS: 2.2 UA+NFTS: 4 ac
Great gray owl (Modeled habitat on the MDF: 74,820 ac)	NF habitat available for cross-country travel	74,820 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 39.5 UA+NFTS: 256	UA: 9.0 UA+NFTS: 226 12%< A-1	UA: 0 UA+NFTS: 217 15%<A-1 4%< A-2	UA 8.2 UA+NFTS: 225 12%< A-1 0.3%<A-2	UA: 9.0 UA+NFTS: 226 12%< A-1

Species	Metric	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
					4%> A-3	
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	71.9 ac (0.1%)	16.4 ac (0.02%)	0 ac (0%)	14.9 ac (0.02%)	16.4 ac (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	465.9 ac (0.6%)	411.3 ac (0.5%)	394.9 ac (0.5%)	409.5 ac (0.5%)	411.3 ac (0.5%)
Marten (Modeled habitat on the MDF: 31,520 ac)	MDF habitat available for cross-country travel	31,520 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 16.5 UA+NFTS: 120	UA: 8.4 UA+NFTS: 112 7%< A-1	UA: 0 UA+NFTS: 104 14%< A-1 7%< A-2	UA: 7.3 UA+NFTS: 111 8%< A-1 1%< A-2 7%> A-3	UA: 8.4 UA+NFTS: 112 7%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	30.0 ac (0.1%)	15.3 ac (0.05%)	0 ac (0%)	13.3 ac (0.04%)	15.3 ac (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	218.4 ac (0.7%)	203.8 ac (0.6%)	189.3 ac (0.6%)	207.0 ac (0.6%)	203.8 ac (0.6%)
Sooty grouse (Modeled habitat on the MDF: 439,280 ac)	NF habitat available for cross-country travel	418,500 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 136.0 UA+NFTS: 1,886	UA: 116.0 UA+NFTS: 1,866 1%< A-1	UA: 0 UA+NFTS: 1,750 7%< A-1 6%< A-2	UA: 95.9 UA+NFTS: 1,845 2%< A-1 1%< A-2 5%> A-3	UA: 116.0 UA+NFTS: 1,866 1%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	247.5 ac (0.06%)	211.1 ac (0.05%)	0 ac (0%)	174.5 ac (0.04%)	211.1 ac (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	3,432 ac (0.8%)	3,396 ac (0.8%)	3,185 ac (0.7%)	3,358 ac (0.8%)	3,396 ac (0.8%)
Northern flying squirrel (Modeled habitat on the MDF: 73,740 ac)	NF habitat available for cross-country travel	63,138 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 25.9 UA+NFTS: 212	UA: 6.6 UA+NFTS: 193	UA: 0 UA+NFTS: 186	UA: 5.5 UA+NFTS: 192	UA: 6.6 UA+NFTS: 193

Species	Metric	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
			9%< A-1	12%< A-1 3%< A-2	10%< A-1 0.06%<A-2 3%>A-3	9%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	47.1 ac (0.06%)	12.0 ac (0.02%)	0 ac (0%)	10.0 ac (0.01%)	12.0 ac (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	385.8 ac (0.5%)	351.3 ac (0.5%)	338.5% (0.5%)	349.4 ac (0.5%)	351.3 ac (0.5%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Threatened and Endangered Species Determinations

Northern Spotted Owl
In accordance with the Endangered Species Act of 1973, as amended, a Biological Evaluation and Assessment for this species was prepared for the Modoc National Forest Motorized Travel Management Project and is hereby incorporated by reference. The analysis concludes minor impacts from the limited cross-country travel and the approximately 0.01 percent of modeled habitat from the addition of routs to the NFTS. Therefore, the Biological Evaluation and Assessment made a determination that the Modoc Travel Management Project would have no effects on northern spotted owls.

Sensitive Species Determinations

California Spotted Owl
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

The Modoc Travel Management Project Alternative 1 may affect individual California spotted owls as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2-5 would have no impacts as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS within California spotted owl habitat. Alternatives 2-5 would therefore have no effects on California spotted owls or their habitats. Thus, it was the biologist's determination that the Modoc Travel Management Project Alternatives 2-5 would not affect California spotted owls or their habitat.

Northern Goshawk
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

The Modoc Travel Management Project Alternative 1 may affect individual northern goshawks as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2, 4, and 5 would prohibit cross-country motorized vehicle travel but would add mileage (30-35 miles within habitat) to the NFTS. Because Alternatives 2, 4, and 5 add mileage to the NFTS there may be some disturbance effects to individual goshawks but the quantity is small and discountable. Alternative 3 would have no

impacts as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS within northern goshawk habitat. Alternative 3 would therefore have no effects on northern goshawks or their habitats. Thus was the biologist's determination that the Modoc Travel Management Project Alternatives 1, 2, 4 and 5 may affect individuals but is not likely to result in a trend toward Federal listing or loss of viability for the northern goshawk. It was also the biologist's determination that Alternative 3 would not affect northern goshawks or their habitat.

Great Gray Owl

In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

It does not appear that cross-country travel would directly affect great gray owls. Due to the lack of confirmed nesting, and the very low level of primary OHV use, it appears unlikely that great gray owls would be nesting at a time and place affected by cross-country travel. Disturbance would appear to be unlikely due to the low densities of great gray owls. Considering the low density of great gray owls, the limited opportunities for disturbance and low quantity of habitat impacts from unauthorized routes (38.5 miles in Alternative 1; or 70 equivalent acres; or .09% of modeled habitat) it appears that there would be no effects to great gray owl populations sufficient to contribute to a trend toward listing or impact viability of the species. Alternatives 2, 3, 4, and 5 would have less effect due to the prohibition of cross-country motorized travel and the fewer or no routes added to the NFTS. In essence, the potential for effects to great gray owls is so low and discountable that it is essentially the same as no effect for any of the alternatives in this project. Given the lack of direct and indirect effects, there are no effects to aggregate with other trends affecting, and impacts occurring to great gray owls and their habitats. Therefore there would be no cumulative effects on great gray owls or their habitat. Thus the it was the wildlife biologist's determination that the Modoc Travel Management project would not affect great gray owls or their habitat.

Marten

In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

The Modoc Travel Management Project Alternative 1 may affect individual marten as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2-5 would have limited impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and less than 15 acres of additional routes would be added to the NFTS within marten habitat. These 15 acres represent approximately 0.05 percent of the modeled habitat for marten on the Modoc National Forest. Alternatives 2, 3, 4 and 5 would therefore have extremely limited effects on marten that are imperceptible and discountable and no effects on their habitats. Thus it was the biologist's determination that the Modoc Travel Management Project Alternative 1 may affect individuals but is not likely to result in a trend toward Federal listing and that Alternatives 2, 3, 4 and 5 would not affect marten or their habitat.

Wide-Ranging Carnivores: Affected Environment

Focal Species Within the Group: Black Bear

This species group is not associated with any one type of habitat, but is associated with a wide variety of conditions. These species include the Forest Service "Sensitive" species wolverine and Sierra Nevada red fox. The wolverine appears to have been absent from northern California for an

extended time (Aubrey et al. 2007, Schwartz et al. 2007). Recently, a wolverine was observed on the Tahoe National Forest. Preliminary genetic information gathered at the observation area seems to indicate a single individual genetically similar to individuals in Idaho (USFS 2008b). The Sierra Nevada red fox is also a rare species with a disjunct limited distribution (Perrine 2005, Zielinski et al. 2005). There are no known observations from the Modoc National Forest in the last 20 years. Currently, the closest known population is located in the vicinity of Lassen Volcanic National Park, approximately 25 miles southwest of the closest portion of the Modoc NF. Because of their scarcity and the paucity of reliable observational data, both wolverine and red fox are presumed absent and are not suitable for this analysis. Wolverine and Sierra Nevada red fox are not considered further.

Marten have been observed on the Forest and also can be considered a wide-ranging carnivore. However, their habitat requirements align more closely with the species in the late-successional group; therefore, marten are discussed in the Late-Successional species group.

Other wide-ranging carnivores that do occur within the Forest are black bears, mountain lions, and bobcats. All three of these species use a variety of habitat types (Zeiner 1990). Black bears are omnivorous (Zeiner 1990); mountain lions are primarily carnivorous and focus their diet on deer (Zeiner 1990); bobcats are also carnivorous but generally take smaller prey than deer, such as rabbits and rodents. Bobcats may consume fruits and grass (Zeiner 1990). There are no specific guidelines for managing black bears, mountain lions, or bobcats on the Modoc National Forest. Black bears were selected as the focal species for this group because they are present on the Forest, and their omnivorous diet does not tie their population fluctuations closely to another species of vertebrate.

Table 3-96 displays the CWHR vegetation type, size and stage classes that provide a cumulative habitat suitability value of at least 0.75 in the CWHR program. The reader should see the late-successional species section for information on the use of the CWHR suitability to determine suitable habitat. The acres of modeled habitat on the Modoc National Forest for the focal species in this group are also displayed.

Table 3-96. For the Wide-Ranging Carnivore Group, California Wildlife Habitat Relationship Stages Considered Suitable, and the Acres of Potential Habitat Occurring on the Modoc National Forest

Species	Habitat (CWHR) Suitability >0.75	Acres of habitat on National Forest
Black bear	ASP: 4S, 5S, 5M EPN: 4S, 5S, 5M JPN: 4S, 5S, 5M LPN: 4S, 5S, 5M MHW: 4S, 5S, 5M, 6 MRI: 4S, 4P, 5S, 5P, 5M, 6 PPN: 4S, 5S, 5M RFR: 4M SMC: 4S, 5S, 5M, 6 SCN: 4M WFR: 4S, 5S, 5M, 6	60,840

*Rounded to nearest 10 acres.

Wide-Ranging Carnivores Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of Continuation of Cross-Country Motorized Vehicle Travel

Table 3-97 displays the acres of habitat potentially available for use under this alternative for the focal species (black bear) within this group. Table 3-98 also displays the route miles available for use within habitat on the Modoc National Forest. The California WHR sizes and stages that were considered as "suitable" are listed for each species in Table 3-96, above. Although occasional direct mortality may occur from off-road collisions with vehicles, this appears to be an exceedingly rare event and has not been reported to occur within the Forest. It is possible that such an occurrence could occur under this alternative; however, given existing use and mobility of the species, such occurrences would remain rare and inconsequential to species population dynamics. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

A larger impact, both in the short term, and the long term, would be the disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to the focal species within this group. Cross-country travel could impact black bear food sources such as berries and invertebrates by changing soil conditions and trampling of plants, down logs or insect nests. These impacts are infrequent because of the low quantity of cross-country travel on the Forest.

Table 3-97. Alternative 1: The Potential Habitat for the Wide-Ranging Carnivore Group that Could be Impacted by Cross-Country, off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Black Bear	53,550	88.0%

*Rounded to nearest 10 acres.

Under this alternative, cross-country travel, which includes motorized use on 491 miles of unauthorized routes, would continue. Table 3-98 displays the unauthorized route mileage within habitats used by the focal species in this group. This alternative contains approximately 25 miles of existing unauthorized routes within modeled black bear habitat. This is approximately 11 percent more miles available for use than in the alternative with the lowest route mileage (Alternative 3). Although black bears will habituate to human presence (as every visitor to Yosemite knows), bears appear to be generally wary and susceptible to disturbance on the Modoc National Forest. This may be because human contact is infrequent in the local area, and possibly due to hunting pressure. Disturbance to black bear activities could occur along routes causing increased energy expenditures, lowered fat reserves, and ultimately lower reproduction. However, the amount of disturbance is limited because of the low volume of traffic that occurs on the unauthorized routes.

Table 3-98 Alternative 1: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles of Unauthorized Route within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat On NF
Black bear	24.7	253.8

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any particular route. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the wide-ranging carnivore group would aggregate with the effects outlined above in table 3-84. Those effects include 2,500 acres of sawlog removal, 3,000 acres of wood removal for fiber, 6,000 acres of mechanical treatment of vegetation, and 4,000 acres of prescribed fire annually on the Modoc National Forest. This is about 15,500 acres per year of vegetation treatments of varying intensity. There is also ongoing timber harvest and Forest regeneration on private lands within and adjacent to the proclaimed boundary of the Forest, as well as stochastic events such as wildfires and catastrophic insect outbreaks. Vegetation management and prescribed fire has the potential to impact species in this group by removing important habitat elements such as downed logs, snags, hollow trees and mature shrubs that are used for cover, or that are important to the life histories of the prey of wide-ranging carnivores. Generally, this group of species is affected negatively by extensive mechanical and prescribed fire treatments that reduce these important habitat elements; although some elements, such as snags and down logs, can be increased by the application of prescribed fire.

This alternative would continue cross-country travel which includes use of unauthorized routes. Therefore the impacts to species in this group, discussed above, would continue and aggregate with effects from vegetation management occurring elsewhere. Because the impacts from cross-country travel are estimated to be low, the continuation of cross-country travel under this alternative would add only minor impacts to negative impacts from vegetation management activities. The continuation of motorized use on unauthorized routes would also continue to provide negative impacts. However, the impact of the unauthorized routes would be small. The unauthorized route mileage can be converted to equivalent-acres by assuming each mile of route is approximately 1.8 acres based on a 15-foot wide impact. This means that the 25 miles of unauthorized route in black bear habitat, in this alternative, is equivalent to approximately 45 acres, or about 0.3 percent, of the area impacted annually by various mechanical and prescribed fire vegetation treatments or about 0.07 percent of the modeled black bear habitat. Furthermore, the unauthorized routes do not constitute a change to habitats, but rather are an existing condition whose vegetation change impact has already occurred and whose conditions would continue into the future. Thus, an acre of unauthorized route has less impact than an acre of new vegetation manipulation. Overall, vehicle-related impacts from this alternative appear to aggregate with other impacts occurring on the landscape. However, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 1 are imperceptible and discountable, and would not change existing trends to species habitat or distribution.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.The potential impacts discussed under Alternative 1 from cross-country travel would not occur. Black bears would not be affected by disturbance, collision or indirect impacts to prey or food resources due to off-road vehicle use.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of route to the NFTS. Table 3-99 (below) displays the route mileage in this alternative within habitats used by the focal species for this group. Alternative 2 would have approximately four percent fewer miles of route available for public use as compared to Alternative 1 and 6 percent more route mileage added to the NFTS than Alternative 3. There are approximately 16 miles of unauthorized routes in this alternative that would slowly regain characteristics of suitable habitat for black bears. Down logs would accumulate, shrub species would re-occupy the sites, and eventually the sites would become suitable for bear foraging. The 16 route miles equates to approximately 27 acres of potential habitat. This is less than 0.05 percent of the modeled black bear habitat. The scope of impact is so small as to be undetectable.

Table 3-99. Alternative 2: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Black bear	15.7	244.8

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, they would have little impact especially since bears are hibernating during much of this period. This is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, no impacts are expected to black bears from changes in existing season of use. Other wide-ranging carnivores may benefit from reduced vehicle travel through reduced snow compaction and reduced disturbance. Snow compaction may allow the movement of some species such as mountain lions and coyotes into areas otherwise inaccessible to these species during periods when snow is deep.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

As in Alternative 1, the effects of Alternative 2 on the wide-ranging carnivore group would aggregate with the effects outlined above in table 3-84 Alternative 2 would discontinue cross-country travel and add approximately 339 miles of route to the NFTS. Impacts to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere because of the additional 339 miles of unauthorized route added to the NFTS. However, the impact of additional routes added to the NFTS would be small. The additional NFTS road mileage, when converted to equivalent-acres, would be equivalent to approximately

29 acres or about 0.2 percent of the area potentially impacted annually by vegetation management and prescribed fire or approximately 0.05% of the modeled habitat. These NFTS additions are partially offset at the 20-year, long-term point by the amount of unauthorized routes in this alternative that have begun to move towards habitat for wide-ranging carnivore species. For black bears, this means an equivalent of approximately nine acres (or an additional 0.01% of the existing modeled habitat) would be moving towards suitability. These acres, 20 years after implementation, would have some attributes of suitable habitat including maturing shrubs and accumulating down logs. Therefore, in this alternative, the impacts of road system use are somewhat reduced compared to the impacts of Alternative 1, and countered additionally by the cessation of impacts from cross-country travel. However, these impacts are still small compared to the impacts of ongoing vegetation treatments on the Forest and adjacent lands. Overall, impacts from this alternative appear to be so minor that when aggregated with other impacts occurring on the landscape, they would be imperceptible and discountable.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel, including continued use of approximately 491 miles of unauthorized routes. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling or indirect impacts to prey or food resources.

Table 3-100. Alternative 3: The Potential Habitat for the Wide-Ranging Carnivore Group that Could be Impacted by Cross-Country, off-Road Travel

Species	Acres of Habitat*
Black Bear	10,220

This alternative would not add any unauthorized routes to the NFTS. However the linear effects of roads would still occur on the 4,580 miles of NFTS. Table 3-101 (below) displays the route mileage within habitats used by the focal species in this group.

Table 3-101. Alternative 3: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Black bear	0	229.1

Alternative 3 would have approximately 11 percent less route mileage as compared to Alternative 1, and six percent less route mileage than Alternatives 2, 4, and 5. Disturbance would not occur along unauthorized routes as cross-country travel would not occur. The approximately 24 miles of unauthorized routes that are within habitat and where motorized use would no longer occur under this alternative, would slowly regain characteristics of suitable habitat for black bears. Down logs would accumulate, shrub species would re-occupy the sites and eventually the sites would become suitable for bear foraging. This impact is limited in scope because of the limited amount of unauthorized routes within black bear habitat. The 24 miles equates to approximately 45 acres

of potential habitat. This is less than 0.08 percent of the modeled black bear habitat. The scope of impact would be so small as to be undetectable in impact.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

Cumulative Effects

The effects of Alternative 3 on the wide-ranging carnivore group would aggregate with the effects outlined above in table 3-84 and discussed in Alternative 1. Alternative 3 would discontinue cross-country travel, which would include approximately 491 miles of unauthorized routes that would no longer be available for motorized use. The impacts to species in this group from the prohibition of cross-country travel may partially counter some of the effects from vegetation management occurring elsewhere. However, the scope and intensity of the impact from ending cross-country travel would be small. For example, the 25 miles of unauthorized route in black bear habitat in this alternative is equivalent to approximately 45 acres, or less than 0.3 percent of the area impacted annually on the Modoc NF by vegetation management and prescribed fire. The positive effects from prohibiting cross-country travel would begin to show at the 20-year, long-term point as unauthorized routes begin to move towards habitat for wide-ranging carnivores. For black bears, this means an equivalent of approximately 45 acres would be moving toward suitability. However, the low rate and intensity of impacts from reduced route use and the cessation of cross-country travel do not appear to be sufficient to counter other impacts that are occurring from vegetation management and stochastic events such as insect outbreaks and stand-replacing fires. Overall, when aggregated with other impacts to the wide-ranging carnivore group, impacts from this alternative appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance, trampling or indirect impacts to prey or food resources from vehicle travel off the NFTS.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-102 displays the added routes within habitats used by the focal species in this group. Alternative 4 would have approximately four percent fewer miles of routes as compared to Alternative 1 and one percent fewer unauthorized route additions within habitat than Alternatives 2 and 5. Disturbance would not occur along the 10.5 miles of unauthorized routes included in the prohibition of cross-country travel. The approximately 10.5 miles of unauthorized routes under this alternative would slowly regain characteristics of suitable habitat for black bears. Down logs would accumulate, shrub species would re-occupy the sites, and eventually the sites would become suitable for bear foraging. This impact is limited in scope because of the limited amount

of unauthorized routes in black bear habitat not added to the NFTS. The 10.5 miles of routes equates to approximately 19 acres of potential habitat. This is less than 0.04 percent of the modeled black bear habitat. Disturbance could still occur on the 14 miles of unauthorized route that would be added to the NFTS. The routes added to the NFTS would equate to approximately 26 acres. This additional disturbance area is so small in comparison to existing habitat as to be insignificant. When combined with the sporadic and limited nature of disturbance, the scope of impact is so small as to be undetectable in impact.

Table 3-102. Alternative 4: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Black bear	14.2	243.3

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of road. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, they would have little impact, especially since bears are hibernating during much of this time period. This is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, no impacts are expected to black bears from changes in existing season of use. Other wide-ranging carnivores may benefit from reduced vehicle travel through reduced snow compaction and reduced disturbance.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. There would be no vehicle class changes proposed in this alternative. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 4 on the wide-ranging carnivore group would aggregate with the effects outlined above in **Error! Reference source not found.**table 3-84. This alternative would discontinue cross-country travel and add 286 miles of unauthorized routes to the NFTS. Impacts from the added routes to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere. However, the impact of additional routes added to the NFTS would be small. For example, the 14 miles of unauthorized route in black bear habitat, added to the NFTS in this alternative, is equivalent to approximately 26 acres, or about 0.2 percent of the area impacted annually by vegetation management and prescribed fire or about 0.04 percent of the modeled black bear habitat. These NFTS additions are partially offset at the 20-year, long-term point by the prohibition of cross-country travel that includes unauthorized routes that would begin to move towards habitat for wide-ranging carnivore species. For black bears, this means an equivalent of approximately 16 acres would be moving towards suitability. These acres, 20 years after implementation, would have some attributes of suitable habitat including maturing shrubs and accumulating down logs. Therefore, in this alternative the impacts of road system use are countered by the cessation of impacts from cross-country travel and somewhat reduced by versus the impacts of Alternative 1. However, these impacts are still small compared to the impacts of ongoing vegetation treatments on the Forest and adjacent lands. Overall, impacts from this alternative appear to be so minor that when aggregated with other impacts occurring on the landscape, they are imperceptible and discountable.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-103 displays the route mileage to be added for use within habitats used by the focal species in this group. The California WHR sizes and stages that were considered as "suitable" are listed for each species in Table 3-96, above. This alternative has the same physical impact to habitat as Alternative 2 because there is no difference in the routes system available for use.

Table 3-103. Alternative 5: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles of Routes Added to the NFTS within Habitat On NF	Combined Miles of NFTS and Added Routes within Habitat On NF
Black bear	15.7	244.8

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, they would have little impact, especially since bears are hibernating during much of this time period. This is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, no impacts are expected to black bears from changes in existing season of use. Other wide-ranging carnivores may benefit from reduced vehicle travel through reduced snow compaction and reduced disturbance. Therefore, the impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use, there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to wide-ranging carnivores as compared to Alternative 2. This alternative has the same cumulative effects as Alternative 2, which are imperceptible and discountable.

Comparison of Effects on Wide-Ranging Carnivores, by Alternative

This section provides tabular comparisons of the five alternatives. Table 3-104 displays a comparison of habitat-change metrics for the focal species in the wide-ranging carnivore group.

In general, Alternative 1 shows the most impacts to wide-ranging carnivores and Alternative 3 the least.

Table 3-104. Comparison of Selected Effects, by Alternative

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Black Bear (Modeled habitat on the MDF: 60,840 ac)	NF habitat available for cross-country travel	53,550 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA*: 24.7 mi UA+NFTS: 254	UA: 15.7 UA+NFTS: 245 4%< A-1	UA: 0 UA+NFTS: 229 10%< A-1 6%< A-2	UA: 14.2 UA+NFTS: 243 4%< A-1 0.6%<A-2 6%> A-3	UA: 15.7 UA+NFTS: 245
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	45.0 ac (0.07%)	28.6 ac (0.05%)	0 ac (0%)	25.8 ac (0.04%)	28.6 ac (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	462.3 ac (0.8%)	445.9 ac (0.7%)	416.8 ac (0.7%)	442.3 ac (0.7%)	445.9 ac (0.7%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Ungulate Group: Affected Environment

Focal Species Within the Group: Elk, Mule Deer

This species group is not associated with any one type of habitat, but is associated with a wide variety of rangeland and brush-field habitats. Ungulate species that occur on the Modoc are pronghorn, wild horses, deer, elk, and bighorn sheep. Pronghorn are considered with the sage-steppe species group. The bighorn sheep appears to be absent from the Modoc National Forest. Individuals are occasionally observed in the Warner Mountains, but these individuals are thought to have dispersed from the Hays Canyon Range or other locations along the California-Nevada border (Flores, 2008). Disease transmission and epizootics (an outbreak of disease affecting many animals of one kind at the same time) appear to be the primary factors affecting bighorn distribution in the Warner Mountains (Flores, 2008). Wild horses occur on the Modoc, particularly on the Devil's Garden and Doublehead Ranger Districts. Wild horses are managed in the Modoc LRMP as livestock, with a goal to maintain a Forest population between 275 and 335 individuals (MDF LRMP, 1991. pg. 4-19).

Elk are a relatively recent arrival on the Modoc National Forest (Yamagiwa 2008). Elk distribution on the Forest is somewhat limited to the western portion of the Forest and the northern portion of the Warner Mountains (Yamagiwa 2008). Elk diets vary greatly geographically (Zeiner et al., 1991) but often contain a large herbaceous component. Elk are considered a focal species for the ungulate group.

Deer are widely distributed on the Forest. Formerly the deer herds were much larger (USFS 1991). The estimated population in 1952 was 100,000 individuals in northeastern California. By 2004, the population estimate had dropped to 16,000 individuals (Modoc MIS report 2007). Mule deer are also considered a focal species for this group.

This species group is associated with vegetation types that contain characteristics of early successional stages. These characteristics include no or smaller trees and shrubs for a given growing site, relatively low canopy closure, and limited amounts of decadence in the form of decay or deformity. Sites have more forbs and young shrubs than older or more Forested vegetation types. Table 3-105 displays the CWHR vegetation type, size and stage classes that provide a cumulative habitat suitability value of at least 0.75 in the CWHR program. For this analysis, habitat conditions are considered as "suitable" if a particular size and stage class provides a combined rating of at least 0.75 for the three components of cover, feeding, and reproduction. The high mobility of the species in this group means a much wider array of habitats may actually contain these species at any given time as they transit across or through less important or less desirable habitats. The habitats modeled here thus represent key habitats required for healthy herds. This section therefore refers to the modeled habitats as "key" habitats.

A zone of route influence was calculated to address edge effects, habitat impacts and other human impacts associated with routes. Routes were buffered a distance that varied with each maintenance level of route, to model the impacts of different amounts of route use. Route buffer distances were obtained from Gaines et al. (2003) and cross-walked to maintenance level in lieu of data pertaining to actual vehicle use for each road segment. The buffer amount used for each maintenance level is as follows:

Maintenance Levels 1 and 0	300 meters
Maintenance Level 2	900 meters
Maintenance Level 3	1000 meters
Maintenance Levels 4 and 5	1,300 meters

The area within the zone of influence was subtracted from the quantity of key habitat available within the 6th order watershed (HUC) to determine the amount of habitat outside of the influence of the road system. The proportion of habitat outside the zone of influence to the amount of habitat in the watershed resulted in a habitat disturbance index. A ranking was assigned that follows the rankings developed by Gaines et al. (2003). The level of influence for each ranking is as follows:

- Less than 50 percent of ungulate key habitat outside the zone of influence is rated a high level of human influence
- Fifty to 70 percent of ungulate key habitat outside the zone of influence is rated a moderate level of human influence
- More than 70 percent of ungulate key habitat outside the zone of influence is rated a low level of human influence

Calculation of the habitat influence rankings resulted in the same rankings between each of the alternatives. All five alternatives had the same number (five) of watersheds that were rated moderate and the same number of watersheds (116) that were rated high. One of the watersheds was rated as low human influence for ungulates.

Table 3-105. For the Ungulate Group, California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
E k	BBR: 2P, 2M, 3P, 4S, 4P	153,550

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
	FEW: 1 (ALL), 2 (ALL) MHW: 1, 2S, 2P, 2M, 3S, 3P, 4S, 4P SGB: 2P, 2M, 3P, 4S, 4P SMC: 1, 2S, 2P, 2M, 3S, 3P, 4S, 4P WTM: 1 (ALL), 2 (ALL) WFR: 1, 2 (ALL), 3S, 3P, 4S, 4P	
Mule deer	ASP: 2S, SP, 3P, 3S, 4M CPC: 2S, 2P, 3S, 3P, 3M, 4P EPN: 2S, 2P, 3P, 3M JPN: 2S, 2P, 3S, 3P, 3M JUN: 2P, 3P, 4P, 5P LPN: 2S, 2P, 3S, 3P, 3M MCP: 2P, 2M, 2D, 3P, 3M MHW: 2S, 2P, 3S, 3P, 3M, 4M MRI: 2S, 2P, 3S, 3P, 3M, 4M PPN: 2S, 2P, 3S, 3P, 3M RFR: 2S, 2P, 3S, 3P, 3M, SMC: 2S, 2P, 3S, 3P, 3M, 4M SCN: 2S, SP, 3S, 3P, 3M WFR: 2S, 2P, 3S, 3P, 3M, 4M	227,440

Ungulate Group: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

The California WHR sizes and stages that were considered as "suitable" are listed for each species in Table 3-105, above. Direct mortality may occur from collisions with vehicles; however, collisions with vehicles operating off road appears to be an exceedingly rare event and has not been reported to occur within the Forest. It is possible that such an occurrence could occur under this alternative; however, given existing use and mobility of the species in this group, such occurrences would remain rare and inconsequential to species population dynamics. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

A larger impact, both in the short-term, and the long-term, would be the disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to the species within this group. Table 3-106 displays the number of acres of habitat potentially available for use under this alternative for the focal species (elk, mule deer) within this group. Cross-country travel has the potential to trample or masticate browse plants and to impact soil conditions, leading to other changes in vegetation that may reduce hiding cover for juveniles or adults. This impact appears to be very limited because of the low rate of cross-country travel.

Table 3-106. Alternative 1: Potential Key Habitat for the Ungulate Group That Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of Key Habitat*	Percent of all habitat on MDF open to cross-country travel
Elk	153,550	100.0%
Mule Deer	227,440	100.0%

*Acres rounded to the nearest 10.

Cross-country travel includes the continuation of use on unauthorized routes. Table 3-107 displays the route mileage within habitats used by the focal species in this group. In this alternative, cross-country travel would continue along with use of the existing roads on the NFTS. This alternative would have the most impact on the ungulate group from disturbance associated with vehicles using routes. Deer and elk would have 10 percent and 8 percent more mileage in key habitat than the alternative with no added unauthorized routes (Alternative 3). As with the other alternatives 98.6 percent of the suitable acres (on a watershed basis) are rated as having a "High" level of habitat influenced by the effects of routes. In studies reported by Gaines et al. (2003), elk moved an average distance of 800 meters and deer moved 400 meters when displaced by human activity (Gaines et al. 2003). These types of movements can be an impact on reproductive success as seen in the reduced reproductive success reported when disturbance occurred in elk caving areas (Phillips and Alldredge 2000 as reported in Gaines et al. 2003). The high level of habitat influence in almost all of the watersheds indicates that impacts to reproductive success from the existing route system (NFTS and all unauthorized routes) may be occurring. Hypothetically, this may be contributing to the long-term decline in deer numbers.

Table 3-107. Alternative 1: Miles of Routes Within Potential key Habitat for the Ungulate Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes Within Habitat on NF
Elk	40	471
Mule Deer	78	805

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any particular route. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the ungulate group would aggregate with the effects outlined above in table 3-84. Those effects include 4,000 acres of prescribed fire, 6,000 acres of mechanical fuel treatments, approximately 1,500 acres of treatments to improve sage-steppe, and 122,500 AUMs of grazing annually on the Modoc National Forest. This is about 11,500 acres per year of vegetation treatments, of varying intensity, potentially affecting ungulate forage and cover. There is also ongoing juniper removal and grazing on private lands within and adjacent to the proclaimed boundary of the Forest as well as stochastic events such as wildfires and catastrophic insect outbreaks. Vegetation treatments and grazing have the potential to impact species in this group by removing forage, impeding the growth of forage, or altering vegetative structure that provides cover. Past trends for this group have generally been negative for deer and somewhat positive for elk.

This alternative would continue cross-country travel which would include continued use of unauthorized routes; therefore, impacts to species in this group from cross-country travel would continue and aggregate with effects from vegetation management occurring elsewhere. Because

the impacts from cross-country travel are estimated to be low, the continuation of cross-country travel under this alternative would add only small negative impacts to the impacts from vegetation management activities. The impact of unauthorized routes available to public use is small. For example, the 38 miles of unauthorized routes in elk habitat, available to public use in this alternative, is equivalent to approximately 69 acres or about 0.6 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments or about 0.05 percent of the modeled elk habitat. The 78 miles of unauthorized routes in mule deer habitat, available to public use in this alternative, is equivalent to approximately 142 acres or about 1.2 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments or about 0.06 percent of the modeled deer habitat. Furthermore, the unauthorized routes do not constitute a change to habitats, but an existing condition whose vegetation change impact has already occurred and whose conditions would continue into the future. Thus, the unauthorized routes have less impact than an acre of new vegetation manipulation. Overall, impacts from this alternative appear to aggregate with other impacts occurring on the landscape; however, compared to the scope and intensity of the other impacts occurring on the landscape. The impacts from Alternative 1 of continuing public cross-country travel are very small. The use of 78 miles o unauthorized route within habitat would impact less than 0.06% of the mule deer habitat and less than 0.05% of the elk habitat on the Modoc National Forest. All of the alternatives would have the same number of HUCs with a rating of "high" indicating that the inclusion of all or none of the unauthorized routes would change the general level of disturbance. These impacts appear to be insufficient to change existing trends to species population size, habitat or distribution.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

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

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of route to the NFTS. Table 3-108 displays the route mileage within habitats used by the focal species in this group.

This alternative would not add approximately 11 miles of currently unauthorized routes within elk habitat that would continue to receive motorized use under continued cross-country travel in Alternative 1. This alternative would add 27 miles (about six percent) more routes to the NFTS than Alternative 3, and add about 1 percent more routes (or two miles) than Alternative 4 would to the NFTS. The route system would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for elk due to route-induced disturbance than Alternatives 3 and 4.

Table 3-108. Alternative 2: Miles of Routes within Potential key Habitat for the Ungulate Group

Species	Miles Of Routes Added To The Nfts Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Elk	27 miles	460 miles

Species	Miles Of Routes Added To The Nfts Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Mule Deer	57 miles	784 miles

The amount of routes added to the NFTS within mule deer habitat is less by three percent (approximately 21 miles) than the unauthorized routes that would continue to receie motorized use under continued cross-country travel in Alternative 1. This alternative would contain 10 percent more added routes (57 miles) than Alternative 3, and about one percent more added route mileage than Alternative 4. The route system would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for mule deer due to route-induced disturbance than Alternatives 3 and 4. Alternative 2 would result in less disturbance than Alternative 1 and the same amount as Alternative 5.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of road. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, disturbance would be reduced during the period of high-energy use for temperature regulation and fetal growth. However, this is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, the impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on the ungulate group. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel, but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 2 on the ungulate group would aggregate with the effects outlined above in Table 3-84. This alternative would prohibit cross-country travel which includes approximately 152 miles of unauthorized routes in this species habitat. Some impacts to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere because of the additional 339 miles of unauthorized route added to the NFTS. However, the impact of additional routes added to the NFTS is small. The roadways can be converted to equivalent-acres by assuming each mile of route is approximately 1.8 acres based on a 15-foot wide impact. This means that the 27 miles of unauthorized route in elk habitat, added to the NFTS in this alternative, is equivalent to approximately 49 acres, or about 0.4 percent of the area impacted annually by vegetation management and prescribed fire or about 0.03 percent of the modeled elk habitat. For mule deer, the 57 miles of unauthorized route, added to the NFTS in this alternative, is equivalent to approximately 104 acres, or about 0.9 percent of the area impacted annually by these treatments or about 0.05% of the modeled mule deer habitat. These NFTS additions are offset at the 20-year, long-term point by the prohibition of cross-country travel which includes unauthorized routes that have begun to move towards habitat for wide-ranging carnivore species. For elk, this means an equivalent of approximately 20 acres are moving towards suitability; for mule deer approximately 38 acres are moving towards suitability. These acres, 20 years after implementation, would have many attributes of suitable habitat, including maturing shrubs and accumulating cover. Therefore, in this alternative the impacts of road system use are somewhat reduced versus the impacts of Alternative 1, and reduced additionally by the cessation of impacts from cross-country travel.

As with the other alternatives, 98.6 percent of the suitable acres (on a watershed basis) are rated as having a “High” level of habitat influenced by the effects of routes. The high level of habitat

influence in almost all of the watersheds indicates that impacts to reproductive success from the existing route system may be occurring. The impacts of the small percentage differences between this alternative and the other alternatives may be essentially undetectable against the background fluctuations of variable traffic quantities, weather and stochastic events such as fires.

The impacts of adding routes to the NFTS are small compared to the impacts of ongoing vegetation treatments on the Forest and adjacent lands and the potential impacts of the existing NFTS system. Overall, impacts from this alternative appear to be so minor that when aggregated with other conditions and impacts occurring on the landscape, that they would be imperceptible and discountable.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

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

This alternative would not add any unauthorized routes to the NFTS. However the linear effects of roads would still occur on the 4,580 miles of NFTS roads open for use. Table 3-109 displays the amount of route mileage within habitats used by the focal species in this group.

Table 3-109. Alternative 3: Miles of Routes Within Potential Habitat for the Ungulate Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of Nfts and Added Routes within Habitat on NF
Elk	0 miles	433 miles
Mule Deer	0 miles	727 miles

This alternative would have the least amount of route mileage within elk habitat at approximately 433 miles. This would be a reduction of eight percent (approximately 38 miles) compared to the total routes available for public travel in Alternative 1. This alternative would add about six percent fewer routes in key habitat than Alternatives 2, 4 and 5. Alternative 3 would thus cause the least energy expenditure for elk due to route-induced disturbance of any of the alternatives. The amount of disturbance difference between Alternative 3 and the other alternatives would appear to be less than the variability in traffic on the road system (see the recreation discussion).

This alternative would have the least route mileage within mule deer habitat at approximately 727 miles. This is a reduction of 8 percent (approximately 38 miles) compared to the total in Alternative 1. This alternative would contain about 6 percent less mileage than Alternatives 2, 4 and 5. Alternative 2 would thus cause the least energy expenditure for elk due to route-induced disturbance of any of the alternatives. However, the variability in traffic on the road system, as well as background fluctuations in weather and stochastic events, renders these differences undetectable in population response.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

This alternative would not have seasonal closures and therefore would have no changes in season of use. There would be no effects to ungulates from this action under this alternative. This alternative would have no change to vehicle use class.

Cumulative Effects

The effects of Alternative 3 on the ungulate group would aggregate with the effects from other activities and factors outlined above in table 3-84. This alternative would prohibit cross-country travel which includes approximately 491 miles of unauthorized routes. The impacts to species in this group from the cross-country travel would cease and may partially counter some of the negative effects from vegetation management occurring elsewhere. However, the scope and intensity of the impact from ending cross-country travel is small. For example, by prohibiting cross-country travel, the 38 miles of unauthorized route in elk habitat, and the 78 miles in deer habitat, in this alternative are equivalent to approximately 69 acres for elk and 142 acres for mule deer of habitat moving toward suitability. These amounts are less than 0.6 percent and 1.2 percent, respectively, of the area impacted annually by vegetation management and prescribed fire. They are approximately 0.05% of the modeled elk habitat and 0.06% of the modeled deer habitat. The positive effects from not continuing cross-country travel, including use on the unauthorized routes, would begin to show at the 20-year long-term point as the unauthorized routes would be moving towards habitat for ungulates. For elk, this means an equivalent of approximately 69 acres would be moving toward suitability and 142 acres for mule deer would be improving. This would be approximately 0.05 percent of the modeled elk habitat and 0.06 percent of the modeled deer habitat. As with the other alternatives, 98.6 percent of the suitable acres (on a watershed basis) are rated as having a "High" level of habitat influenced by the effects of routes. The high level of habitat influence in almost all of the watersheds indicates that impacts to reproductive success from the existing route system may be occurring.

The limited scope and low intensity of the reduced impacts from cessation of unauthorized route use and the cessation of cross-country travel do not appear to be sufficient to counter other impacts that are occurring from vegetation management and stochastic events such as disease outbreaks and stand-replacing fires. Overall, when aggregated with other conditions and impacts to the ungulate group, impacts from this alternative appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

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

Effects of Adding Unauthorized Routes to the NFTS

Table 3-110 displays the amount of route mileage within habitats used by the focal species in this group.

Table 3-110. Alternative 4: Miles of Routes within Potential Habitat for the Ungulate Group

Species	Miles of Routes Added to the NFTS Within Habitat on NF	Combined Miles of NFTS and Added Routes Within Habitat on NF
Elk	26 miles	458 miles
Mule Deer	49 miles	775 miles

This alternative would reduce the amount of routes added to the NFTS within elk habitat by three percent (approximately 13 miles) compared to the total in Alternative 1. This Alternative would add two miles fewer routes than Alternatives 2 and 5, or less than one percent. Alternative 4 would have about 25 miles (about 6 percent) more routes added to the NFTS than Alternative 3. Alternative 4 would thus cause slightly higher energy expenditure for elk due to route-induced disturbance than Alternative 3, but less than Alternatives 1, 2 and 5.

The amount of routes added to the NFTS within mule deer habitat would decline by 4 percent (approximately 30 miles) in Alternative 4 as compared to the total in Alternative 1. This alternative would add 7 percent more route mileage (48 miles) to the NFTS than Alternative 3, and would add about 1 percent less route mileage to the NFTS than Alternatives 2 and 5. Alternative 4 would thus cause slightly higher energy expenditure for mule deer due to route-induced disturbance than Alternative 3 but less than Alternatives 1, 2 and 5.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, disturbance would be reduced during the period of high-energy use for temperature regulation and fetal growth. The impact of seasonal closures is expected to be minor to undetectable as considerable wintering occurs off the Modoc National Forest.

Changes to class of use are not expected to have any detectable impact on wildlife. Whether an auto, truck, or OHV is the source of disturbance, it is assumed to that the amount of disturbance is same for this analysis. There would be no change to vehicle class in this alternative. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 4 on the ungulate group would aggregate with the effects outlined above in **Error! Reference source not found.**3-103. This alternative would prohibit cross-country travel which would include the use of approximately 213 miles of unauthorized routes. Impacts to species in this group from the 286 miles of routes added to the NFTS would continue, and aggregate with effects from vegetation management occurring elsewhere. However, the impact of additional routes added to the NFTS is small. For example, the 25 miles of unauthorized route in elk habitat, added to the NFTS in this alternative, is equivalent to approximately 45 acres, or about 0.4 percent of the area impacted annually by vegetation management and prescribed fire or approximately 0.03% of modeled habitat. For mule deer, the 48 miles of unauthorized route, added to the NFTS in this alternative, is equivalent to approximately 87 acres, or about 0.7 percent of the area impacted annually by these treatments or about 0.04 percent of the modeled deer habitat. These NFTS additions are offset at the 20-year long-term point by the prohibition of cross-country travel, which includes the use of unauthorized routes that would have begun to move towards habitat for ungulate species. For elk, this means an equivalent of approximately 24 acres would be moving towards suitability; for mule deer approximately 55 acres would be moving towards suitability. Therefore, in this alternative, the impacts are somewhat reduced by the cessation of impacts from cross-country travel. However, these impacts are still small compared to the impacts of ongoing vegetation treatments on the

Forest and adjacent lands. As with the other alternatives, 98.6 percent of the suitable acres (on a watershed basis) are rated as having a "High" level of habitat influenced by the effects of routes. The high level of habitat influence in almost all of the watersheds indicates that impacts to reproductive success from the existing route system may be occurring.

Overall, impacts from this alternative appear to be so minor that when aggregated with other impacts occurring on the landscape, they are imperceptible and discountable.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-111 displays the amount of route mileage within habitats used by the focal species in this group. This alternative has the same physical impact to habitat as Alternative 2, as there is no difference in the routes mileage or arrangement. Thus, the effects of adding unauthorized routes to the NFTS are the same in Alternative 5 as in Alternative 2.

Table 3-111. Alternative 5: Miles of Routes within Potential Habitat for the Ungulate Group

Species	Miles of Routes Added to the NFTS Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Elk	27 miles	460 miles
Mule Deer	57 miles	784 miles

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of road. Effects would be the same as those for Alternative 2.

By allowing an additional 530 miles of mixed use there may be some additional vehicle travel on the NFTS, but there are no indications that the amount of use would be greater than the existing variation in total use. Whether an auto, truck, or OHV is the source of disturbance, it is assumed to that the amount of disturbance is same for this analysis. Thus, although more NFTS roads may be open for OHV use under this alternative, the total miles of road open for vehicle use is the same as Alternative 2. Changing the mix of use is not expected to have any additional impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to ungulate species as compared to Alternative 2. This alternative has the same cumulative effects as Alternative 2, which are imperceptible and discountable.

Comparison of effects on Ungulates by Alternative

This section provides tabular comparisons of the five alternatives. Table 3-112 displays a comparison of habitat change metrics for the focal species for the ungulate group. In general, Alternative 1 shows the most impacts to ungulate species and Alternative 3 the least.

Table 3-112. Comparison of Selected Effects, by Alternative

Species	Measure	Alt 1	Alt 2	Alt 3	Alt4	Alt5
E k (Modeled habitat on the MDF: 152,550)	NF habitat available for cross-country travel	150,100ac	0 acres	0 ac	0 ac	0 ac
	Miles of route in habitat	UA*: 38 mi UA+NFTS: 471	UA: 27 UA+NFTS: 460 2%< A-1	UA: 0 UA+NFTS: 433 8%< A-1 6%< A-2	UA: 25 UA+NFTS: 458 3%< A-1 0.4%<A-2 6%> A-3	UA: 27 UA+NFTS: 460
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	69.2 ac (0.05%)	49.1 ac (0.03%)	0 ac (0%)	45.5 ac (0.03%)	49.1 ac (0.03)%
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	857.2 ac	837.2 ac	788.1 ac	833.6 ac	49.1 ac
Mule Deer (Modeled habitat on the MDF: 227,440)	NF habitat available for cross-country travel	218,940	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 78 UA+NFTS: 805	UA: 57 UA+NFTS: 784 3%< A-1	UA: 0 UA+NFTS: 727 10%< A-1 7%< A-2	UA: 48 UA+NFTS: 775 4%< A-1 1%<A-2 7%> A-3	UA: 57 UA+NFTS: 784
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	142.0 ac (0.06%)	103.7 ac (0.05%)	0 ac (0%)	87.4 ac (0.04%)	103.7 ac (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	1,465 ac (0.6%)	1,427 ac (0.6%)	1,323 ac (0.6%)	1,411 ac (0.6%)	1,427 ac (0.6%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Riparian Group: Affected Environment

Focal Species Within the Group: Bald Eagle, Willow Flycatcher, Yellow Warbler, Osprey

This species group is associated with habitats along rivers, streams and wetlands. Species that represent this group include the Forest Service "Sensitive" species bald eagle and willow flycatcher. Other species include the yellow warbler and golden eagle. Currently riparian habitats

are managed according to the standards contained within the Modoc LRMP as amended by the SNFPA and NWFP. Within the SNFPA ROD, Standard 69 states, "Prohibit wheeled vehicle travel off of designated routes, trails, and limited off highway vehicle (OHV) use areas. Unless otherwise restricted by current Forest plans or other specific area standards and guidelines, cross-country travel by over-snow vehicles would continue."

The NWFP includes specific guidelines for an aquatic conservation strategy. Standard RM-2 particularly applies to this project: "Adjust dispersed and developed recreation practices that retard or prevent attainment of Aquatic conservation Strategy objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective, eliminate the practice or occupancy."

These specific guidelines and standards, along with others concerning new development and maintenance of existing routes, provide protection for riparian habitats.

Bald eagles are dependent on riparian and river systems to provide foraging locations for fish and waterfowl (Zeiner 1990). They primarily use large trees for nest locations that are close to the shore of lakes or streams. Jenkins (1992) found that bald eagles on the middle Pit River used trees that averaged 44.2 inches in diameter and averaged 1,391 feet from the water's edge. Known bald eagle nests on the Modoc National Forest average 435 meters from the closest stream course. This compares closely with nests within the middle Pit River drainage (Big Lake to Pit 5 Reservoir), where all nests had a view of the closest permanent water body and averaged 424 meters from fish-bearing water (Jenkins 1992, table 3 pg 59). In order to evaluate effects to bald eagles the riparian habitat conservation areas and the pond and lake GIS layers were buffered by 450 meters to provide an estimate of the area on the Forest available to potentially support bald eagles. This area estimate is considered the maximum potential habitat. The amount of area that actually could provide nesting is unknown because the small inclusions of large trees required for nest sites are not mapped. The maximum potential habitat indicates those areas where eagles may occur, given suitable foraging and sufficient size trees for nesting.

The maximum potential habitat was then used to calculate a bald eagle nesting habitat disturbance index. Routes were buffered by 450 meters to determine the route zone of influence. The habitat disturbance index was calculated by dividing the area within the route zone of influence by the amount of maximum potential bald eagle habitat within the 6th-order watershed to determine the proportion of bald eagle habitat that could be influenced by routes available for public use. A ranking was assigned that follows the rankings developed by Gaines et al. (2003) using the following class breaks:

- Less than 30 percent of maximum potential habitat within route zone of influence ranks as a "Low" level of human influence
- Thirty to 50 percent of maximum potential habitat within the route zone of influence is a moderate level of human influence
- More than 50 percent of maximum potential habitat within the route zone of influence is a high level of human influence

The quantity of routes within the maximum potential habitat was determined for each alternative, as well as the amount of maximum potential habitat available for cross-country motor vehicle travel. Because the maximum potential habitat is substantially larger than the known nesting and roosting habitat, the analysis also calculated the quantity of routes and the area open to cross-country travel within 0.25 miles of known roosts or nests for each alternative.

Willow flycatchers breed in riparian thickets during the summer months (Bombay et al. 2003) and spend the remainder of the year in Mexico and Central America. They breed in shrubby riparian vegetation that has at least some surface water or saturated soil within the territory during early breeding in June (Bombay et al. 2003). Observations are primarily limited to the Warner Mountains (USFS 2007). Because willow flycatchers are very habitat specific, only known locations were analyzed. The area within 0.25 miles of known willow flycatcher activity centers is approximately 1,760 acres. Other areas may provide long-term potential habitat, but are not analyzed for impacts from changes proposed by this project because of concerns related to actions outside of this project. See the cumulative effects section for more discussion. The effects of disturbance may be problematic; in at least one study (Altman et al. 2003) moderate or high human activity did not appear to be a factor in nest success. This may indicate that disturbance from human presence is not an important factor for this species. Other impacts from brood parasitism and livestock may be more important.

The yellow warbler is found in habitats of wet, deciduous thickets (Lowther et al. 1999). There are roughly 86,585 acres of potential habitat for yellow warblers on the Modoc NF when modeled to the CWHR 0.75 suitability index level used in this analysis. Yellow warbler populations have increased in other areas where livestock grazing in riparian areas has been curtailed and in locations where cowbirds have been reduced (Lowther et al. 1999).

A 60-meter habitat influence buffer was created to address edge effects, snag loss, down log impacts and other human impacts associated with routes. A riparian influence index was then calculated where the proportion of riparian habitat conservation area (RHCA) within the habitat influence buffer to the amount of RHCA in the 6th order watershed (HUC) was determined. A ranking was assigned that follows the rankings developed by Gaines et al. (2003). The level of influence is as follows:

- Less than 30 percent of total RHCA within the habitat influence buffer is a low level of human influence
- Thirty to 50 percent within the habitat influence buffer is a moderate level of human influence
- More than 70 percent within the habitat influence buffer is a high level of human influence

Ospreys are dependent on live fish for food (Poole et al. 2002). Because of this requirement, osprey distribution on the Doublehead Ranger District is limited (USFS 2007). Osprey habitat on the Modoc National Forest is approximately 2,980 acres within 0.25 miles of known sites. Ospreys habituate easily to nearby human activity, although individuals nesting away from disturbance may be sensitive to human presence (Poole et al. 2002). Adults nesting near highways are vulnerable to collisions with vehicles. Because osprey are dependent on large trees or structures that provide suitable substrates for nest construction, their habitat is not mappable. In order to analyze effects to osprey, the impacts to existing known sites is analyzed and used as a relative measure of impact between alternatives.

Table 3-113. For the Riparian Group, California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
Bald eagle	SPECIAL ELEMENTS (see discussion)	979,490 acres maximum potential 7,320 acres within 0.25 miles of existing activity centers
Willow flycatcher	SPECIAL ELEMENTS (see discussion)	1,760 within 0.25 miles of existing activity

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
		centers
Yellow warbler	MRI: 2P, 2M, 2D, 3 (ALL), 4S, 4P, 4M PPN: 2P, 2M, 3P, 3M, 4P, 4M SMC: 2P, 2M, 3P, 3M, 4P, 4M WFR: 2P, 2M, 2D, 3(ALL), 4S, 4P, 4M	86,585 acres
Osprey	SPECIAL ELEMENTS (see discussion)	2,980 acres within 0.25 miles of existing activity centers

Riparian Group: Environmental Consequences

Alternative 1

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

The California WHR sizes and stages that were considered as "suitable" are listed for each species in Table 3-96 above. Although occasional direct mortality to adults may occur from collisions with vehicles on highways, this is not known to have occurred from slower moving vehicles off road. If off-road vehicle collisions with the focal species in this group do occur, such occurrence appears to be an exceedingly rare event and has not been reported within the Forest. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality of adults would still be unlikely.

Indirect impacts, both in the short-term, and the long-term, would result from disturbance that may cause individuals to move or alter behavior. This alternative would provide potential disturbance to the focal species within this group. Table 3-114 displays the acres of habitat potentially open for use under this alternative for the focal species within this group. Table 3-114 also displays the route mileage that occurs within habitat on the National Forest.

Table 3-114. Alternative 1: Potential Habitat for the Riparian Group that Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Bald eagle	7,320 w/in 0.25 mi existing 979,490 in maximum potential habitat	100.0% 100.0%
Willow flycatcher	1,710	97.1%
Yellow warbler	79,155	91.4%
Osprey	2,980	100.0%

*Acres rounded to the nearest 10.

Bald eagles appear to be more sensitive to foot travel than vehicle travel (Gaines et al. 2003). Anecdotal evidence from long-time observers of bald eagles in northeastern California seems to indicate a link between early nesting season vehicle access to nest stands and lowered nesting success (B. Turner personal observation, J. Rechtin personal observation; also see Watson 2004 related to foot access). Access by vehicles under incubating birds or winter roosting birds is presumed to be detrimental. Vehicle use under nest and roost trees probably results in lowered reproductive success. Potentially 7,320 acres within 0.25 miles of existing sites could be negatively affected by this alternative.

Direct impacts to willow flycatchers could include disturbance or loss of eggs or young due to jostling of willows. Similar impacts have been documented for livestock (USFS 2001a Vol.3, Chap. 3, part 4.4.2.3). A direct impact to willow flycatchers from cross-country vehicle travel is

possible but somewhat speculative. Indirect impacts could result from vehicle-induced changes to soil water levels affecting willow growth and invertebrate assemblages. For more information on impacts of cross-country travel on soil moisture and surface water flow, see the section on effects to hydrology and soils elsewhere in this document. There are no known occurrences of habitat loss due to off-highway vehicle use on the Modoc National Forest.

Yellow warblers could be impacted by loss of eggs or young from the jostling of plants on which nests are built. Vehicle impacts that reduce riparian hardwoods such as willows would reduce quantities of available habitat for yellow warblers. Impacts on yellow warblers from cross-country vehicle travel are possible but somewhat speculative. There are no known occurrences of yellow warbler habitat loss due to off-highway vehicle use on the Modoc National Forest.

Osprey may also be affected by cross-country travel by disturbance of nesting birds. Although ospreys appear to habituate readily to vehicle traffic, sudden appearance of vehicles in unusual places (e.g., off a well-traveled road) has caused osprey to flush off the nest (B. Turner personal observation).

Prohibition of cross-country travel includes the continuation of use on unauthorized routes. Table 3-115 displays the route mileage that would be available for use by the public within habitats used by the focal species in this group. This alternative would have approximately 21 miles of roads within a quarter mile of existing bald eagle nests and roosts. Of these 21 miles, only 0.7 miles are unauthorized routes. Under the four action alternatives, cross-country travel would be prohibited which includes these 0.7 miles. Alternative 1 would thus have 0.7 miles, or 3 percent, more route mileage within 0.25 miles of active bald eagle areas than the other alternatives.

Within the maximum potential habitat, there would be roughly 2,850 miles of routes, of which, approximately 234 miles would be unauthorized routes. This is approximately eight percent more route mileage within the maximum potential habitat than occurs in the alternative with the least route mileage (Alternative 3). This small percentage difference is also reflected in the riparian habitat influence index ratings. Alternative 1 has three more watersheds (98 out of 123) with "High" ratings than Alternative 3, which has the least number of "High"-ranked watersheds. "High" ratings indicate that human influence is high within the area potentially used by bald eagles. For bald eagles this alternative would therefore provide a slight additional amount of disturbance emanating from routes than the other alternatives. Because of fluctuations in snow accumulation and when spring snowmelt occurs, access to eagle nest and roost areas is highly variable. This variability affects when in the nesting cycle disturbance may occur near eagles. When disturbance occurs in the breeding cycle, is important, as eagles show more sensitivity to disturbance during incubation and early stages of brooding than later in the nesting cycle (Watson 2004). Given that the high variability in weather probably causes a large variability in disturbance timing, a four- to eight-percent difference in route availability appears to be an undetectable amount of impact.

Table 3-115. Alternative 1: Miles of Routes within Potential Habitat for the Riparian Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Bald eagle	0.7 mi within 0.25 miles of existing use 233.8 mi. within the maximum potential habitat	21 miles of route (total) within 0.25 miles existing use 2,851 mi within max. potential
Willow flycatcher	0.9	10.9 miles of route (total)
Yellow warbler	24.7	398.9 miles of route (total)

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Osprey	0.8	11.3 miles of route (total)

Willow flycatcher habitat would contain approximately 11 miles of unauthorized routes within 0.25 miles of known occurrence locations under this alternative. Approximately 9 percent more routes would occur in this alternative than would in Alternative 3, which does not add any routes to the NFTS. In at least one study (Altman et al. 2003), moderate or high human activity did not appear to be a factor in nest success. This may indicate that disturbance from human presence is not an important factor for this species. Routes may have an indirect impact of altering hydrology and thus impacting the amount of riparian shrub habitat available for nesting. This alternative would have the most impact from routes, although those impacts are expected to be limited compared to the impacts from other land management activities, especially grazing (see the cumulative effects section below).

Yellow warbler habitat would be affected similarly to willow flycatcher habitat. Approximately six percent of the total route mileage within potential habitat in this alternative would consist of unauthorized routes. This alternative would have the most unauthorized and NFTS route mileage within potential habitat at approximately 399 total miles as compared to the 374 total miles in Alternative 3, the alternative that does not add any unauthorized routes to the system. This alternative is very similar in the quantity of routes within habitat that would exist under Alternatives 2, 4, and 5. Alternative 1 would not prohibit cross-country travel which includes unauthorized routes that equal approximately two to three percent more route mileage than Alternatives 2, 4, and 5. Differences in disturbance on yellow warblers between alternatives would not likely be detectable given the relatively small changes in route mileage between alternatives. The indirect effect of altered hydrology and impacts to aquatic invertebrates are potentially much larger impacts. Because this alternative continues cross-country travel which includes the use of unauthorized routes, it would have a greater impact on potential habitat than the other alternatives. For the potential changes to stream hydrology from this alternative, see the hydrology and soils section of this chapter.

Alternative 1 would have approximately 7 percent more routes (11.3 miles) within 0.25 miles of a known osprey nest than Alternative 3, the alternative that does not add any unauthorized routes to the system. Ospreys readily habituate to human road use (Poole et al. 2002). It appears that the small differences in routes between the alternatives are unlikely to have a detectable effect on osprey population dynamics. Osprey are seasonal migrants and subject to impacts from changes in fish populations, weather during the nesting season, and changes to nest site availability. Impacts from small perturbations in the amount of disturbance do not appear to be meaningful.

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any routes. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the riparian group would aggregate with the effects outlined above in table 3-115. Those most important to the riparian group of the effects are the 122,500 AUMs of grazing annually on the Modoc National Forest, plus additional grazing actions on adjacent public and private lands. This grazing may be potentially affecting riparian species forage and cover. Forest standards provide protections to riparian areas and reduce impacts due to other management actions such as timber harvest, prescribed fire, and mechanical fuel treatments (USFS 1991). However, some riparian systems on the Forest are still recovering from impacts

that occurred prior to the implementation of the Modoc LRMP in 1991. For additional discussion on changes to riparian systems, see the hydrology and aquatic biology sections of this chapter.

There is also ongoing residential development, timber harvest, and juniper removal on private lands within and adjacent to the proclaimed boundary of the Forest, as well as stochastic events such as wildfires and catastrophic insect outbreaks. These actions are not subject to the Forest's standards, but in the case of timber harvest on private land, may be required to follow state timber harvest regulations that provide for protection of riparian resources. Vegetation treatments and grazing have the potential to impact species in this group by removing cover, impeding the growth of cover, altering vegetative structure or altering the relative amounts of different riparian plants (USFS 2001a). Some potential habitat for riparian shrub species such as willow flycatcher and yellow warbler cannot achieve suitability due to past, current and foreseeable actions, particularly grazing within perennial wet meadows. Grazing can suppress establishment and growth of willows (USFS 2001a Vol.3, Chap. 3, part 4.4.2.3). Changes to vegetation may result in changes in insect assemblages which may affect forage quality and quantity for willow flycatchers and yellow warblers (USFS 2001a Vol.3, Chap. 3, part 4.4.2.3). Loss of shrubs may also impact osprey by affecting the availability of fish. Past trends for this group have generally been negative but have improved greatly for bald eagles, culminating in their removal from the Endangered Species List in 2007.

This alternative would continue cross-country travel which would include the use of unauthorized routes, therefore impacts to species in this group would continue and aggregate with effects from other activities that affect stream hydrology and riparian vegetation. This aggregation of effects appears to be insufficient to negatively impact bald eagles. Bald eagles continue to reproduce and roost on the Modoc National Forest. The Forest has no indication that trends are other than positive and reflective of the general trends that led to de-listing of this species.

Cross-country travel may lead to additional negative impacts to hydrology and vegetative growth in riparian areas that can impact willow flycatcher habitat. This may aggregate with ongoing impacts from grazing that limit or minimize new willow establishment in wet meadows and removed willows in the past. Cross-country travel that reduces shrub density may combine with other impacts such as grazing, recreation, landing construction for timber management, and residential development, to increase the distribution and density of brown-headed cowbirds resulting in increased nest parasitism of willow flycatchers and yellow warblers.

The impact of cross-country travel on osprey appears to be minimal because of osprey's ability to habituate to vehicle presence. Ospreys are long-distance migrants and are therefore exposed to a multitude of impacts related to changes in not only the breeding area, but in the wintering areas. Changes to food sources can have large impacts to osprey productivity. For example, the removal of a fish hatchery as a food source for osprey on the Lassen National Forest resulted in a large decrease in nesting osprey on the Hat Creek Ranger District (USFS, Hat Creek Ranger District, unpublished data). Examples such as this would indicate that the impacts of occasional increased flushing of the small osprey population on the Modoc are probably insignificant at the population trend level.

Continuation of cross-country travel which includes use on unauthorized routes would also continue to provide impacts. However, the impact of unauthorized routes appears to be small. For example, the 11 miles of routes in willow flycatcher habitat in this alternative, is equivalent to approximately 20 acres or about one percent of the willow flycatcher habitat modeled by this analysis. Furthermore, the roadways do not constitute a change to habitats but an existing condition whose vegetation change impact has already occurred and whose conditions would continue into the future. Thus, the routes have less impact than an acre of new vegetation removal. This small additional impact would aggregate with negative pressures to population

growth such as limited willow habitats and potentially increasing brood parasitism but the additional impact is negligible and would thus, not alter, or accelerate existing trends. Yellow warblers are also long distance migrants and would be impacted similarly to willow flycatchers from the unauthorized routes within this alternative.

In summary, this alternative would add negative impacts, primarily from cross-country travel, to the ongoing population trends for this species group. This additional impact is of a minimal nature and appears discountable and insignificant such that population and habitat trends would be unaffected.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The bald eagles and ospreys would not be affected by vehicle travel underneath nest or roost trees. Loss of young and loss of eggs due to jostling would not occur for willow flycatchers and yellow warblers. Changes to riparian vegetation cover would not occur from cross-country vehicle travel.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of routes to the NFTS. Table 3-116 displays the route mileage within habitats used by the focal species in this group. This alternative would have approximately 20 miles of route within a quarter mile of existing bald eagle nests and roosts. These 20 miles are all existing NFTS routes, as no routes within the quarter mile zone would be added to the NFTS under this alternative. Therefore, this alternative would have no effect on bald eagles from the use of added routes within 0.25 miles of a bald eagle use location.

Within the bald eagle maximum potential habitat, there would be roughly 2,750 miles of NFTS routes, of which, approximately 134 miles would be added routes. This is approximately five percent more added routes within the maximum potential habitat than occurs in the alternative with the least mileage of added routes (Alternative 3). This alternative would have approximately four percent fewer added routes within the maximum potential habitat than Alternative 1. This small percentage difference is also reflected in the habitat influence index ratings. Alternative 2 has one more watershed (96 out of 123) with "High" ratings than Alternative 3, which has the least number of "High"-ranked watersheds. Alternative 2 has two fewer watersheds with "High" ratings than Alternative 1. "High" ratings indicate that human influence is high within the area potentially used by bald eagles. For bald eagles, this alternative would therefore provide a slight amount of disturbance reduction compared to Alternative 1. Given that the high variability in weather probably causes a large variability in disturbance timing, a one- to five-percent difference in route availability appears to be undetectable in amount of impact.

Table 3-116. Alternative 2: Miles of Routes within Potential Habitat for the Riparian Group

Species	Miles of Routes Added to the NFTS Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Bald eagle	0 mi within 0.25 miles of existing eagle use 133.8 mi. within the maximum potential habitat	20 miles within 0.25 miles of existing eagle use 2,751 mi within max. potential

Species	Miles of Routes Added to the NFTS Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Willow flycatcher	0.1 miles	10.1 miles
Yellow warbler	15.1 miles	389 miles
Osprey	0.6 miles	11.1 miles

Willow flycatcher habitat would contain approximately 10 miles of routes within 0.25 miles of known occurrence locations under this alternative. Approximately two percent more routes would occur in this alternative than would in Alternative 3, which has the least amount of routes. This alternative would have approximately seven percent less route mileage than Alternative 1 where allowing cross-country travel includes the continued use of one mile of unauthorized routes within willow flycatcher habitat. Routes may have an indirect impact of altering hydrology and thus impacting the amount of riparian shrub habitat available for nesting. This alternative would have an intermediate impact to hydrology from routes, as compared to the other alternatives. The impacts from disturbance and changes to riparian habitats caused by altered stream flows are expected to be limited compared to the impacts from other land management activities, especially grazing (see the hydrology section elsewhere and the cumulative effects section below).

Yellow warbler habitat would be affected similarly to willow flycatcher habitat. Approximately four percent of the route mileage within potential habitat in this alternative would consist of added routes. This alternative would have an intermediate quantity of route mileage within potential habitat at approximately 389 total miles, as compared to the 374 total miles in Alternative 3, the alternative with the smallest mileage of routes. Alternative 1 would have approximately two percent more route mileage in potential yellow warbler habitat than would occur in Alternative 2. The quantity of route mileage in Alternative 2 is approximately one percent more than would occur in Alternative 4, and the same as Alternative 5. Differences in disturbance to yellow warblers between alternatives would not likely be detectable, given the relatively small changes in route mileage between alternatives. The indirect effect of altered hydrology and impacts to aquatic invertebrates are potentially much larger impacts. Because this alternative prohibits cross-country travel, it would have a smaller impact on potential habitat than Alternative 1, but would still have more impact than Alternative 3, which does not add any unauthorized routes to the NFTS. For more discussion of the potential changes to stream hydrology from this alternative see the hydrology and soils section of this chapter.

Alternative 2 would have approximately five percent more route mileage (11.3 miles) within 0.25 miles of a known osprey nest than Alternative 3, the alternative with the least route mileage. Alternative 2 would also have approximately two percent less route mileage than Alternative 1. It appears that the small differences in route mileage between the alternatives are unlikely to have a detectable effect on osprey population dynamics given osprey's tolerance to human activity. Osprey are seasonal migrants and subject to impacts from changes in fish populations, weather during the nesting season, and changes to nest site availability. Impacts from small perturbations in the amount of disturbance do not appear to be meaningful.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities of bald eagles such as pair-bonding, nest initiation, incubation and early brooding may have less disturbance resulting in more successful reproduction. The seasonal closures would also reduce disturbance at winter roosts, potentially providing bald eagles with additional energy reserves. Willow flycatchers, yellow warblers and osprey would be absent during the seasonal closures as they are seasonal migrants.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on this focal group.

Cumulative Effects

The effects of Alternative 2 on the riparian group would aggregate with the effects outlined above in table 3-84. Forest standards provide protections to riparian areas and reduce impacts due to management actions (USFS 1991). However, some riparian systems on the Forest are still recovering from impacts that occurred prior to the implementation of the Modoc LRMP in 1991. For additional discussion on changes to riparian systems, see the hydrology and aquatic biology sections of this chapter.

There is also ongoing residential development, timber harvest, juniper removal, and grazing on private lands within and adjacent to the proclaimed boundary of the Forest, as well as stochastic events such as wildfires and catastrophic insect outbreaks. Vegetation treatments and grazing have the potential to impact species in this group by removing cover, impeding the growth of cover, altering vegetative structure or altering the relative amounts of different riparian plants. Changes to vegetation may result in changes in insect assemblages, which may affect forage quality and quantity for willow flycatchers and yellow warblers. Past trends for this group have generally been negative but have improved greatly for bald eagles, culminating in their removal from the Endangered Species List in 2007.

This alternative would not continue cross-country travel; therefore, cross-country travel impacts to species in this group would cease and no longer aggregate with effects from other activities that affect stream hydrology and riparian vegetation. See the cumulative effects discussion for Alternative 1 above for more information on this aggregation of effects.

The addition of 339 miles of routes to the NFTS would also continue to provide impacts. However, the impact of adding the routes to the NFTS is small. For example, the 10.1 miles of added route and pre-existing NFTS route in willow flycatcher habitat in this alternative, is equivalent to approximately 18 acres. This small additional impact would aggregate with negative pressures to population growth such as limited willow habitats, impacts occurring during migration and on the wintering grounds, and potentially increasing brood parasitism. However, the additional impact from route additions under this alternative is negligible and would thus not alter or accelerate existing trends. Yellow warblers, willow flycatchers and osprey are also long-distance migrants. They would suffer little relative impact from the route added to the NFTS, within this alternative, compared to the ongoing impacts to habitat they use during other parts of their lifecycle.

In summary, this alternative would add fewer negative impacts to the ongoing population trends for this species group than Alternative 1. The primary reason for the lower amount of impact is the prohibition of cross-country travel and the reduced amount of routes available for public travel as compared to Alternative 1. The small amount of impact that this alternative would add to existing population and habitat trends is of a minimal nature and appears discountable and insignificant.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The bald eagles and ospreys would not be affected by vehicle travel underneath nest or roost trees. Loss of young and loss of eggs due to jostling would not occur for willow flycatchers and yellow warblers. Changes to riparian vegetation cover would not occur from cross-country vehicle travel.

This alternative would not add any unauthorized routes to the NFTS. However, the linear effects of routes would still occur on the 4,580 miles of NFTS available for use. Table 3-117 displays the route mileage within habitats used by the focal species in this group. This alternative would have approximately 20 miles of NFTS routes within a quarter mile of existing bald eagle nests and roosts. Of these 20 miles, none would be unauthorized routes. Therefore, this alternative would have no effect on bald eagles from the addition of unauthorized routes within 0.25 miles of a bald eagle use location.

Within the maximum potential habitat, there would be roughly 2,617 miles of routes, of which none would be added unauthorized routes. This is approximately eight percent less route mileage within the maximum potential habitat, than occurs in the alternative that does not prohibit cross-country travel which includes the use of unauthorized routes (Alternative 1). This percentage difference is also reflected in the habitat influence index ratings. Alternative 3 has three less watersheds (98 out of 123) with "High" ratings than Alternative 1, which has the largest number of "High"-ranked watersheds. Alternative 2 has one more watershed with a "High" rating than Alternative 3. "High" ratings indicate that human influence is high within the area potentially used by bald eagles. This alternative would also have four to five percent less route mileage within bald eagle maximum potential habitat than alternatives 2, 4, and 5. For bald eagles, this alternative would therefore provide some disturbance reduction compared to the other alternatives. Given that the high variability in weather probably causes a large variability in disturbance timing, a four- to eight-percent difference in route availability appears to be an undetectable amount of impact.

Table 3-117. Alternative 3: Miles of Routes within Potential Habitat for the Riparian Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat
Bald eagle	0 mi within 0.25 miles of existing eagle use 0 mi. within the maximum potential habitat	20 mi within 0.25 miles of existing eagle use 2,617 mi within max. potential
Willow flycatcher	0 miles	9.9 miles
Yellow warbler	0 miles	374 miles
Osprey	0 miles	10.5 miles

Willow flycatcher habitat would contain approximately 10 miles of routes within 0.25 miles of known occurrence locations under this alternative. Approximately nine percent less route mileage would occur in this alternative than would in Alternative 1, which has the largest amount of route mileage near existing willow flycatcher sites. This alternative would have approximately two percent less route mileage than Alternatives 2, 4, and 5. Routes may have an indirect impact of altering hydrology and thus impacting the amount of riparian shrub habitat available for nesting. This alternative would have the least impact to hydrology from routes. The impacts from disturbance and changes to riparian habitats caused by altered stream flows are expected to be

limited, compared to the impacts from other land management activities, especially grazing (see the hydrology section elsewhere and the cumulative effects section below).

Yellow warbler habitat would be affected similarly to willow flycatcher habitat. There would be no addition of unauthorized routes to the NFTS under this alternative. This alternative would have the lowest quantity of route mileage within potential habitat at approximately 374 total miles as compared to the 399 total miles in Alternative 1. Alternatives 2, 4, and 5 would have approximately three to four percent more routes in potential yellow warbler habitat. Differences in disturbance to yellow warblers between alternatives would not likely be detectable given the relatively small changes in route mileage between alternatives. The indirect effect of altered hydrology and impacts to aquatic invertebrates are potentially much larger impacts. Because this alternative does not add any unauthorized routes, it would have the least impact on potential habitat. For more discussion of the potential changes to stream hydrology from this alternative, see the hydrology and soils section of this chapter.

Alternative 3 would have approximately seven percent less route mileage (11.3 miles) within 0.25 miles of a known osprey nest than Alternative 1. Alternatives 2 and 5 would have approximately five percent more route mileage than this alternative. It appears that the small differences in route mileage between the alternatives are unlikely to have a detectable effect on osprey population dynamics, given osprey's tolerance to human activity. Osprey are seasonal migrants and subject to impacts from changes in fish populations, weather during the nesting season, and changes to nest site availability. Impacts from small perturbations in the amount of disturbance do not appear to be meaningful.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

There would be no changes to vehicle class in this alternative. Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

This alternative would not add any unauthorized routes to the NFTS and would discontinue cross-country travel. The impacts to species in this group from the cross-country travel which includes the use of unauthorized routes would cease, and may partially counter some of the effects from vegetation management and grazing occurring elsewhere. However, the scope and intensity of the impact from cross-country travel is small. For example, 25 miles of unauthorized routes that would no longer be used with the prohibition of cross-country travel would convert slowly back to yellow warbler habitat over time This is equivalent to approximately 46 acres or less than 0.02 percent of the modeled yellow warbler habitat. The positive effects from prohibiting cross-country travel begin to show immediately for species such as willow flycatchers and yellow warblers that may suffer direct mortality from nest damage or jostling. However, the vehicle-caused mortality appears to be very small in relation to the potential for mortality from grazing. Livestock are more numerous than vehicles, and spend more time in and adjacent to riparian shrubs (122,500 animal-unit months versus 897 primary-use and 22,755 secondary-use OHV visits (English et al. 2004)). At the 20-year, long-term point, some additional riparian habitat may have begun to accumulate from the prohibition of cross-country travel. However, the low rate and intensity of impacts from the cessation of cross-country travel do not appear to be sufficient to

counter other impacts that are occurring from grazing, vegetation management and stochastic events such as breeding season, inclement weather, and stand-replacing fires. Overall, when aggregated with other impacts to the riparian group, impacts from this alternative appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. In habitat where cross-country travel is prohibited, the bald eagles and ospreys would not be affected by vehicle travel underneath nest or roost trees. Potential loss of young and loss of eggs due to jostling would not occur for willow flycatchers and yellow warblers.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 286 miles of routes to the NFTS. Table displays the route mileage within habitats used by the focal species in this group. This alternative would have approximately 20 miles of route within a quarter mile of existing bald eagle nests and roosts. Of these 20 miles, none are unauthorized routes. Therefore, this alternative would have no effect on bald eagles from the use of unauthorized routes within a quarter mile of a bald eagle use location.

Within the bald eagle maximum potential habitat, there would be roughly 2,728 miles of routes, of which approximately 111 miles would be added routes. This is approximately four percent more route mileage within the maximum potential habitat than occurs in the alternative that prohibits cross-country travel and does not add any unauthorized routes to the NFTS (Alternative 3). This alternative would have approximately four percent less route mileage within the bald eagle maximum potential habitat than Alternative 1. This small percentage difference is also reflected in the habitat influence index ratings. Alternative 4 has one more watershed (96 out of 123) with "High" ratings than Alternative 3, which has the least number of "High"-ranked watersheds. Alternative 4 has two fewer watersheds with "High" ratings than Alternative 1. "High" ratings indicate that human influence is high within the area potentially used by bald eagles. For bald eagles, this alternative would therefore provide a slight amount of disturbance reduction compared to Alternative 1. Given that the high variability in spring weather probably causes a large variability in disturbance timing, a four percent difference in route mileage appears to be an undetectable amount of impact.

Table 3-118. Alternative 4: Miles of Routes within Potential Habitat for the Riparian Group

Species	Miles of Routes Added to the NFTS Within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Bald eagle	0 mi with 0.25 miles of existing eagle use 111.3 mi. within the maximum potential habitat	20 mi with 0.25 miles of existing eagle use 2,728 mi within max. potential
Willow flycatcher	0.1 miles	10.1 miles
Yellow warbler	12.6 miles	387 miles
Osprey	0.6 miles	11.1 miles

Willow flycatcher habitat would contain approximately 11 miles of routes within 0.25 miles of known occurrence locations under this alternative. Approximately two percent more routes would occur in this alternative than in Alternative 3, which does not add any unauthorized routes to the NFTS. This alternative would have approximately seven percent less route mileage than Alternative 1. Routes may have an indirect impact of altering hydrology and thus impact the amount of riparian shrub habitat available for nesting. This alternative would have an intermediate impact to hydrology from routes. The impacts from disturbance and changes to riparian habitats caused by altered stream flows are expected to be limited, compared to the impacts from other land management activities, especially grazing (see the hydrology section elsewhere and the cumulative effects section below).

Yellow warbler habitat would be affected similarly to willow flycatcher habitat. Approximately three percent of the total route mileage within potential habitat in this alternative would consist of unauthorized routes added to the NFTS. This alternative would have an intermediate quantity of route mileage within potential yellow warbler habitat with approximately 387 total miles as compared to the 374 total miles in Alternative 3, the alternative where no unauthorized routes are added to the NFTS. Alternative 1 would have approximately three percent more routes in potential yellow warbler habitat than would occur in Alternative 4. The route mileage in Alternative 4 is approximately one percent more than would occur in Alternatives 2 and 5. Differences in disturbance to yellow warblers between alternatives would not likely be detectable, given the relatively small changes in route mileage between alternatives. The indirect effect of altered hydrology and impacts to aquatic invertebrates are potentially larger impacts. Because this alternative prohibits cross-country travel, it would have a smaller impact on potential habitat than Alternative 1. However, it would still have more impact than Alternative 3, which does not add any unauthorized routes to the NFTS. For more discussion of the potential changes to stream hydrology and aquatic invertebrates from this alternative, see the hydrology and aquatic biology sections of this chapter.

Alternative 4 would have approximately six percent more route mileage (11.3 miles) within a quarter mile of a known osprey nest than Alternative 3, the alternative with the lowest route mileage. Alternative 4 would also have approximately two percent less route mileage than Alternative 1. It appears that the small differences in route mileage between the alternatives are unlikely to have a detectable effect on osprey population dynamics given osprey's tolerance to human activity. Osprey are seasonal migrants and subject to impacts from changes in fish populations, weather during the nesting season, and changes to nest site availability. Impacts from small perturbations in the amount of disturbance do not appear to be meaningful.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities of bald eagles such as pair-bonding, nest initiation, incubation and early brooding may have less disturbance resulting in more successful reproduction. The seasonal closures would also reduce disturbance at winter roosts, potentially providing bald eagles with additional energy reserves. Willow flycatchers, yellow warblers and osprey would be absent during the seasonal closures as they are seasonal migrants.

Changes to class of use are not expected to have any detectable impact on the riparian group. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. This alternative would have no change in vehicle class. Changing the mix of use is not expected to have any impacts on the riparian group.

Cumulative Effects

The effects of Alternative 4 on the riparian group would aggregate with the effects outlined above in table 3-84. For additional discussion on changes to riparian systems, see the hydrology and aquatic biology sections of this chapter. Past trends for this group have generally been negative but have improved greatly for bald eagles, culminating in their removal from the Endangered Species List in 2007.

This alternative would not continue cross-country travel; therefore, impacts to species in this group from cross-country travel would cease and no longer aggregate with effects from other activities that affect stream hydrology and riparian vegetation. See the cumulative effects discussion for Alternative 1 above for more information on this aggregation of effects.

The addition of 286 miles of unauthorized routes to the NFTS would also continue to provide impacts. However, the impact of adding the unauthorized routes to the NFTS is small. For example, the 10.1 miles of route in willow flycatcher habitat, added to the NFTS in this alternative, is equivalent to approximately 18 acres. This small additional impact would aggregate with negative pressures to population growth such as limited willow habitats and potentially increasing brood parasitism, as well as grazing induced mortality and changes to riparian shrub vegetation. However, the additional impact from vehicle disturbance is negligible, and would thus not alter, or accelerate existing trends. Yellow warblers, osprey, and willow flycatchers, and juvenile bald eagles are also long-distance migrants. They would suffer little relative impact from the unauthorized routes added to the NFTS within this alternative, compared to the ongoing impacts to habitat they use during other parts of their lifecycle.

In summary, this alternative would add fewer negative impacts to the ongoing population trends for this species group than Alternative 1, 2 and 5, but more than Alternative 3. The primary reason for the lower amount of impact is the prohibition of cross-country travel and the reduced amount of route added to the NFTS. The small amount of impact that this alternative would add to existing population and habitat trends is of a minimal nature and appears discountable and insignificant.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. Table 3-119 displays the route mileage within habitats used by the focal species in this group for this alternative. This alternative has the same route configuration as Alternative 2. Because the route system is the same, the effects to riparian species are the same for this alternative (Alternative 5) and Alternative 2.

Table 3-119. Miles of Routes within Potential Habitat for the Riparian Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Bald eagle	0 mi within 0.25 miles of existing eagle use 133.8 mi. within the maximum potential habitat	20 mi within 0.25 miles of existing eagle use 2,751 mi within max. potential habitat
Willow flycatcher	0.1 miles	10.1 miles

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Yellow warbler	15.1 miles	389 miles
Osprey	0.6 miles	11.1 miles

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities of bald eagles such as pair-bonding, nest initiation, incubation and early brooding may have less disturbance, thereby resulting in more successful reproduction. The seasonal closures would also reduce disturbance at winter roosts potentially providing bald eagles with additional energy reserves. Willow flycatchers, yellow warblers and osprey would be absent during the seasonal closures as they are seasonal migrants.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel, but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on riparian wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to riparian species as compared to Alternative 2. This alternative has the same cumulative effects as Alternative 2, which are imperceptible and discountable.

Comparison of Effects on the Riparian Group, by Alternative

This section provides tabular comparisons of the five alternatives. The first two tables (Table 3-120, Table 3-121) display the relative impacts at the watershed level of the five alternatives.

Table 3-120. Riparian Habitat Influence Rank Ratings, by Alternative

Number of HUCs with each Habitat Influence Rank Rating, Where each HUC Contains some Riparian Reserve					
Ranking	Alt 1	Alt 2	Alt 3	Alt4	Alt5
Low	86	87	89	87	87
Moderate	27	27	25	27	27
High	4	3	3	3	3

Table 3-121. Bald Eagle Habitat Influence Rank Ratings, by Alternative

Number of HUCs with each Habitat Influence Rank Rating, Where each HUC Contains some Riparian Reserve					
Ranking	Alt 1	Alt 2	Alt 3	Alt4	Alt5
Low	9	9	10	9	9
Moderate	16	18	18	18	18
High	98	96	95	96	96

Table 3-122. Comparison of Selected Effects, by Alternative

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Bald eagle (Modeled habitat on the MDF: 7,320 within ¼ mi zone: 979,490 ac within max. potential habitat)	NF habitat available to cross-country travel (1/4-mi zone)	7,320 ac	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat (1/4 -mi zone)	UA*: 0.7 UA+NFTS: 21	UA: 0 UA+NFTS: 20.3	UA: 0 UA+NFTS: 20.3	UA 0 UA+NFTS: 20.3	UA: 0 UA+NFTS: 20.3
	Equivalent acres of UA routes in habitat (% of ¼ mi zone Habitat)	1.3 ac (0.02%)	0 ac (0%)	0 ac (0%)	0 ac (0%)	0 ac (0%)
	Equivalent acres of UA +NFTS routes in habitat (% of ¼ mi zone Habitat)	38.2 ac (0.5%)	36.9 ac (0.5%)	36.9 ac (0.5%)	36.9 ac (0.5%)	36.9 ac (0.5%)
	Area of maximum potential habitat available to cross-country travel	979,490	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat (maximum potential habitat)	UA*: 233.8 UA+NFTS: 2,851	UA:133.8 UA+NFTS: 2,751 4%<A-1	UA: 0 UA+NFTS: 2,617 8%< A-1 5%< A-2	UA 111.3 UA+NFTS: 2,728 3%< A-1 1%< A-2 4%> A-3	UA: 133.8 UA+NFTS: 2,751 4%< A-1
	Equivalent acres of UA routes in habitat (% of maximum potential Habitat)	425.5 ac (0.04%)	243.5 ac (0.02%)	0 ac (0%)	202.5 ac (0.02%)	243.5 ac (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of maximum potential Habitat)	5,189 ac (0.5%)	5,007 ac (0.5%)	4,763 ac (0.5%)	4,965 ac (0.5%)	5,007 ac (0.5%)
Willow flycatcher (Modeled habitat on the MDF: 1,760)	NF habitat available for cross-country travel	1,713 acres	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 1.0 UA+NFTS: 10.9	UA: 0.2 UA+NFTS: 10.1 mi 7%< A-1	UA: 0 UA+NFTS: 9.9 9%< A-1 2%< A-2	UA: 0.2 UA+NFTS: 10.1 7%< A-1 0%<A-2 2%> A-3	UA: 0.2 UA+NFTS: 10.1 7%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	1.8 ac (0.1%)	0.4 ac (0.02%)	0 ac (0%)	0.4 ac (0.02%)	0.4 ac (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	19.8 ac (1.1%)	18.4 ac (1.0%)	18.0 ac (1.0%)	18.4 ac (1.0%)	18.4 ac (1.0%)

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Yellow warbler (Modeled habitat on the MDF: 86,585)	NF habitat available for cross-country travel	79,155	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	24.7 UA mi 398.9 mi	15.1 UA mi 389.3mi 2% < A-1	0 UA mi 374.2 mi 6% < A-1 4% < A-2	12.6 UA mi 386.8 mi 3% < A-1 1%< A-2 3%> A-3	15.1 UA mi 389.3mi 2% < A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)					
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)					
Osprey (Modeled habitat on the MDF: 2,980 acres)	NF habitat available for cross-country travel	2,980	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	0.8 UA mi 11.3 mi	0.6 UA mi 11.1 mi 3%< A-1	0 UA mi 10.5 mi 10%< A-1 7%< A-2	0.6 UA mi 11.1 mi 4%< A-1 1%<A-2 7%> A-3	0.6 UA mi 11.1 mi 3%< A-1

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Sensitive Species Determinations

Bald Eagle
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

The Modoc Travel Management Project Alternative 1 may affect individual bald eagles as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2, 3, 4 and 5 would have no impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS within 1/4 –mile of an existing bald eagle site. Alternatives 2, 3, 4 and 5 would therefore have no effects on bald eagles or their habitats. Thus it is the biologist's determination that the Modoc Travel Management Project Alternative 1 may affect individuals but is not likely to result in a trend toward Federal listing and that Alternatives 2, 3, 4, and 5 would not affect bald eagles or their habitat.

Willow Flycatcher
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

The Modoc Travel Management Project Alternative 1 may affect individual willow flycatchers as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2, 3 4, and 5 would have no impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and less than ¼ mile of additional routes would be added to the NFTS within willow flycatcher habitat. Alternatives 2, 3, 4 and 5 would therefore have no effects on willow flycatchers or their habitats. Thus it is the biologist's determination that the Modoc Travel Management Project Alternative 1 may affect individuals but is not likely to result in a trend toward Federal listing and that Alternatives 2, 3, 4 and 5 would not affect willow flycatchers or their habitat.

Cavity-Dependent Group: Affected Environment

Focal Species Within the Group: Hairy woodpecker, black-backed woodpecker, pileated woodpecker, red-naped sapsucker, red-breasted sapsucker

This species group is associated with cavities in trees. Species included in the group include the pallid bat, a Forest Service "Sensitive" species. Other species include woodpeckers such as the hairy woodpecker, black-backed woodpecker, pileated woodpecker, red-naped sapsucker and the red-breasted sapsucker. The Modoc LRMP, as amended by the NWFP and the SNFPA, provides for a variety of snag densities..

Table 3-123. Snag Retention Guidelines on the Modoc National Forest

Habitat	Density	Source of Guideline
Big Valley Sustained Yield Unit	1.5 snags >16" DBH/acre	Modoc LRMP 1991
Eastside pine types	At least 3.0 largest snags/acre	SNFPA
Westside mixed conifer and ponderosa pine types	At least 4.0 largest snags/acre	SNFPA
Red fir	At least 6.0 largest snags/acre	SNFPA
NWFP matrix	Sufficient snags to support 40% of potential cavity-nesting bird population levels	Northwest Forest Plan

The hairy woodpecker, found in all woodland and Forest types, uses snags and dead parts of trees to create cavities (USFS 1991b pg. 3-110). Zeiner et al. (1990) report that hairy woodpecker nest tree diameter ranges from 13 to 30 inches. Jackson et al. (2002) report cavity entrances are about 5 cm (2 inches) in diameter. This would indicate use of trees much smaller than the 13" minimum reported by Zeiner may not be physically possible due to structural weakness created in trees smaller than 10-13" DBH.

Black-backed woodpeckers are also found in a variety of Forested habitats. This species uses live and dead trees with an average size of 14-15" DBH (Dixon et al. 2000). The cavity is often excavated in a tree with heartrot or in the sapwood of a recently burned tree (Dixon et al. 2000).

Pileated woodpeckers are the largest woodpecker in the Modoc area and in most of North America (Bull and Jackson 1995). This species uses late-successional Forest or younger Forest with large remnant trees (Bull and Jackson 1995). Roost locations are in trees with existing hollow interiors created by decay. Nest trees in the Pacific Northwest are typically snags with large diameters (mean DBHs of 38, 33 and 27 inches reported in Bull and Jackson 1995). Pileated woodpeckers are reported to be "tolerant" of human activity near the nest, and to exhibit variable behavior near roosts where some individuals may be tolerant and other individuals may change roosts (Bull and Jackson 1995). The CWHR and vegetation modeling predicts an estimated

25,360 acres could potentially support this species in mixed conifer, white fir and red fir vegetation types on the Forest.

The red-naped and red-breasted sapsuckers are closely related species of woodpeckers found on the Modoc National Forest. The range of the two species overlaps on the Modoc NF and the two species hybridize (Walters et al. 2002). These aptly named birds are adapted for sipping sap from a variety of conifer and hardwood species (Walters et al. 2002). Red-breasted sapsuckers may place cavities higher in trees than red-naped sapsuckers (55 to 65 foot average for red-breasted sapsuckers, versus 9.5- to 58-foot averages for red-naped as reported in Walters et al. 2002). Cavity diameters are generally about 1.5 to 1.8 inches (Walters et al. 2002). The minimum size tree used by sapsuckers was reported as 6.6 inches (Walters et al. 2002). It appears that, at least the red-naped, is "little affected by vehicle traffic when nesting alongside roads" (Walters et al. 2002). Because red-naped sapsuckers are mostly limited to the Warner Mountains, the habitat modeling was restricted to the Warner Mountain Ranger District. Red-naped sapsuckers do occur on other portions of the Forest; however, the Warner Mountains provide the locations where red-naped sapsuckers are routinely observed on the Forest.

Cavity use places pallid bats in this species grouping. Pallid bats are thought to be widely distributed across the Forest. The SNFPA FEIS 2001 refers to pallid bats as "roosting habitat generalists" whose "foraging habitats requirements appear to be more restrictive" (Vol.3, Chap. 3, part 4.4 pg. 55 (USFS 2001a)). Some of the roosts used by pallid bats are oak cavities and hollow trees (USFS 2001a, Vol. 3. Chap. 3, part 4.4, pg. 55) Pallid bats also forage on ground-dwelling arthropods so open areas are important for feeding. The presence of cavities and open areas across much of the Forest provides the conditions that support the assumption of broad distribution. Suitable cavities for pallid bats may occur anywhere that there are sufficiently large trees to form cavities (assumed to be trees larger than 6" DBH). Pallid bats' preference for foraging in open areas makes determination of habitat difficult. Also, the broad nature of habitats used results in none of the CWHR habitat stages meeting the 0.75 suitability index used in this analysis. Because of the diverse nature and lack of sufficient suitability rating impacts to pallid bats will only be discussed in a qualitative way.

In order to examine relative impacts between alternatives, a disturbance index was calculated. Hairy woodpeckers were used to represent the other focal species in this group. Hairy woodpeckers have a relatively widespread population across the Forest and capture both medium- and large-tree Forest types. To determine the route zone of influence, routes were buffered by 60-meters. The habitat disturbance index was calculated by dividing the hairy woodpecker habitat within the route zone of influence by the amount of hairy woodpecker habitat within the 6th order watershed to determine the proportion of habitat that could be influenced by routes. A ranking was assigned that follows the rankings developed by Gaines et al. (2003) using the following class breaks:

- Less than 30 percent of maximum potential habitat within route zone of influence ranks as a "Low" level of human influence
- Thirty to 50 percent of maximum potential habitat within the route zone of influence is a moderate level of human influence
- Greater than 50 percent of maximum potential habitat within the route zone of influence is a high level of human influence.

Table 3-124. For the Cavity-dependent Group, California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
Hairy Woodpecker	ASP: 4S, 4P, 4M, 5S, 5P, 5M, 6 EPN: 4S, 4P, 4M, 5S, 5P, 5M JPN: 4S, 4P, 4M, 5S, 5P, 5M LPN: 4S, 4P, 4M, 5S, 5P, 5M MHW: 5S, 5P, 5M, 6 MRI: 4S, 4P, 4M, 5S, 5P, 5M, 6 PPN: 4S, 4P, 4M, 5S, 5P, 5M RFR: 5S, 5P SMC: 4S, 4P, 4M, 5S, 5P, 5M, 6 SCN: 5S, 5P, 5M WFR: 4S, 4P, 4M, 5S, 5P, 5M, 6	390,960 acres
Black-backed woodpecker	LPN: 4 (ALL), 5(ALL) RFR: 5D	25,600 acres
Pileated woodpecker	JPN: 5M, 5D MHW: 5M, 5D, 6 PPN: 5M, 5D SMC: 5M, 5D, 6 WFR: 5M, 5D, 6	25,360 acres
Red-naped sapsucker	ASP: 3S, 3P, 3M, 4S, 4P, 4M, 5S, 5P, 5M ESP: 5S, 5P, 5M MHW: 3S, 3P, 3M, 4S, 4P, 4M, 5S, 5P, 5M MRI: 3S, 3P, 3M, 4S, 4P, 4M, 5S, 5P, 5M WFR: 3S, 3P, 3M, 4S, 4P, 4M, 5S, 5P, 5M	19,530 acres
Red-breasted sapsucker	ASP: 4S, 4P, 4M, 5S, 5P, 5M, 6 EPN: 4S, 4P, 4M, 5S, 5P, 5M JPN: 4S, 4P, 5S, 5P, 5M JUN: 5S, 5P LPN: 4S 4P, 4M, 5S, 5P, 5M MHW: 4S 4P, 4M, 5S, 5P, 5M, 6 MRI: 4S 4P, 4M, 5S, 5P, 5M, 6 PPN: 4S 4P, 4M, 5S, 5P, 5M RFR: 4S, 4P, 4M SMC: 4S 4P, 4M, 5S, 5P, 5M, 6 WFR: 4S 4P, 4M, 5S, 5P, 5M	380,610 acres
Pallid bat	NO HABITATS >0.75 (see discussion)	

Cavity-Dependent Group: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

Table 3-125 displays the acres of habitat potentially available for use under this alternative for the focal species within this group. Cross-country travel includes the use of unauthorized routes. Table 3-126 displays the route mileage that occurs within habitats of the focal species on the Modoc National Forest. Although occasional direct mortality may occur from off-road collisions with vehicles, this appears to be an exceedingly rare event and has not been reported to occur within the Forest. It is possible that such an event could occur under this alternative, however given existing use and mobility of the species, such occurrences would remain rare and inconsequential to species population dynamics. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

A larger impact, both in the short term, and the long term, would be the disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to the focal species within this group. Disturbance could occur during feeding activities. Vehicles in proximity may cause birds to flush from feeding locations. Disturbance may also impact food deliveries to cavities, pair-bonding, and cavity construction. Breeding-related impacts may be somewhat limited, as early breeding activities may begin when snow impedes or prevents most cross-country travel.

Hairy woodpeckers and red-breasted sapsuckers, being widespread, are the most available to be impacted. At the same time, the large number of acres of habitat means the impacts that do occur are diluted. Pileated woodpeckers often forage near or on the ground (Bull and Jackson 1995) and thus may be particularly susceptible to having feeding disturbed. Impacts to red-naped sapsuckers may be reduced, compared to other cavity-dependent species, as the Warner Mountains with their steeper slopes may be less used for cross-country travel than other portions of the Forest.

Cross-country road travel may benefit pallid bats by increasing the amount of openings in the ground-level vegetation. This effect would probably be limited, as most areas suitable for cross-country travel probably have sufficient ground-level openings.

Table 3-125. Alternative 1: Potential Habitat for the Cavity-Dependent Group that Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Hairy woodpecker	376,820	96.4%
Black-backed woodpecker	21,250	83.0%
Pileated woodpecker	22,160	87.4%
Red-naped sapsucker	13,970	71.5%
Red-breasted sapsucker	285,910	75.1%

*Rounded to nearest 10 acres.

This alternative would continue to allow cross-country travel which would include the use of 491 miles of unauthorized routes. Table 3-126 displays the amount of route mileage within habitats used by the focal species in this group. Disturbance to cavity-dependent species' activities could occur along these routes. The largest impact would be the increased loss of recently dead trees to woodcutting and hazard reduction.

The habitat influence rating was "Moderate" for 11 of the watersheds, and "Low" for 100 watersheds. Of the hairy woodpecker habitat on the Modoc National Forest, 94 percent occurs in a watershed with a "Low" rating for human influence. This alternative has the most watersheds with moderate ratings and has the lowest percentage of habitat with a low rating. The

continuation of cross-country travel results in approximately five percent of the habitat being rated "moderate" rather than "low".

As a group, all of the focal species would be most affected by this alternative, as opposed to the other alternatives, because cross-country travel, which includes the continued use of unauthorized routes, would continue under this alternative. The routes and vehicle traffic probably present little direct impact to any of the focal species in this group. Indirectly, more route mileage would equal more area that would be easily accessible for woodcutting. Woodcutting typically happens in proximity to a roadway resulting in fewer snags near the road. The habitat influence rating of "Low" indicates that this impact does not greatly affect the populations of these focal species. However, there would be about five percent fewer acres occurring within a "Low" ranked watershed under this alternative than under Alternative 3, which prohibits cross-country travel and does not add any unauthorized routes to the NFTS. Black-backed woodpeckers, pileated woodpeckers, and red-naped sapsuckers are probably less affected by continued cross-country travel, as these species tend to be more associated with special habitat elements. The special habitat elements of recently burned trees for black-backed woodpeckers, large trees and ants for pileated woodpeckers, and riparian hardwoods for red-naped sapsuckers are not evenly distributed across the Forest. Black-backed and pileated woodpecker habitat show the largest differential between alternatives in the miles of route within habitat metric. This alternative would continue cross-country travel which would include five percent more route mileage within pileated habitat and 14 percent more miles within black-backed habitat than would occur under Alternative 3. For the black-backed woodpecker, this alternative differs from Alternatives 2, 4, and 5 by about six to seven percent in the route mileage within habitat. The mileage differences (on a percentage basis) are less for the other focal species. The sapsuckers and the hairy woodpecker are affected by eight to ten percent more routes under this alternative than under the alternative where no unauthorized routes are added to the NFTS (Alternative 3). There is little difference (two to six percent) between this alternative and Alternatives 2, 4, and 5 in the change in route mileage within habitat for the sapsuckers and the hairy woodpecker.

Table 3-126. Alternative 1: Miles of Routes within Potential Habitat for the Cavity-Dependent Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Hairy woodpecker	147.5	1,749
Black-backed woodpecker	12.9	95
Pileated woodpecker	3.3	66
Red-naped sapsucker	5.9	59
Red-breasted sapsucker	123.8	1,363

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any particular route segment. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the cavity-dependent group would aggregate with the effects outlined above in table 3-84. Those effects include 4,000 acres of prescribed fire, 6,000 acres of mechanical fuel treatments, 1,500 acres of treatments to improve sage-steppe, and 5,500 acres of timber harvest on the Modoc National Forest. This is about 17,000 acres per year of vegetation treatments, of varying intensity, potentially affecting cavity-dependent species' forage and cover. There is also ongoing timber harvest and juniper removal on private lands within and adjacent to

the proclaimed boundary of the Forest, as well as stochastic events such as wildfires and catastrophic insect outbreaks. Vegetation management and prescribed fire have the potential to impact species in this group by removing important habitat elements such as downed logs, snags, hollow trees and large trees. These elements are used for cover, cavity construction or are important to the life histories of the prey of cavity-dwellers. Prescribed fire and wildfire may also increase the numbers of dead trees, or increase the stress levels within trees, resulting in additional insect populations. Generally, this group of species is affected negatively by extensive mechanical treatments that reduce these important habitat elements and reduce the rate of accumulation of dead trees. Conversely, the species in this group tend to benefit from wildfires, prescribed fire, insect outbreaks and densely stocked timber stands. The benefits from these conditions are a result of higher quantities of snags and higher insect populations that provide improved foraging for these primarily insectivorous species.

This alternative would continue cross-country travel, which includes the public use of the 491 miles of unauthorized routes. Therefore, impacts to species in this group would continue and aggregate with effects from vegetation management occurring elsewhere. Because the impacts from cross-country travel are estimated to be low, the continuation of cross-country travel under this alternative would add only a small amount of negative impacts to those impacts occurring from vegetation management activities. The continuation of public travel on the unauthorized routes would also continue to provide impacts. However, the impact of the unauthorized routes is small in relation to the extent of habitat for these species. For example, the 148 miles of unauthorized routes in hairy woodpecker habitat in this alternative is equivalent to approximately 270 acres, or about two percent, of the area impacted annually by various mechanical and prescribed fire vegetation treatments, or 0.04 percent of the modeled suitable hairy woodpecker habitat on the Modoc National Forest. The three miles of unauthorized routes in pileated woodpecker habitat in this alternative, is equivalent to approximately six acres, or 0.3 percent area impacted annually by various mechanical and prescribed-fire vegetation treatments, or about 0.02 percent of the habitat open to cross-country travel. Furthermore, the unauthorized routes do not constitute a change to habitats, but an existing condition whose vegetation-change impact has already occurred, and whose conditions would continue into the future. Thus, the unauthorized routes have less impact than an acre of new vegetation manipulation.

Alternative 1 has the highest level of negative effects of the alternatives, but these effects are limited in scope and intensity in comparison to other actions occurring on the landscape. Timber harvest and mechanical fuels treatments must meet minimum retention requirements for down logs and snags, thereby ameliorating the potential negative effects to cavity-dependent species from direct removal of snags. Reduced stand density from timber harvest and stand tending results in stronger trees, more resistant to insects. The lower rates of mortality in treated stands thus result in lower densities of snags and ultimately down logs. This effect can last 20 years or more until stand density increases sufficiently to cause tree stress and death. Snag density is encouraged through the retention of existing snags, but as snags fall, the reduced snag recruitment rate can result in areas being below target levels of snag density. This is detrimental to those cavity nesters depending on snags for forage and nesting substrates. Prescribed fire, wildfire, and insect attacks create additional snags and down logs. At the same time, stand-replacing wildfire, while providing a pulse of snags, can remove all living trees, leaving an area poorly suited for cavity nesters for decades. To the extent that snag-removing activities exceed snag-creating activities, there may be a long-term decline in habitat quality for cavity-dependent species. The small acreages of unauthorized routes in this alternative (e.g., 268 equivalent-acres in hairy woodpecker habitat) are insignificant compared to the quantity of treated landscape (5,500 acres per year on the Modoc National Forest, additional would occur on adjacent private lands) especially when considering the positive benefits from this project are essentially a one-time event and timber harvest is ongoing. In other words, the impact of 286 acres of unauthorized

route would be undetectable compared to the long-term period of 20 years and 110,000 acres of timber treatments. Thus, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 1 are imperceptible and discountable.They do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

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

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of unauthorized routes to the NFTS. The routes and vehicle traffic probably present little direct impact to any of the focal species in this group. Indirectly, more routes would equal more area easily accessible for woodcutting. Woodcutting typically happens in proximity to a roadway, resulting in fewer snags near the road. The habitat influence rating of "Low" indicates that this impact does not greatly affect the populations of these focal species. However, there would be about five percent fewer acres occurring within a "Low" ranked watershed under this alternative than under Alternative 3, which has the lowest route mileage. This alternative would have two percent more route miles within pileated woodpecker habitat, and eight percent more route miles within black-backed habitat than would occur under Alternative 3. For the black-backed woodpecker, this alternative differs from Alternative 4 by about 1 percent in the route mileage within habitat. The sapsuckers and the hairy woodpecker are affected by five to seven percent more route mileage under this alternative than under the alternative with the least mileage (Alternative 3). There is little difference (one percent) between this alternative and Alternatives 4 in the change in route mileage within habitat for the sapsuckers and the hairy woodpecker. The impacts of this alternative would be the same as Alternative 5 because they have the same routes. The routes in Alternative 2 would thus result in lower impacts to cavity-dependent species than would occur under Alternative 1, have essentially the same impacts as Alternatives 4 and 5, and slightly more impact than Alternative 3. These impacts would primarily be a slight lowering of available snags adjacent to routes and occasional disturbance of foraging due to passing vehicles. These impact differences are limited in scope and intensity.

Table 3-127 displays the route mileage within habitats used by the focal species for this group. The habitat influence rating was "Moderate" for 10 of the watersheds, and "Low" for 101 watersheds. In this alternative, 95 percent of the hairy woodpecker habitat on the Modoc National Forest occurs in a watershed with a "Low" rating for human influence.

Table 3-127. Alternative 2: Miles of Routes within Potential Habitat for the Cavity-Dependent Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Hairy woodpecker	114.5	1,716
Black-backed woodpecker	7.6	90
Pileated woodpecker	1.5	64

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Red-naped sapsucker	3.0	56
Red-breasted sapsucker	98.9	1,363

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles. These areas would have no disturbance from vehicles during the closure periods. Seasonal closures do not appear to be a factor for this species group.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance; whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel, but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 2 on the cavity-dependent group would aggregate with the effects outlined above in table 3-84 This alternative would not continue cross-country travel, which includes the use of unauthorized routes; therefore, impacts to species in this group from cross-country travel would cease and no longer aggregate with effects from other activities that affect cavity-dependent species or their habitat.

The addition of 339 miles of unauthorized routes to the NFTS would also continue to provide impacts. However, the impact of the added routes is small in relation to the extent of habitat for these species. For example, the 115 miles of added route in hairy woodpecker habitat, in this alternative, is equivalent to approximately 209, acres or about one percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. The 1.5 miles of added route in pileated woodpecker habitat, in this alternative, is equivalent to approximately three acres, or about 0.01 percent of the habitat on the National Forest, or 0.01 percent of the area impacted annually by various mechanical and prescribed-fire vegetation treatments.

Alternative 2 has a level of negative effects equal to Alternative 5, below those of Alternative 1, and above those of Alternatives 3 and 4. The primary reasons for the lower amount of impact compared to Alternative 1 is the prohibition of cross-country travel in Alternative 2. The effects of Alternative 2 are limited in scope and intensity in comparison to other actions occurring on the landscape. The small acreages of routes added to the NFTS in this alternative are insignificant compared to the quantity of treated landscape. Thus, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 2 are imperceptible and discountable. They do not appear to affect existing trends to species population size, habitat, or distribution. The small amount of impact that this alternative would add to existing population and habitat trends is of a minimal nature and appears discountable and insignificant.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed

under Alternative 1 from cross-country travel would not occur. The focal species would not be affected by disturbance or indirect impacts to prey or food resources.

This alternative would not add any unauthorized routes to the NFTS. However, the linear effects of routes would still occur on the 4,580 miles of NFTS routes. Table 3-128 displays the route mileage within habitats used by the focal species in this group.

The habitat influence rating was "Moderate" for 8 of the watersheds, and "Low" for 103 watersheds. Of the hairy woodpecker habitat on the Modoc National Forest, 99 percent occurs in a watershed with a "Low" rating for human influence. This alternative would have the smallest quantity of route mileage of the alternatives. This alternative could potentially add approximately 268 acres of hairy woodpecker habitat if all the routes no longer used due to the prohibition of cross-country travel, re-vegetate into suitable Forested habitat. The quantities of potential habitat prohibiting cross-country travel would be even less for the other focal species in this group because they have route mileage within their suitable habitat. For example, pileated woodpeckers have only 3.3 miles of unauthorized route in their modeled habitat. This is approximately six acres. Even for hairy woodpecker, the amount of habitat added is small compared to the extent of the existing habitat. For hairy woodpecker the 268 acres from routes not added to the NFTS is only 0.07 percent of the total hairy woodpecker habitat on the National Forest. For pileated woodpeckers, the potential habitat gain is only 0.03 percent of modeled habitat. These extremely small percentages indicate that even no addition of unauthorized routes to the NFTS has no perceptible impact to the population of cavity-dependent species on the Forest.

Table 3-128. Alternative 3: Miles of Routes Within Potential Habitat for the Cavity-Dependent Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes Within Habitat on NF
Hairy woodpecker	114.5	1,716
Black-backed woodpecker	7.6	90
Pileated woodpecker	1.5	64
Red-naped sapsucker	3.0	56
Red-breasted sapsucker	98.9	1,363

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

This alternative would have no change in vehicle class of use.

Cumulative Effects

This alternative would discontinue cross-country travel, which would include use of approximately 491 miles of unauthorized routes to the NFTS. The impacts to species in this group from the cross-country travel would cease and may partially counter negative effects from vegetation management occurring elsewhere. However, the scope and intensity of the impact from ending cross-country travel is small (see the cumulative effects discussion above for Alternative 1). The positive effects from prohibiting cross-country travel would begin to show immediately for species such as pileated woodpeckers that forage on down logs. At the 20-year, long-term point, some additional cavity habitat would have begun to accumulate. However, the low rate and intensity of positive impacts from the cessation of cross-country travel do not appear to be sufficient to counter other impacts that are occurring from vegetation management

treatments. As noted above, there is a potential one-time gain of 268 acres of habitat for hairy woodpecker. This pales in comparison to the 5,500 acres per year of timber harvest that is reasonably foreseeable. Thus, at the end of 20 years the potential habitat gain of 268 acres from this alternative could possibly be countered by 110,000 acres of treatment. Additional harvest would occur on the adjacent private timberlands, also reducing live tree mortality and reducing potential hairy woodpecker habitat. During this 20-year period, some improvement in condition for hairy woodpeckers would occur as prescribed fire, wildfire, and insect outbreaks create new snags. However, these impacts also would dwarf the impact of the potential additional habitat from this alternative. Overall, when aggregated with other impacts to the cavity-dependent group, impacts from this alternative are imperceptible and discountable. They do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

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

Effects of Adding Unauthorized Routes to the NFTS

Table 3-129 displays the amount of route mileage within habitats used by the focal species in this group.

The habitat influence rating was “Moderate” for 10 of the watersheds, and “Low” for 101 watersheds. Of the hairy woodpecker habitat on the Modoc National Forest, 95 percent occurs in a watershed with a “Low” rating for human influence. This alternative differs from Alternatives 2 and 5 by less than one percent in the quantity of unauthorized routes added to the NFTS in the habitat for the focal species. The difference in “footprint” between this alternative and alternatives 2 and 5 are, for all intents, essentially undetectable. Therefore, Alternative 4 would have the same effects to cavity-dependent species as Alternative 2.

Table 3-129. Alternative 4: Miles of Routes within Potential Habitat for the Cavity-Dependent Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Hairy woodpecker	114.5	1,716
Black-backed woodpecker	7.6	90
Pileated woodpecker	1.5	64
Red-naped sapsucker	3.0	56
Red-breasted sapsucker	98.9	1,363

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route. These areas would have no disturbance from vehicles during the closure periods. Hairy woodpeckers, black-backed woodpeckers and pileated woodpeckers may see some small reduction in disturbance from seasonal closures, but the extent of closures is small in comparison to the distribution of these

species. Because additional miles of seasonal closure occur on the Warner Mountains in this alternative, red-naped sapsuckers would have additional relief from disturbance as compared to the other alternatives that would not implement closures in the Warner Mountains. Conversely, red-breasted sapsuckers would not benefit from the additional closures.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. There would be no change to vehicle class of use in this alternative. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 4 on the cavity-dependent group would aggregate with the effects outlined above in table 3-84. This alternative would not continue cross-country travel; therefore, the disturbance impacts to species in this group would cease and no longer aggregate with effects from other activities that affect cavity-dependent species and their habitat. The continuation of public travel on 286 miles of unauthorized route added to the NFTS would also continue to provide impacts. However, the impact of the added routes is small in relation to the extent of habitat for these species. For example, the 94 miles of route added to the NFTS in hairy woodpecker habitat, in this alternative, is equivalent to approximately 171 acres or about one percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. The 1.4 miles of route added to the NFTS in pileated woodpecker habitat, in this alternative, is equivalent to approximately 2.5 acres, or about 0.01 percent of the habitat on the National Forest, or 0.01 percent area impacted annually by various mechanical and prescribed-fire vegetation treatments. These impacts are essentially the same as those that would occur under Alternatives 2 and 5.

The small acreages of route added to the NFTS in this alternative are insignificant compared to the quantity of treated landscape. Certainly, the quantity of potential improvement is insufficient to affect habitat trends or population dynamics. Thus, compared to the scope and intensity of the other impacts occurring on the landscape the impacts from Alternative 4 are imperceptible and discountable. They do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. Table 3-130 displays the route mileage proposed to be added to the NFTS within habitats used by the focal species in this group under Alternative 5. Because the route system is the same, the effects to cavity-dependent species are the same for this alternative (Alternative 5) and Alternative 2. Because the route footprint is less than one percent different with Alternative 4, Alternative 5 has essentially the same impacts as Alternative 4.

Table 3-130. Alternative 5: Miles of Routes within Potential Habitat for the Wide-Ranging Carnivore Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Hairy woodpecker	114.5	1,716
Black-backed woodpecker	7.6	90
Pileated woodpecker	1.5	64
Red-naped sapsucker	3.0	56
Red-breasted sapsucker	98.9	1,363

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair-bonding and nest initiation may have less disturbance. However, this is also the period when roads are often blocked by snow drifts and unavailable for wheeled travel. Therefore, the impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to cavity-dependent species as compared to Alternative 2. This alternative has the same imperceptible and discountable cumulative effects as Alternative 2.

Comparison of Effects on Cavity-Dependent Species, by Alternative

This section provides tabular comparisons of the five alternatives. Table 3-131 displays how the alternatives compare in number of watersheds with a low habitat influence index, and in proportion of habitat acres occurring within a watershed with a “Low” route influence index rating. Table 3-131 displays a comparison of habitat change metrics for the focal species in the cavity-dependent group. In general, Alternative 1 shows the most impacts to cavity-dependent species and Alternative 3 the least.

Table 3-131. Comparison of Habitat Disturbance Index Ratings Between Alternatives for the Cavity-Dependent Group

Metric	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
# of watersheds with a low habitat influence index	100	101	103	101	101
% of habitat acres whose watershed rating is "Low"	94%	95%	99%	95%	95%

Table 3-132. Comparison of Selected Effects, by Alternative

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Hairy Woodpecker (Modeled habitat on the MDF: 390,960)	NF habitat available for cross-country travel	376,825	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA*: 147.5 UA+NFTS: 1,749 mi	UA: 114.5 UA+NFTS: 1,716 mi 2%< A-1	UA: 0 UA+NFTS: 1,601mi 8%< A-1 7%< A-2	UA: 94.2 UA+NFTS: 1,695 mi 3%< A-1 1%<A-2 6%> A-3	UA: 114.5 UA+NFTS: 1,716 mi 2%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	268.4 (0.07%)	298.4 (0.05%)	0 (0%)	171.4 (0.04%)	298.4 (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	3,183 (0.8%)	3,123 (0.8%)	2,914 (0.7%)	3,085 (0.8%)	3,123 (0.8%)
Black-backed woodpecker (Modeled habitat on the MDF: 25,600)	NF habitat available for cross-country travel	21,252 acres	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat l	UA: 12.9 UA+NFTS: 95	UA: 7.6 UA+NFTS: 90 6%< A-1	UA: 0 UA+NFTS: 82 14%< A-1 8%< A-2	UA: 6.4 UA+NFTS: 89 7%< A-1 1%<A-2 8%> A-3	UA: 7.6 UA+NFTS: 90 6%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	23.5 (0.09%)	13.8 (0.05%)	0 (0%)	11.6 (0.05%)	13.8 (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	172.9 (0.7%)	163.8 (0.6%)	149.2 (0.6%)	162.0 (0.6%)	163.8 (0.6%)
Pileated woodpecker (Modeled habitat	NF habitat available for cross-country travel	22,165 acres	0 ac	0 ac	0 ac	0 ac

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
on the MDF: 25,360)	Miles of route in habitat	UA: 3.3 UA+NFTS: 66	UA: 1.5 UA+NFTS: 64 3%< A-1	UA: 0 UA+NFTS: 62 5%< A-1 2%< A-2	UA: 1.4 UA+NFTS: 64 3%< A-1 0%<A-2 2%> A-3	UA: 1.5 UA+NFTS: 64 3%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	6.0 (0.02%)	2.7 (0.01%)	0 (0%)	2.5 (0.01%)	2.7 (0.01%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	120.1 (0.5%)	116.5 (0.5%)	112.8 (0.4%)	116.5 (0.5%)	116.5 (0.5%)
Red-naped sapsucker (Modeled habitat on the MDF: 19,530)	NF habitat available for cross-country travel	13,967	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 5.9 UA+NFTS: 59	UA: 3.0 UA+NFTS: 56 5%< A-1	UA: 0 UA+NFTS: 53 10%< A-1 5%< A-2	UA: 2.5 UA+NFTS: 56 6%< A-1 1%<A-2 5%> A-3	UA: 3.0 UA+NFTS: 56 5%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	10.7 (0.05%)	5.5 (0.03%)	0 (0%)	4.6 (0.02%)	5.5 (0.03%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	107.4 (0.5%)	101.9 (0.5%)	96.5 (0.5%)	101.9 (0.5%)	101.9 (0.5%)
Red-breasted sapsucker (Modeled habitat on the MDF: 380,610)	NF habitat available for cross-country travel	285,907 acres	0 ac	0 ac	0 ac	0 ac
	Miles of route in habitat	UA: 123.8 UA+NFTS: 1,363	UA: 98.9 UA+NFTS: 1,338 2%< A-1	UA: 0 UA+NFTS: 1,239 9%< A-1 7%< A-2	UA: 81.5 UA+NFTS: 1,320 3%< A-1 1%<A-2 7%> A-3	UA: 98.9 UA+NFTS: 1,338 2%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	225.3 (0.06%)	180.0 (0.05%)	0 (0%)	148.3 (0.04%)	180.0 (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	2,481 (0.7%)	2,435 (0.6%)	2,255 (0.6%)	2,402 (0.6%)	2,435 (0.6%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Oak Group: Affected Environment

Focal Species within the Group: Western Gray Squirrel, Mountain Quail

This species group is associated with habitats that contain oak trees and other hardwoods not associated with riparian zones. Typical species in this group are western gray squirrel, wild turkeys, and mountain quail. Western gray squirrels and mountain quail are the focal species for this group.

Western gray squirrels use the lower-elevation habitats of the Big Valley Ranger District, and are sporadically observed on the other Ranger Districts (USFS 2007). Western gray squirrel presence data for the Modoc is almost entirely from oak habitat (USFS 2007). Mountain quail are included in this group, although they are also strongly associated with shrub habitats other than oaks. However, much of the oak habitat on the Modoc National Forest is often associated with, or located near, dense shrub habitats such as mountain mahogany (*Cercocarpus* sp), *Ceanothus*, or *Prunus* species (B. Turner, 2008 personal observation). Mountain quail habitat is generally steeper, has more cover, more trees, and more woody debris than California quail habitat does (Gutierrez and Delehanty 1999). Mountain quail have been observed to hull and eat "acorns extensively in the fall" (Gutierrez and Delehanty 1999). Mountain quail also eat mushrooms in winter, and generally restrict their diet to plant material (Gutierrez and Delehanty 1999). Mountain quail are altitudinal migrants that move downslope in fall to avoid deep winter snows (Gutierrez and Delehanty 1999).

The Modoc LRMP contains standards and guidelines for managing oaks. The area of the Forest that is managed in accordance with the SNFPA (USFS 2004) provides for oak regeneration and oak retention during treatments. Management of the Big Valley Sustained Yield Unit provides for oak retention under the standards promulgated in the 1991 LRMP. These standards require maintaining at least 36 square feet of basal area per acre in deer intermediate and winter ranges, and 10 square feet of basal area per acre in other areas of oak occurrence.

In order to examine relative impacts between alternatives, a disturbance index was calculated. Western gray squirrels were used to represent the other species in this group. Western gray squirrels appear to be more associated with oak habitats than mountain quail based on the CWHR habitats that are important (see Table 3-133, below). To determine the route zone of influence, routes were buffered by 60 meters. The habitat disturbance index was calculated by dividing the western gray squirrel habitat within the route zone of influence by the amount of western gray squirrel habitat within the 6th order watershed to determine the proportion of habitat that could be influenced by routes. A ranking was assigned that follows the rankings developed by Gaines et al. (2003) using the following class breaks:

- Less than 30 percent of western gray squirrel habitat within a route zone of influence ranks as a "Low" level of human influence
- Thirty to 50 percent of habitat within the route zone of influence is a moderate level of human influence
- More than 50 percent of habitat within the route zone of influence is a high level of human influence

Table 3-133. For the Oak-associated Group: California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (Cwhr) Suitability >0.75	Acres of Habitat on National Forest
Western gray squirrel	ESP: 4D, 4M, 5D	141,780 acres

Species	Habitat (Cwhr) Suitability >0.75	Acres of Habitat on National Forest
	MHW: 3D, 4D, 5P, 5M, 5D, 6 PPN: 4D, 5S, 5P, 5M	
Mountain quail	ESP: 2(ALL), 3,(ALL), 4(ALL), 5(ALL) JPN: 2(ALL), 3,(ALL), 4(ALL), 5(ALL) MCP: 2S, 2P, 3S, 3P, 4S, 4P MHW: 1(ALL), 2(ALL), 3,(ALL), 4(ALL), 5(ALL), 6 MRI: 2(ALL), 3,(ALL), 4(ALL), 5(ALL), 6 PPN: 1(ALL), 2(ALL), 3,(ALL), 4(ALL), 5(ALL) SMC: 1(ALL), 2(ALL), 3,(ALL), 4(ALL), 5(ALL), 6 SCN: 2(ALL), 3,(ALL), 4(ALL), 5(ALL) WFR: 1(ALL), 2(ALL), 3,(ALL), 4(ALL), 5(ALL), 6	340,000 acres

Oak Group: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

The California WHR sizes and stages that were considered as "suitable" are listed for each species in Table 3-133, above. Table 3-134 displays the acres of habitat potentially available for use under this alternative for the focal species within this group. Table 3-135 displays the route mileage that occurs within habitat on the National Forest. Although occasional direct mortality may occur from collisions with vehicles on highways, this is not known to have occurred from slower-moving vehicles off road. If off-road vehicle collisions with the focal species in this group do occur, such occurrences appear to be rare events, and have not been reported within the Forest. Mountain quail nests could be destroyed by off-road vehicle use because of the ground-nesting behavior of this bird. Western gray squirrel young are generally arboreal, and away from direct impacts of vehicles. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events may occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

Indirect impacts to species in this group include impacts to soils that result in less food availability. In locations of heavy off-road use, soil conditions can become compacted. Compacted soils could potentially reduce acorn production, have lower truffle production, and provide fewer opportunities for caching of acorns. Because there are few locations that show extensive compaction from recreational off-road vehicle use, these indirect impacts are very limited on the Modoc NF. For more information on impacts to soils, see the soils and hydrology sections of this document.

A larger impact, both in the short term, and the long term, would be the disturbance that would cause individuals to move or alter behavior. This alternative would provide potential disturbance to the focal species within this group

Table 3-134. Alternative 1: Potential Habitat for the Oak Group that Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Western gray squirrel	141,060	99.5%
Mountain quail	338,870	99.7%

*Acres rounded to the nearest 10.

Cross-country travel includes the use of unauthorized routes, and Table 3-135 displays the route mileage within habitats used by the focal species in this group.

Table 3-135. Alternative 1: Miles of Routes within Potential Habitat for the Oak-Associated Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Western gray squirrel	59.0 miles	658.4 miles
Mountain quail	146.8 miles	1,578.0 miles

This alternative would continue to allow the use of 491 miles of unauthorized routes. Disturbance to oak-associated species' activities could occur along these routes. The largest impact would be the continued disturbance along route edges. Vehicle travel may disrupt foraging activities, resulting in more energy expenditures. However, the habitat influence index that was calculated for western gray squirrels indicate that roadside disturbance is probably a minor impact. The habitat influence rating was "Moderate" for eight of the watersheds with gray squirrel habitat, and "Low" for 94 watersheds. There were no watersheds with western gray squirrel habitat that had a rating of "High". Of the western gray squirrel habitat on the Modoc National Forest, 94 percent occurs in a watershed with a "Low" rating for human influence. All of the alternatives have the same number of watersheds in each of the rating categories.

Although the watersheds all have the same rating between alternatives, there are differences in the amount of habitat that is within the disturbance zone that occurs within 60 meters of a route. Not surprisingly, given that cross-country travel, including continued use of unauthorized routes, would continue, Alternative 1 has the largest number of acres (30,607) that fall within the route disturbance zone. This equates to about eight percent more than the alternative with the fewest acres within the disturbance zone (Alternative 3).

As a group, all of the oak-associated species would be most affected by this alternative, as opposed to the other alternatives, because this alternative would have the most route mileage. The routes and vehicle traffic probably present little direct impact to any of the focal species in this group. Indirectly, more route mileage would equal less available habitat for foraging and reproduction. This is especially true in the long-term time period of 20 years, when the other alternatives would have converted routes into re-vegetated foraging habitat for these species.. This alternative would have nine percent more route mileage within gray squirrel and mountain quail habitat, than would occur under Alternative 3. For the gray squirrel, this alternative differs from Alternatives 2, 4, and 5 by about two to four percent in the route mileage within habitat. For the mountain quail, this alternative differs from Alternatives 2, 4, and 5 by about two to three percent in the route mileage within habitat.

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any route. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the oak-dependent group would aggregate with the effects outlined above in table 3-84. Vegetation management and prescribed fire have the potential to impact species in this group by removing small oaks. Vegetation management that may affect oaks includes 4,000 acres of prescribed fire, 6,000 acres of mechanical fuel treatments, 1,500 acres of treatments to improve sage-steppe, and 5,500 acres of timber harvest on the Modoc National Forest. This is about 17,000 acres per year of vegetation treatments, of varying intensity, potentially affecting oak-dependent species forage and cover. Much, if not most, of this activity would occur in areas without an oak component. There is also ongoing timber harvest on private lands where oaks may not be retained at any level. Other ongoing adjacent actions that may impact oaks include juniper removal and grazing on private lands within and adjacent to the proclaimed boundary of the Forest, as well as stochastic events such as wildfires and catastrophic insect and disease outbreaks. Prescribed fire and wildfire may increase acorn production. Some oak habitat is lost through time as conifers overtop the oaks, causing them to decline and eventually die. Generally, this group of species is affected negatively by extensive mechanical treatments that reduce the quantity of oaks and affected positively by treatments that remove conifers that are competing with oaks for sunlight and water. Competition from conifers is an endemic problem in most oak stands due to the long-term effects of fire suppression.

This alternative would continue cross-country travel which would include use of unauthorized routes to public use; therefore, the impacts described above to species in this group would continue and aggregate with effects from vegetation management occurring on the Forest and elsewhere. Because the impacts from cross-country travel are limited in intensity, the continuation of cross-country travel under this alternative would add minor negative impacts to impacts from vegetation management activities. Included in cross-country travel is the continuation of public travel on the unauthorized routes which would also continue to provide impacts. However, the impact of unauthorized routes is small in relation to the extent of habitat for these species. For example, the 59 miles of unauthorized route in western gray squirrel habitat, is equivalent to approximately 107 acres, or about 0.6 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. The 147 miles of unauthorized route in modeled mountain quail habitat, in this alternative, is equivalent to approximately 268 acres, or about 0.07 percent of the habitat open to cross-country travel, or 1.6 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments.

Alternative 1 has the highest level of negative effects of the alternatives, but these effects are limited in scope and intensity in comparison to other actions occurring on the landscape. Oak habitat is lost through time as conifers overtop the oaks. The mechanical treatments and timber harvest that remove competing conifers provide a partial counter to this trend toward loss of oaks due to conifer competition. Although timber harvest and mechanical fuels treatments must meet minimum retention requirements for oaks under the Forest LRMP, oak regeneration can be lost during these actions and during prescribed fire treatments. Grazing can also affect oak regeneration (Bartolome et al. 1987). The impacts of slow habitat loss due to conifer competition, suppressed regeneration due to grazing, and loss of small oaks during other vegetation treatments is occurring across the distribution of oak on the Modoc NF. Thus, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 1 are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The western gray squirrel and mountain quail would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation by cross-country travel would not occur.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of unauthorized routes to the NFTS. Table 3-136 displays the route mileage within habitats used by the focal species in this group.

Table 3-136. Alternative 2: Miles of Routes within Potential Habitat for the Oak-Associated Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Western gray squirrel	44.9 miles	644 miles
Mountain quail	118.2 miles	1,549 miles

The route mileage added to the NFTS within western gray squirrel habitat declines by two percent (approximately 14 miles) compared to Alternative 1. This Alternative would contain seven percent more route mileage added to the NFTS (45 miles) than Alternative 3, and about two percent more route mileage (10 miles) than Alternative 4. The added route mileage would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for gray squirrels due to route-induced disturbance than Alternatives 3 and 4. Alternative 2 would result in less disturbance than Alternative 1 and the same amount as Alternative 5. The habitat influence index that was calculated for western gray squirrels indicates that road-side disturbance is probably a minor impact. The habitat influence rating was "Moderate" for eight of the watersheds with gray squirrel habitat, and "Low" for 94 watersheds, the same as the other alternatives. There were no watersheds with western gray squirrel habitat that had a rating of "High".

Although the watersheds all have the same rating between alternatives, there are differences in the amount of habitat that is within the disturbance zone that occurs within 60 meters of a route. Alternative 2 has the second largest number of acres (30,089) that fall within the route disturbance zone. This equates to about two percent less than the alternative with the most acres within the disturbance zone, Alternative 1.

The amount of route mileage within mountain quail habitat declines by two percent (approximately 28 miles) compared to Alternative 1. This Alternative would contain eight percent more route mileage added to the NFTS (118 miles) than Alternative 3, and about 1 percent more route mileage (22 miles) than Alternative 4. The routes would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for mountain quail due to route-induced disturbance than Alternatives 3 and 4. Alternative 2 would result in less disturbance than Alternative 1 and the same amount of disturbance as Alternative 5.

The impacts of the small percentage differences between this alternative and the other alternatives in the route mileage added to the NFTS within habitat for the focal species, may be essentially undetectable against the background fluctuations of variable traffic quantities, variable hunting pressure, weather, and stochastic events such as fires.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may have less disturbance.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 2 on the oak-dependent group would aggregate with the effects outlined above in table 3-84. (Also, see the discussion above for alternative 1 and its effects on oak-dependent species.) This alternative would not continue cross-country travel; therefore, impacts from cross-country travel to species in this group would cease and no longer aggregate with effects from other activities that affect oak-dependent species vegetation. The continuation of public travel on 339 miles of routes added to the NFTS would also continue to provide impacts. However, the impact of added routes is small in relation to the extent of habitat for these species. For example, the 45 miles of route added to the NFTS in western gray squirrel habitat in this alternative, is equivalent to approximately 82 acres, or about 0.5 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. This also equates to 0.06 percent of the modeled western gray squirrel habitat. The 118 miles of routes added to the NFTS in mountain quail habitat, in this alternative, is equivalent to approximately 215 acres, or about 0.06 percent, of the habitat on the Modoc National Forest, or 1.2 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. The small acreages of route added to the NFTS in this alternative are insignificant compared to the quantity of treated landscape. Certainly, the quantity of potential improvement in habitat that would occur by the passive restoration of unauthorized routes resulting from prohibition of cross-country travel is insufficient to affect habitat trends or population dynamics. Thus, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 2 are imperceptible and discountable. They do not appear to affect existing trends to species population size, habitat or distribution and are therefore insignificant.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

The western gray squirrel and mountain quail would not be affected by vehicle travel adjacent to nests or within foraging habitat that occurs as a result of cross-country vehicle travel. This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed

under Alternative 1 from cross-country travel would not occur. Changes to food resources caused by compaction or removal of vegetation would not occur.

This alternative would not add any routes to the NFTS. However, the linear effects of roads would still occur on the 4,580 miles of NFTS routes. Table 3-137 displays the route mileage within habitats used by the focal species in this group.

Table 3-137. Alternative 3: Miles of Routes within Potential Habitat for the Oak-Associated Group

Species	Miles of Unauthorized Routes Added to the NFTS within Habitat ON NF	Combined Miles of NFTS and Added Unauthorized Routes within Habitat on NF
Western gray squirrel	0 miles	599 miles
Mountain quail	0 miles	1,431 miles

The route mileage within western gray squirrel habitat declines by nine percent (approximately 59 miles) compared to Alternative 1. In Alternative 3, route mileage declines by seven percent (approximately 45 miles) compared to the total in Alternative 2 or Alternative 5. Alternative 3 has six percent (approximately 35 miles) fewer miles within habitat than Alternative 4. This alternative would thus have the lowest energy expenditure for gray squirrels due to road-induced disturbance. Even though this alternative would have less route mileage, all of the alternatives have the same number of watersheds in each of the rating categories, indicating similar levels of impact from route edge effects. Although the watersheds all have the same rating between alternatives, there are differences in the amount of habitat that is within the disturbance zone that occurs within 60 meters of a route. Not surprisingly, given it has the lowest route mileage, Alternative 3 has the fewest number of acres (28,129) that fall within the route disturbance zone. This equates to about eight percent fewer than the alternative with the most acres within the disturbance zone, Alternative 1.

The route mileage within mountain quail habitat declines by nine percent (approximately 147 miles) compared to Alternative 1. In Alternative 3, route mileage declines by eight percent (approximately 118 miles) compared to the total in Alternative 2 or Alternative 5. Alternative 3 has seven percent (approximately 35 miles) less route mileage within habitat than Alternative 4. Alternative 3 would thus have the lowest energy expenditure for mountain quail due to road-induced disturbance.

Although this alternative has the lowest route mileage within habitat, the percentage change of miles within habitat is less than 10 percent between all alternatives. The impacts of the small percentage differences may be essentially undetectable against the background fluctuations of variable traffic quantities, harvest, weather and stochastic events such as fires.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

Changes to class of use are not expected to have any detectable impact on wildlife.

Cumulative Effects

This alternative would discontinue cross-country travel which would include the use of approximately 491 miles of unauthorized routes. The impacts to species in this group from the cross-country travel would cease and may partially counter some of the effects from loss due to

conifer competition occurring elsewhere. However, the scope and intensity of the impact from ending cross-country travel is small (see the cumulative effects discussion above for Alternative 1). The positive effects from discontinuing cross-country travel which includes unauthorized routes, would begin to show immediately as new oaks begin to sprout and reclaim disturbed areas. At the 20-year, long-term point, some additional oak habitat would have begun to accumulate. However, the low rate and intensity of impacts from the cessation of cross-country travel do not appear to be sufficient to counter the rate of habitat loss due to conifer competition, stochastic events such as wildfire or catastrophic disease, or reduced recruitment of oaks due to grazing. Overall, when aggregated with other impacts to the cavity-dependent group, impacts from this alternative appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The western gray squirrel and mountain quail would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation would not occur.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-138 displays the route mileage that would be added to the NFTS within habitats used by the focal species in this group.

Table 3-138. Alternative 4: Miles of Route within Potential Habitat for the Oak-Associated Group

Species	Miles Of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Western gray squirrel	34.9 miles	634 miles
Mountain quail	96.1 miles	1,527 miles

The route mileage within western gray squirrel habitat declines by four percent (approximately 24 miles) compared to Alternative 1 and declines by two percent (approximately 10 miles), compared to the route mileage added to the NFTS in Alternatives 2 and 5. This Alternative would contain six percent more added mileage (35 miles) than Alternative 3. Alternative 4 would thus cause slightly higher energy expenditure for gray squirrels due to road-induced disturbance than Alternative 3. Alternative 4 would result in less disturbance than Alternatives 1, 2, and 5. The habitat influence index that was calculated for western gray squirrels indicate that roadside disturbance is probably a minor impact. The habitat influence rating was “Moderate” for eight of the watersheds with gray squirrel habitat, and “Low” for 94 watersheds, the same as the other alternatives. There were no watersheds with western gray squirrel habitat that had a rating of “High”.

Although the watersheds all have the same rating between alternatives, there are differences in the amount of habitat that is within the disturbance zone that occurs within 60 meters of a route. Alternative 4 has the second-fewest number of acres (29,630) that fall within the route

disturbance zone. This equates to about five percent more than the alternative with the least acres (Alternative 3), and about three percent less than the alternative with the most acres within the disturbance zone, Alternative 1.

The route mileage within mountain quail habitat declines by three percent (approximately 51 miles) compared to Alternative 1. This Alternative would contain seven percent more route mileage (96 miles) than Alternative 3, and about one percent less route mileage (22 miles) than Alternative 2 and Alternative 5. Alternative 4 would thus cause slightly higher energy expenditures for mountain quail due to route-induced disturbance than Alternative 3. Alternative 4 would result in less disturbance to mountain quail than Alternatives 1, 2 and 5.

The impacts of the small percentage differences between this alternative and the other alternatives in the amount of routes within habitat for the focal species, may be essentially undetectable against the background fluctuations of variable traffic quantities, variable hunting pressure, weather and stochastic events such as fires.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may have less disturbance.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. There would be no change in vehicle class of use in this alternative. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 4 on the oak-dependent group would aggregate with the effects outlined above in table 3-84. (Also, see the discussion above for Alternative 1 and its effects on oak-dependent species.). This alternative would not continue cross-country travel; therefore, those impacts to species in this group would cease and no longer aggregate with effects from other activities that affect oak-dependent species habitat. The addition of 286 miles of unauthorized routes to the NFTS would also continue to provide impacts. However, the impact of the added route use is small in relation to the extent of habitat for these species. For example, the 35 miles of unauthorized route that would be added to the NFTS in western gray squirrel habitat, in this alternative, is equivalent to approximately 64 acres or about 0.4 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments. The 118 miles of unauthorized routes added to the NFTS in mountain quail habitat, in this alternative, is equivalent to approximately 215 acres, or about 0.06 percent of the habitat on the Modoc National Forest, or 1.2 percent of the area impacted annually by various mechanical and prescribed fire vegetation treatments.

The small acreages of unauthorized route added to the NFTS in this alternative are insignificant, compared to the quantity of treated landscape and the quantity of landscape affected by conifer-competition. The effects from the prohibition of cross-country travel in this alternative are also small when compared to the quantity of other actions affecting these species. Certainly, the quantity of potential improvement is insufficient to affect habitat trends or population dynamics. Thus, compared to the scope and intensity of the other impacts occurring on the landscape, the impacts from Alternative 4 are imperceptible and discountable. They do not appear to affect existing trends to species population size, habitat or distribution and are therefore insignificant.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. Therefore, there would be no impacts from cross-country, motorized travel.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-13 displays the route mileage that would be added to the NFTS within habitats used by the focal species in this group. This alternative has the same route configuration as Alternative 2. Because the road system is the same, the effects to oak-associated species are the same for this alternative (Alternative 5) and Alternative 2.

Table 3-139. Miles of Routes within Potential Habitat for the Oak-Associated Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Western gray squirrel	44.9 miles	644 miles
Mountain quail	118.2 miles	1,549 miles

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of road and be identical to those that would occur with Alternative 2. These closure areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair-bonding and nest initiation may have less disturbance. The impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2, with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to oak-associated species as compared to Alternative 2. This alternative has the same cumulative effects as Alternative 2, which effects are imperceptible and discountable.

Comparison of Effects on Oak-Associated Species, by Alternative

This section provides tabular comparisons of the five alternatives. The first table (3-140) compares the number of watersheds with a "Low" disturbance index rating and compares the amount of total acres that lie within the habitat disturbance zone. Table 3-141 displays a comparison of habitat change metrics for the focal species in the oak-associated group. Alternative 1 shows the most impacts to oak-associated species, and Alternative 3 the least.

Table 3-140. Comparison of Habitat Disturbance Index Ratings Between Alternatives for the Oak-Associated Group

Metric	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
# of watersheds with a low habitat disturbance index	94	94	94	94	94
# of acres within the habitat disturbance zone"	30,607	30,089	28,189	29,630	30,089

Table 3-141. Comparison of Selected Effects, by Alternative on the Oak-Associated Group

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Western gray squirrel (Modeled habitat on the MDF: 141,780)	NF habitat available for cross-country travel	141,060 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA*: 59.0 UA+NFTS: 658.4	UA: 44.9 UA+NFTS: 644.3 2%< A-1	UA: 0 UA+NFTS: 599.4 9%< A-1 7%< A-2	UA: 34.9 UA+NFTS: 634.3 4%< A-1 2%<A-2 6%> A-3	UA: 44.9 UA+NFTS: 644.3 2%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	107.4 (0.08%)	81.7 (0.06%)	0 (0%)	63.5 (0.04%)	81.7 (0.06%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	1,198 (0.8%)	1,173 (0.8%)	1,091 (0.8%)	1,154 (0.8%)	1,173 (0.8%)
Mountain quail (Modeled habitat on the MDF: 340,000)	NF habitat available for cross-country travel	338,870 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 146.8 UA+NFTS: 1,578	UA: 118.2 UA+NFTS: 1,549 2%< A-1	UA: 0 UA+NFTS: 1,431 9%< A-1 8%< A-2	UA: 96.1 UA+NFTS: 1,527 3%< A-1 1%<A-2 7%> A-3	UA: 118.2 UA+NFTS: 1,549 2%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	267.2 (0.08%)	215.1 (0.06%)	0 (0%)	174.9 (0.05%)	215.1 (0.06%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	2,872 (0.8%)	2,819 (0.8%)	2,604 (0.8%)	2,779 (0.8%)	2,819 (0.8%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Wetland Group: Affected Environment

Focal Species within the Group: Sandhill Crane, Canada Goose, Mallard

This species group is associated with seasonal and permanent wetlands and areas with wet soils that support rushes and sedges. Focal species for this group include sandhill cranes, Canada goose, and mallards. Sandhill cranes that breed at many of the larger wetland areas on the Forest are part of the Central Valley Population of greater sandhill cranes (Grus canadensis tabida; Ivey and Herziger 2001). Sandhill cranes nest in flooded meadows and marshes with scattered stands of bulrush, cattails and burreed (Tacha et al. 1992). Established pairs tend to return to breeding sites (Tacha et al. 1992).

Canada geese nest on many of the islands in wetlands and lakes on the Modoc National Forest. Approximately 667 islands have been constructed for goose nesting on the Modoc National Forest (USFS 2007). Mallard use of habitat on the Modoc National Forest is similar to that used by Canada geese (USFS 2007). The CWHR habitat stages that are important (as measured by exceeding the 0.75 suitability index) are the same for both mallards and Canada geese. Because of the similarities of their habitat, mallards and Canada geese are analyzed together. Disturbance of mallards or Canada geese on the nest can result in nest desertion or attraction of avian and mammalian predators (Drilling et al. 2002). Wetlands on the Modoc NF are not only important for nesting, but as important mid-migration foraging areas (Miller et al. 2005).

An index to evaluate the effects of displacement, avoidance, and disturbance is the security habitat index (Gaines et al. 2003). For this analysis, routes are buffered by 250 meters, in order to establish a zone of route influence The mapped habitats that scored a CWHR suitability index of 0.75 for mallards and Canada geese (see Table 3-142 below) were buffered by 250 meters following the procedure established by Gaines et al. (2003) to establish the potential habitat. The amount of potential habitat in a watershed outside of the zone of route influence (the security habitat) is divided by the total amount of potential habitat to determine the level of human influence within the watershed. A ranking was assigned that follows the rankings developed by Gaines et al. (2003) and that reflects an approximation of a point where human influences affect wetland wildlife use of the wetland. The level of influence of human activities on habitat ranking is as follows:

- Less than 50 percent security habitat is a high level of human influence
- Fifty to 70 percent security habitat is a moderate level of human influence
- More than 70 percent security habitat is a low level of human influence

Table 3-142. For the Wetland-Associated Group, California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
Sandhill crane	FEW: 1M, 1D, 2M, 2D WTM: 1M, 1D, 2M, 2D	7,060 acres
Canada goose and Mallard duck	AGS: All sizes/stages FEW: All sizes/stages PGS: All sizes/stages WTM: All sizes/stages	82,000 acres

Wetland Group: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

The California WHR sizes and stages that were considered as "suitable" are listed for each species in Table 3-142, above. Table 3-143 displays the number of acres of mapped habitat that meets the CWHR stages potentially available for use under this alternative. Table 3-144 displays the route mileage that occurs within habitat on the National Forest. Although occasional direct mortality may occur from collisions with vehicles on highways, this is not known to have occurred from slower moving vehicles off road. If off-road vehicle collisions with adults in this group do occur, such occurrence appears to be a rare event and has not been reported within the Forest. Sandhill crane, mallard and goose nests could be destroyed by off-road vehicle use because of the ground-nesting behavior of these birds. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

Indirect impacts to species in this group include impacts to vegetation that results in less cover suitable for nesting. In locations of heavy off-road use, vegetation can be impacted such that it becomes compacted or in extreme cases removed, thereby rendering a site unsuitable for nesting waterfowl and cranes. Sedimentation of wetlands from off-road vehicle use could also impact vegetation growth or invertebrate production in the wetlands. For more information on impacts to soils and water quality, see the soils and hydrology sections of this document.

Another impact would be the disturbance caused by off-road use of vehicles resulting in the movement of individuals or the alteration of their behavior. Disturbance-caused movement can expose eggs or chicks to potentially fatal weather conditions or predators. Disturbance can also alter feeding patterns or interrupt important mating rituals. These impacts to feeding and mating can have indirect impacts to the production of young through delaying the onset of laying, reducing clutch size or reducing the fitness of adults or chicks.

Table 3-143. Alternative 1: Potential Habitat for the Wetland Group that Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of Habitat*	Percent of all habitat on MDF open to cross-country travel
Sandhill crane	6,560 acres of mapped habitat	92.9%
Canada goose Mallard	78,150 acres of mapped habitat	95.3%

*Acres rounded to the nearest 10.

Continued cross-country travel includes effects from the continuation of use of unauthorized routes. Table 3-144 displays the route mileage within habitats used by the focal species in this group.

Table 3-144. Alternative 1: Miles of Routes within Potential Habitat for the Wetland Group

Species	Miles of Unauthorized Routes within Habitat on NF	Combined Miles of NFTS and Unauthorized Routes within Habitat on NF
Sandhill crane	2.25 miles	13 miles
Canada goose Mallard	35.0 miles	257 miles

This alternative would continue cross-country travel which would include the use of 491 miles of unauthorized routes. Disturbance to wetland species' activities could occur along these routes. The largest impact would be the continued disturbance along route edges. Vehicle travel may disrupt foraging activities, resulting in more energy expenditures. To evaluate the level of human influence, the security index for wetland habitat was calculated. In this alternative, the human influence rating would be "High" for 67 of the watersheds with wetland habitat, "Moderate" for 31 of the watersheds, and "Low" for 23 watersheds. These ratings reflect the increased route mileage under this alternative compared to the other alternatives. This alternative (Alternative 1) has six more watersheds with high rankings than the alternative with the fewest high rankings (Alternative 3), and four fewer "Low"-ranked watersheds than the two alternatives with the most "Low"-ranked watersheds (Alternatives 3 and 4).

As a group, all of the wetland species would be most affected by this alternative, as opposed to the other alternatives, because this alternative allows continued cross-country travel which includes unauthorized routes. Indirectly, more route mileage would equal less available habitat, as well as more disturbance to foraging and reproduction activities. This is especially true in the long-term time period of 20 years when the other alternatives would have unauthorized routes which, over time, would convert into re-vegetated foraging habitat or buffer from disturbance for these species. Because cross-country travel includes unauthorized roads, this alternative would have 17 percent more route miles within sandhill crane habitat, than would occur under Alternative 3, the alternative that does not add any unauthorized routes to the system and prohibits cross-country travel. For the sandhill crane, this alternative differs from Alternatives 2, 4, and 5 by about 11 to14 percent in the route mileage within habitat. The larger percentage differences between this alternative and the other alternatives in route mileage within sandhill crane habitat may be a factor of the relatively small area that is known to be sandhill crane habitat. This alternative would have 14 percent more route mileage within Canada goose and mallard habitat, than would occur under Alternative 3, the alternative that does not add any unauthorized routes to the system and prohibits cross-country travel. For the goose and mallard, this alternative differs from Alternatives 2, 4, and 5 by approximately seven to eight percent in the mileage of routes within habitat. The impacts of the small percentage differences between this

alternative and the other alternatives in the amount of routes within Canada goose and mallard habitat may be essentially undetectable against the background fluctuations of variable wetland water levels, variable harvest rates, weather and stochastic events such as fires and floods. However, Alternative 1 would have the most impact of all the alternatives on wetland species.

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any particular route segment. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the wetland-dependent group would aggregate with the effects outlined above in table 3-84. Those impacts most affecting wetland habitats are related to the 122,500 AUMs of grazing on the National Forest and similar impacts occurring on adjacent BLM and private lands. These impacts include mortality to wetland associated species from fence entanglement and hay cropping, removal of vegetation that results in the loss of nesting cover, loss of substrate for invertebrates, lowered water quality and increased turbidity. Vegetation management activities that affect water quality and quantity of runoff can also impact the habitat for this species group. For more information on cumulative effects to water quality and quantity, see the hydrology section of this chapter.

This alternative would continue cross-country travel which includes the use of unauthorized routes by the public; therefore, impacts to species in this group would continue and aggregate with effects from vegetation management and grazing. Because the impacts from cross-country travel are estimated to be of limited intensity, the continuation of cross-country travel under this alternative would add a small amount of negative impacts to the impacts from grazing and other activities. The continuation of use on the unauthorized routes, which is a part of cross-country travel, would also continue to provide impacts. However, the impact of this use is small in relation to the extent of habitat for these species. For example, the 35 miles of unauthorized route in Canada goose and mallard habitat, in this alternative, is equivalent to approximately 64 acres or about 0.08 percent of the buffered Canada goose and mallard habitat area. Under Alternative 1, approximately 2.25 miles of unauthorized route is an equivalent of approximately four acres or 0.06% of potential sandhill crane habitat.

Alternative 1 has the highest level of negative effects of the alternatives, but these effects are limited in scope and intensity in comparison to the other actions occurring on the landscape. Especially on private lands, residual vegetation after grazing may be insufficient to provide nesting cover. Trends for Canada goose and mallard populations are affected by conditions on the wintering grounds and other centers of nesting. Generally, Canada goose populations appear to be increasing in the West, while mallard populations appear to have declined (USFS 2007). Sandhill crane populations also appear to be increasing (USFS 2007). The small negative impacts of this alternative, aggregated with the other negative impacts occurring to wetland habitats, appear to be insufficient to counter the increasing numbers of sandhill cranes and Canada geese. These same impacts may be contributing to a portion of the decline in mallard numbers. However, mallard populations may be more heavily affected by factors impacting the primary breeding and wintering areas in the Great Plains, Palouse and Central Valley (Austin and Miller 1995). When compared to the scope and intensity of the other impacts occurring on the landscape, and to the overall trends for the focal species, the impacts from Alternative 1, including individual mortality, degraded water quality, and removal of emergent vegetation, are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The sandhill crane, mallard and Canada goose would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation would not occur.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of routes to the NFTS. Table 3-145 displays the routes within habitats used by the focal species in this group.

Table 3-145. Alternative 2: Miles of Routes within Potential Habitat for the Wetland Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Sandhill crane	0.76 miles	11.75 miles
Canada goose Mallard	17.45 miles	239 miles

The route mileage within sandhill crane habitat declines by 11 percent (approximately 1.5 miles) compared to Alternative 1. This Alternative would contain about 6 percent more added route mileage (0.8 miles) than Alternative 3, and about 3 percent more added route mileage (0.5 miles) than Alternative 4. The route system would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for sandhill cranes due to route-induced disturbance than Alternatives 3 and 4. Alternative 2 would result in less disturbance than Alternative 1 and the same amount as Alternative 5.

The route mileage within Canada goose and mallard habitat declines by 7 percent (approximately 17.5 miles) compared to Alternative 1. This Alternative would contain 7 percent more route mileage (17.5 miles) than Alternative 3, and about 1 percent more route mileage (3.5 miles) than Alternative 4. The route mileage would be the same for both this alternative and Alternative 5. Alternative 2 would thus cause slightly higher energy expenditure for geese and mallards due to route-induced disturbance than Alternatives 3 and 4. Alternative 2 would result in less disturbance than Alternative 1 and the same amount as Alternative 5.

To evaluate the level of human influence, the security index for wetland habitat was calculated. In this alternative the human influence rating would be “High” for 66 of the watersheds with Canada goose/mallard habitat, “Moderate” for 31 of the watersheds, and “Low” for 24 watersheds. These ratings reflect the slightly higher amount of route mileage than contained in Alternatives 3 and 4. This alternative would have the same number of watersheds in each ranking category as Alternative 5. This alternative (Alternative 2) has five more watersheds with high rankings than the alternative with the fewest high rankings (Alternative 3), and three fewer low-ranked watersheds than the two alternatives with the most low-ranked watersheds (Alternatives 3 and 4). These changes in ratings places this alternative as intermediate in the effect of routes on wetland habitats compared to the other alternatives. However, the impacts of the small percentage differences between this alternative and the other alternatives in the route mileage within Canada goose and mallard habitat, may be essentially undetectable against the background fluctuations of

variable wetland water levels, variable harvest rates, weather and stochastic events such as fires and floods.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may have be disturbed less than under alternatives 1 and 3 that do not implement closures.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance; whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 2 on the wetland-dependent group would aggregate with the effects outlined above in table 3-84. This alternative would discontinue cross-country travel which would include approximately 152 miles of unauthorized routes that with discontinued use would eventually re-vegetate. The addition of 339 miles of unauthorized routes to the NFTS would continue to provide impacts. However, the impact of additional routes is small in relation to the extent of habitat for these species. For example, the 17 miles of unauthorized routes added to the NFTS in Canada goose and mallard habitat, in this alternative, is equivalent to approximately 31 acres or about 0.04 percent of the buffered Canada goose and mallard habitat area. Under Alternative 2, approximately 0.76 miles of unauthorized routes would be added to the NFTS in sandhill crane habitat. This would be less than two acres or about 0.02% of modeled sandhill crane habitat.

The small negative impacts of this alternative, aggregated with the other negative impacts occurring to wetland habitats, appear to be insufficient to counter the increasing numbers of sandhill cranes and Canada geese (see discussion under Alternative 1). These same impacts may be contributing to a portion of the decline in mallard numbers. However, mallard populations may be more heavily affected by factors impacting the primary breeding and wintering areas in the Great Plains, Palouse and Central Valley (Austin and Miller 1995, Miller and Duncan 1999). When compared to the scope and intensity of the other impacts occurring on the landscape, and to the overall trends for the focal species, the impacts from Alternative 2, including individual mortality, degraded water-quality, and removal of emergent vegetation, are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The wetland species would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation would not occur.

This alternative would not add any routes to the NFTS. However the linear effects of routes would still occur on the 4,580 miles of NFTS roads open for use. Table 3-146 displays the route mileage within habitats used by the focal species in this group.

Table 3-146. Alternative 3: Miles of Routes within Potential Habitat for the Wetland Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Sandhill crane	0 miles	11 miles
Canada goose Mallard	0 miles	222 miles

The route mileage within sandhill crane habitat declines by 17 percent (approximately 2.25 miles) compared to Alternative 1. In Alternative 3, route mileage in crane habitat declines by 6 percent (approximately 0.75 miles) compared to the total in Alternative 2 or Alternative 5. Alternative 3 has 4 percent (approximately 0.5 miles) fewer miles within habitat than Alternative 4. This alternative would thus have the lowest energy expenditure for sandhill cranes due to road-induced disturbance.

The route mileage within Canada goose and mallard habitat declines by 4 percent (approximately 35 miles) compared to Alternative 1. In this alternative (Alternative 3), route mileage declines by 7 percent (approximately 17 miles) compared to the total in Alternative 2 or Alternative 5. Alternative 3 has 6 percent (approximately 14 miles) fewer route miles within habitat than Alternative 4. Alternative 3 would thus have the lowest energy expenditure for Canada geese and mallards due to road-induced disturbance.

To evaluate the level of human influence, the security index for wetland habitat was calculated. In this alternative the human influence rating would be “High” for 61 of the watersheds with Canada goose/mallard habitat, “Moderate” for 33 of the watersheds, and “Low” for 27 watersheds. These ratings reflect the reduced route mileage under this alternative compared to the other alternatives. This alternative (Alternative 3) has six fewer watersheds with high rankings than the alternative with the most “High” rankings (Alternative 1), and four more low-ranked watersheds than the alternative with the least “Low” ranked watersheds (Alternatives 1). These changes in ratings places this alternative as the lowest in the effect of routes on wetland habitats compared to the other alternatives. The lowest impact from existing routes means the least amount of disturbance caused by vehicles operating on roadways. However, the impacts of the small percentage differences between this alternative and the other alternatives in the amount of routes within Canada goose and mallard habitat, may be essentially undetectable against the background fluctuations of variable wetland water levels, weather and stochastic events such as fires and floods. The larger percentage differences between this alternative and the other alternatives in amount of routes within sandhill crane habitat may indicate the potential for sandhill cranes to benefit from reduced routes adjacent to wetlands used by sandhill cranes.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

Changes to class of use are not expected to have any detectable impact on wildlife.

Cumulative Effects

This alternative would discontinue cross-country travel which would include continued use of 491 miles of unauthorized routes to the NFTS. The impacts to species in this group from the cross-country travel and from the unauthorized routes would cease and may partially counter some of the ongoing negative effects due to grazing. However, the scope and intensity of the impact from ending cross-country travel is small (see the cumulative effects discussion above for Alternative 1). The positive effects from prohibiting cross-country travel begin to show immediately as disturbance would be immediately reduced. At the 20-year, long-term point, some additional wetland habitat would have begun to accumulate from discontinuation of motorized use on unauthorized roads resulting from the prohibition of cross-country travel. However, the low rate and intensity of impacts from cessation of cross-country travel do not appear to be sufficient to counter the impacts from ongoing grazing or stochastic events such as wildfire or catastrophic disease. Overall, the reduced negative impacts from this alternative, when aggregated with the positive population trends for geese and cranes, seem to indicate that conditions may continue to improve for Canada geese and sandhill cranes. The aggregated negative effects may be a small contribution to mallard population declines, but the project area is small in comparison to mallard habitat in the Pacific flyway. Overall, cumulative effects appear to be insufficient to alter the larger trends occurring on the landscape.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country travel. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from cross-country travel would not occur. The sandhill crane, Canada goose and mallard would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation would not occur.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-147 displays the route mileage within habitats used by the focal species in this group.

Table 3-147. Alternative 4: Miles of Routes within Potential Habitat for the Wetland Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Sandhill crane	0.45 miles	11.4 miles
Canada goose Mallard	14 miles	236 miles

The route mileage within sandhill crane habitat declines by 14 percent (approximately 1.8 miles) compared to Alternative 1 and declines by 3 percent (approximately 0.3 miles) compared to the added route mileage in Alternatives 2 and 5. This Alternative would contain 4 percent more added route mileage (0.5 miles) than Alternative 3. Alternative 4 would thus cause slightly higher energy expenditure for sandhill cranes due to route-induced disturbance than Alternative 3. Alternative 4 would result in less disturbance than Alternatives 1, 2, and 5.

The route mileage within mallard and Canada goose habitat declines by 8 percent (approximately 21 miles) compared to Alternative 1. This Alternative would contain 6 percent more added route mileage (14 miles) than Alternative 3, and about 1 percent less route mileage (3.5 miles) than Alternative 2 and Alternative 5. Alternative 4 would thus cause slightly higher energy expenditures for geese and mallards due to route-induced disturbance than Alternative 3. Alternative 4 would result in less disturbance than Alternatives 1, 2 and 5.

In this alternative the human influence rating would be "High" for 66 of the watersheds with Canada goose/mallard habitat, "Moderate" for 28 of the watersheds, and "Low" for 27 watersheds. These ratings reflect the reduced mileage of routes added to the NFTS under this alternative compared to most of the other alternatives. This alternative (Alternative 4) has one less watershed with a high ranking than the alternative with the most "High" rankings (Alternative 1), and the same number of "Low" ranked watersheds as the other alternative with the most low-ranked watersheds (Alternative 3). These ratings place this alternative as intermediate in the effect of routes on wetland habitats compared to the other alternatives. Although tying for the number of watersheds with a "Low" ranking, this alternative has more "High" rated watersheds than the alternative (3) that does not add any routes to the NFTS. This would appear to indicate an elevated level of negative impact from this alternative as compared to Alternative 3. The impacts of the percentage differences between this alternative and the other alternatives in the route mileage added within Canada goose and mallard habitat, may be essentially undetectable against the background fluctuations of variable wetland water levels, variable harvest rates, weather and stochastic events such as fires and floods. This alternative provides benefits of reduced disturbance to sandhill cranes as compared to Alternative 1. That Alternatives 2-5 have small differences in effect may reflect the screening that was performed by the line officer/interdisciplinary team and indicate that the screening would not add the most onerous route segments, at least for sandhill cranes, to the NFTS.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may be disturbed less than by Alternative 1 and Alternative 3 which do not have seasonal closures.

Changes to class of use are not expected to have any detectable impact on wildlife.

Cumulative Effects

The effects of Alternative 4 on the wetland-dependent group would aggregate with the effects outlined above in table 3-84. This alternative would discontinue cross-country travel which includes continued use on approximately 152 miles of unauthorized routes. The continuation of public travel on 339 miles of unauthorized routes would continue to provide impacts. However, the impact of the routes added to the NFTS is small in relation to the extent of habitat for these species. For example, the 14 miles of added route in Canada goose and mallard habitat, in this alternative, is equivalent to approximately 25 acres or about 0.03 percent of the buffered Canada goose and mallard habitat area. Under Alternative 4, approximately 0.5 miles of unauthorized routes would be added to the NFTS in sandhill crane habitat. This would be less than one acre of potential habitat.

The small negative impacts of this alternative, aggregated with the other negative impacts occurring to wetland habitats, appear to be insufficient to counter the increasing numbers of sandhill cranes and Canada geese (see discussion under Alternative 1). These same impacts may be contributing to a portion of the decline in mallard numbers. However, mallard populations may be more heavily affected by factors impacting the primary breeding and wintering areas in the

Great Plains, Palouse and Central Valley (Austin and Miller 1995, Miller and Duncan 1999). When compared to the scope and intensity of the other impacts occurring on the landscape, and to the overall trends for the focal species, the impacts from Alternative 4, including individual mortality, degraded water-quality, and removal of emergent vegetation, are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within this group by prohibiting cross-country. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. Table 3-148 displays the route mileage proposed to be added to the NFTS within habitats used by the focal species in this group. This alternative has the same NFTS configuration as Alternative 2. Because the NFTS is the same, the effect to wetland species is the same for this alternative (Alternative 5) and Alternative 2.

Table 3-148. Miles of Route within Potential Habitat for the Wetland Group

Species	Miles Of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Sandhill crane	0.76 miles	11.75 miles
Canada goose Mallard	17.45 miles	239 miles

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of road and be identical to those that would occur with Alternative 2. These closure areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities such as pair-bonding and nest initiation may have less disturbance. The impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance; whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

Alternative 5 has the same effects as Alternative 2 with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to wetland species as compared to Alternative 2. This alternative has the same cumulative effects as Alternative 2, which are effects that are imperceptible and discountable.

Comparison of Effects on Wetland Species, by Alternative

This section provides tabular comparisons of the five alternatives. The first table (Table 3-149) compares the number of watersheds with a “Low” disturbance index rating and compares the

amount of acres that lie within the habitat disturbance zone. Table 3-150 displays a comparison of habitat change metrics for the focal species in the wetland-associated group. Alternative 1 has the most impacts to wetland-associated species and Alternative 3 the least.

Cumulative Effects

Table 3-149. Comparison of Habitat Disturbance Index Ratings Between Alternatives for the Wetland Group

Metric	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
# of watersheds with each human influence rank	23 "Low" 31 "Moderate" 67 "High"	24 "Low" 31 "Moderate" 66 "High"	27 "Low" 33 "Moderate" 61 "High"	27 "Low" 28 "Moderate" 66 "High"	24 "Low" 31 "Moderate" 66 "High"

Table 3-150. Comparison of Selected Effects by Alternative on the Oak-Associated Group

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Sandhill crane (Modeled habitat on the MDF: 7,060)	NF habitat available for cross-country travel	6,560 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA*: 2.25 UA+NFTS: 13	UA: 0.76 UA+NFTS: 12 11%< A-1	UA: 0 UA+NFTS: 11 17%< A-1 6%< A-2	UA: 0.45 UA+NFTS: 11 14%< A-1 3%<A-2 4%> A-3	UA: 0.76 UA+NFTS: 12 11%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	4.1 (0.06%)	1.4 (0.02%)	0 (0%)	0.8 (0.01%)	1.4 (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	23.7 (0.3%)	21.8 (0.3%)	20.0 (0.3%)	20.0 (0.3%)	21.8 (0.3%)
Canada goose and Mallard (Modeled habitat on the MDF: 82,000)	NF habitat available for cross-country travel	78,150 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 35.0 UA+NFTS: 257	UA 17.5 UA+NFTS: 239 7%< A-1	UA: 0 UA+NFTS: 222 14%< A-1 7%< A-2	UA: 14.0 UA+NFTS: 236 8%< A-1 1%<A-2 6%> A-3	UA: 17.5 UA+NFTS: 239 7%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	63.7 (0.08%)	31.9 (0.04%)	0 (0%)	25.5 (0.03%)	31.9 (0.04%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	467,7 (0.6%)	435.0 (0.5%)	122.0 (0.1%)	429.5 (0.5%)	435.0 (0.5%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Sensitive Species Determinations

Greater Sandhill Crane
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

For the Modoc Travel Management Project Alternative 1, the biologist found that the alternative may affect individual sandhill cranes as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2, 4 and 5 would prohibit cross-country travel and reduce the potential disturbance and indirect effects from additional routes being added to the NFTS compared to the potential impacts of Alternative 1. This reduction appears to sufficiently reduce impacts to a level so low as to be undetectable and thus Alternatives 2, 4 and 5 would have no effect on sandhill cranes. Alternative 3 would have no impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS. Alternative 3 would therefore have no effects on sandhill cranes or their habitats. Thus it is my determination that the Modoc Travel Management Project Alternatives 2-5 would not affect sandhill cranes or their habitat.

Sage-Steppe Group: Affected Environment

Focal Species within the Group: Pronghorn, Greater Sage-Grouse, Swainson's Hawk, Golden Eagle

This species group is associated with the dynamic mosaic landscape of big and low sagebrush, grasslands, and juniper.

Pronghorn use extensive sagebrush areas with a low coverage of shrubs for food and predator escape (USFS 2008a). Pronghorns rely on the ability to visually detect predators at long distance and the pronghorn's speed to escape predators (Zeiner et al. 1990). This sensitivity to predators makes does in late pregnancy and does with young fawns highly reactive to any form of harassment (Lee et al. 1998). There is an estimated 62,550 acres of potential pronghorn habitat that meets the CWHR suitability index equal to or greater than 0.75 on the Modoc National Forest. A habitat disturbance index was calculated for pronghorn antelope based on a 1,500-meter buffer. However, only a limited number of watersheds (10) showed any difference between the two most divergent alternatives (1 and 3). The average difference of 53 acres in the raw acre calculation resulted in very small percentage differences between Alternative 1 and Alternative 3. Additionally, 96 percent of the modeled habitat, Forest-wide was contained in the 1500-meter disturbance buffer. Because of these results it is clear that pronghorn habitat is potentially subject to roadside disturbance and that the differences between alternatives is insufficient for the habitat disturbance index to be a useful measure of effect.

The Swainson's hawk is a long-distance migrant that breeds on the Modoc National Forest (Modoc National Forest records) and spends the non-breeding season in South America (England et al. 1997). Swainson's hawk reproduction appears to be restricted on the Modoc to the northwest corner of the Doublehead Ranger District, although there appears to be suitable habitat on at least small portions of the other three districts.

Nesting pairs may desert their nests after visits to nests by humans (England et al. 1997). Although apparently tolerant of regular, ongoing human activities, loud, irregular, unpredictable activities have caused nest abandonment (England et al. 1997). A study on the Hanford Site in

central Washington found that Swainson's hawks appeared to be sensitive to pedestrian and vehicle traffic (Poole et al. 1988). The authors of the study recommended a 2.2 kilometer (1.4 mile) buffer around nest trees to reduce disturbance to nesting Swainson's hawks and to protect against impacts to the prey base (Poole et al. 1988). The Modoc LRMP requires a 402.3 meter (0.25 mile) protective buffer around Swainson's hawk nests to prevent disturbance from management activities (USFS 1991). Analysis of this project's effects on Swainson's hawks is thus complicated by widely distributed, but apparently vacant habitat and widely varying potential effects zones. Thus, in order to cover the impacts that may potentially occur, without knowing the appropriate scale, this analysis looks at the effects to Swainson's hawks at three scales. The Forest-wide CWHR potentially suitable habitat is the largest scale and includes habitat on all four ranger districts. The mid-scale examines the potential impacts at the 2.2-kilometer range around the known, recently active nesting sites. The third and smallest scale examines the potential impacts within the 402.3 meter disturbance zone around the known active nests. The 2.2 kilometer and the 402.3 meter scales only examine the known sites on the Doublehead Ranger District.

Greater sage-grouse on the Modoc plateau have declined (USFS 2008a) as have sage-grouse populations in other areas of their contracting range (Schroeder et al. 1999). California Department of Fish and Game records indicate there were many active leks across much of the Devil's Garden and Doublehead Ranger Districts with scattered leks on or adjacent to the other two districts in the early part of the 20th century (USFS 2007). By the 1950s, the sage-grouse population had dropped dramatically and by 2004, only six birds remained on the only known remaining active lek on the Devil's Garden (USFS 2007). The encroachment of juniper into the sagebrush steppe has been a major factor in the decline of sage-grouse habitat on the Modoc National Forest (USFS 2007). This analysis looks at the potential sagebrush habitats across the historic range of sage-grouse on the Modoc National Forest including the remaining center of activity near the Clear Lake Hills on the Doublehead Ranger District. The entire historic range of habitat is analyzed to detect potential conflicts with areas of sage habitat that may be currently vacant but that may provide important future expansion habitats.

The area designated for active management of the Devil's Garden/Clear Lake population management unit ("active management area") is also analyzed for impacts. This is the area where a multi-agency group (including the Forest Service) is actively working to enhance the sage-grouse population through habitat manipulation and the release of translocated birds. The active management area is approximately 289,400 acres of which 212,710 acres are on the Modoc National Forest. This area of the Modoc National Forest was selected to analyze the effects of the alternatives considered in this document on sage-grouse in this important area of active population restoration.

The small-scale, local impacts near the currently active sage-grouse leks were considered as part of the analysis of each unauthorized route segment by the line officer/interdisciplinary team as part of the analysis to define the proposed action.

Golden eagles hunt primarily prey of open country such as hares, rabbits, ground squirrels, prairie dogs and will frequently use carrion (Kochert et al. 2002, USFS 2007). An estimated 5,500 acres are within 0.25 miles of nesting golden eagles on the Forest. Humans cause >70 percent of the recorded golden eagle deaths with collision being the largest cause (Kochert et al. 2002). Nearly 1,000 golden eagles were killed along highways near Rock Springs, WY in one winter (Kochert et al. 2002). Analysis of golden eagles examines the potential impacts within a 402.3 meter (0.25 mile) radius of the known nesting sites. This scale was picked due to the difficulty in defining golden eagle habitat. Golden eagles on the Modoc use a variety of vegetation types and substrates for nesting. Foraging can also occur in a variety of habitat types. Due to these factors, the existing

golden eagle locations were buffered by 0.25 mile and used to analyze the relative differences between alternatives.

Table 3-151. For The Sage-Steppe Group, California Wildlife Habitat Relationship Stage Classes Considered Suitable

Species	Habitat (CWHR) Suitability >0.75	Acres of Habitat on National Forest
Pronghorn	AGS: All sizes/stages LSG: 1, 2S, 2P, 2M, 3S PAS: All sizes/stages SGB: 1, 2S, 2P, 2M	62,550 acres
Swainson's hawk	AGS: All sizes/stages JUN: 5S, 5P PAS: All sizes/stages	59,450 acres (potential habitat from model) 17,720 acres (within 2.2 kilometers of existing site) 1,450 acres (within 0.25 miles of existing sites)
Greater sage-grouse	BBR: 2(ALL), 3(ALL), 4(ALL) SGB: 2(ALL), 3(ALL), 4(ALL) WTM: 1S, 1P, 2D	128,940 acres (potential habitat from model)
Greater sage-grouse	National Forest System lands within the active management area	212,710 acres
Golden eagle	SPECIAL ELEMENTS	5,550 (within 0.25 miles of existing sites)

Sage-Steppe Group: Environmental Consequences

Alternative 1

Direct and Indirect Effects

Effects of the Continuation of Cross-Country Motorized Vehicle Travel

The California WHR sizes and stages that were considered as "suitable" are listed for each species in , above. Table 3-152. displays the number of acres of mapped habitat that meets the CWHR stages potentially open for cross-country travel under this alternative. Table 3-153. displays the route mileage that occurs within habitat on the National Forest. Although occasional direct mortality may occur from collisions with vehicles on highways, this is not known to have occurred from slower moving vehicles off-road. Sage grouse nests could be destroyed by cross-country travel. At the long-term analysis point (20 years in the future), assuming an increase of off-highway use, direct mortality events would occur more frequently, probably increasing at a rate similar to the rate of increase of off-highway use.

Indirect impacts to species in this group from cross-country travel fall into two basic sets. One set is related to changes in vegetation due to cross-country travel. The other set of impacts is related to disturbance to animal behavior from cross-country vehicle travel.

Changes to vegetation that result from cross-country vehicle travel potentially include reduction in quantity of vegetation, changes to vegetative structure that affects cover, or changes in relative abundance of plant species. In locations of heavy off-road use, vegetation can be impacted such that it becomes compacted or in extreme cases, removed; thereby rendering a site unsuitable for ground-nesting birds such as sage-grouse to construct nests safe from predators. Cross-country travel may also alter the relative mix of plant species. An example may be a reduction in sage shrubs and an increase in annual grasses from repeated vehicle travel masticating the shrubs. Cross-country vehicle travel can also disrupt soil crusts reducing soil fertility resulting in less new

plant growth, and potentially increasing noxious plants (Kaltenecker and Wicklow-Howard 1994). For more information on cross-country travel effects to plants see the botany section elsewhere in this document.

The amount of impact from cross-country vehicle travel is unknown but presumed small due to the relatively low quantity of cross-country vehicle travel on the Modoc National Forest (see discussion on recreation and of-road vehicle use patterns elsewhere in the document). The intensity of this impact is unknown but appears to be limited especially when compared to other vegetation altering activities (see cumulative effects sections).

Disturbance can be an impact, caused by off-road use of vehicles that may result in direct and indirect effects by causing the movement of individuals or the alteration of their behavior. Disturbance-caused movement can expose eggs or young to potentially fatal weather conditions or predators. Disturbance can also alter feeding patterns or interrupt important mating rituals. These impacts to feeding and mating can have impacts to the production of young through delaying the onset of laying, reducing clutch size or reducing the fitness of adults or young with reduced fitness manifesting in lower rates of survival for offspring. The amount of this impact is unknown but presumed small due to the relatively low quantity of cross-country vehicle travel on the Modoc National Forest (see discussion on recreation and off-road vehicle use patterns elsewhere in the document).

Table 3-152. Alternative 1: Potential Habitat for the Sage-Steppe Group that Could be Impacted by Cross-Country, Off-Road Travel

Species	Acres of habitat*	Percent of all habitat (or area) on MDF open to cross-country travel
Pronghorn	62,530 acres (CWHR habitat model)	100%
Swainson's hawk	59,430 acres (CWHR habitat model)	100%
	17,720 acres (2.2 km buffer of known sites)	100%
	1,450 acres (402.3 m buffer of known sites)	100%
Greater sage-grouse	128,300 acres (CWHR habitat model)	100%
	212,710 acres (active management area)	100%
Golden eagle	4,980 acres (402.3 m buffer of known sites)	89.7%

*Acres rounded to the nearest 10.

Table 3-153. displays the route mileage within habitats used by the focal species in this group.

Table 3-153. Alternative 1: Miles of Route within Potential Habitat for the Sage-Steppe Group

Species	Miles of Unauthorized Routes Within Habitat on NF or within the active management area (sage-grouse)	Combined Miles of NFTS and Unauthorized Routes
Pronghorn	31.26 miles	208.5 miles
Swainson's hawk	29.4 miles (CWHR habitat model)	194.4 miles (CWHR habitat model)
	0.2 miles (2.2 km buffer of known sites)	40.2 miles (2.2 km buffer of known sites)
	0 miles (402.3 m buffer of known sites)	4.8 miles (402.3 m buffer of known sites)
Greater sage-grouse	34.3 miles (CWHR habitat model)	372 miles (CWHR habitat model)
	43.1 miles (active management area)	797 miles (active management area)

Species	Miles of Unauthorized Routes Within Habitat on NF or within the active management area (sage-grouse)	Combined Miles of NFTS and Unauthorized Routes
Golden eagle	1.5 miles	17.8 miles

This alternative would continue to allow the use of 491 miles of unauthorized routes as part of the continuation of cross-country travel. Disturbance to sage-steppe species' activities could occur along these routes. The largest impact would be the continued disturbance along route edges. Vehicle travel may disrupt foraging activities resulting in more energy expenditures. As a group, all of the sage-steppe species would be most affected by this alternative, as opposed to the other alternatives, because cross-country travel would continue that includes the use of the most route mileage available for public motorized vehicle travel.

Approximately 31.3 miles of unauthorized routes would be available for use within potential pronghorn habitat in this alternative. This is 15 percent more than route mileage that would be available for use under Alternative 3, which does not add any unauthorized routes to the NFTS. Alternatives 2, 4, and 5 would have approximately 7-8 percent fewer route miles than this alternative. Alternative 1 would allow cross-country travel which includes 209 miles of unauthorized routes within the CWHR modeled pronghorn habitat. This is approximately 15 percent (29 miles) more than would occur under Alternative 3, the alternative with no unauthorized route usage. The additional route mileage would result in this alternative having the greatest potential disturbance to pronghorn. However, this disturbance effect is tempered by the average length of the unauthorized route segments. Approximately 84 percent of all unauthorized route segments are less than 0.5 miles in length or much shorter than the 1500-meter (0.93 mile) distance used to approximate pronghorn reactions. Analysis indicates that 100 percent of the unauthorized routes would lie within the influence zone of the existing route system. Thus, even though this alternative would have more routes than the other alternatives, the additional miles do not result in additional disturbance to pronghorn.

Indirectly, more unauthorized route mileage would equal less available habitat. Assuming an average 15-foot route width, the 31.3 miles of unauthorized routes that occurs in pronghorn habitat represents about 57 acres. In the long-term time period of 20 years, when the other alternatives would have converted routes not added to the NFTS into re-vegetated foraging habitat, Alternative 1 would still have 57 acres of unauthorized routes within habitat and the acres would not be available as pronghorn habitat.

Alternative 1 would potentially have more disturbance to Swainson's hawks than Alternative 3 due to 29 more miles routes being available for use in Alternative 1. This is about 15 percent more route mileage than Alternative 3. Alternative 1 would also have approximately 7-9 percent more route mileage than Alternatives 2, 4, and 5. Although these percentages are relatively high for the effects in this project, they are somewhat speculative given the speculative nature of the CWHR modeled Swainson's hawk habitat. The known Swainson's hawk habitat at the 2.2-kilometer scale would only be impacted by 0.2 miles of unauthorized route that would be available to public use in Alternative 1, or added to the NFTS in Alternatives 2, 4, and 5. At the 402.3-meter scale, there are no unauthorized routes in any of the alternatives. It thus appears that there is a small, somewhat speculative, increase in disturbance to Swainson's hawk potential habitat away from the known nesting areas.

Alternative 1 would not prohibit cross-country travel and would include continued use on approximately 34 miles of unauthorized routes in potential sage-grouse habitat across the Forest. Alternative 1 would also continue public use on 43.1 miles of unauthorized routes within the active management area for sage-grouse. When combined with existing NFTS routes a total of 372 miles would be available for public use within the modeled habitat and 438 miles would be available within the active management area. This is 9 percent more route mileage in habitat than

under Alternative 3 and 10% more mileage in the active mileage area than would be available for public use in Alternative 3. Route mileage in habitat across the Forest, in Alternative 1 totals approximately 3 percent more than would occur in Alternatives 2, 4, and 5. Route mileage in the active management area would be 3-4 percent more than would occur in Alternatives 2, 4, and 5. Only one mile of unauthorized route is within ¼ mile of a historic lek site. This one mile aggregate would affect four historic lek sites, none of which appear to be currently active. In the long-term, this alternative would maintain current disturbance levels and would not have the potential recovery of habitat that would occur under the other alternatives.

Golden eagle activity centers would have approximately 17.8 miles of route continuing to be used by the public under this alternative. This is approximately 8 percent more route mileage than would occur under Alternative 3. Alternatives 2, 4, and 5 would have approximately 5-6 percent less route mileage (16.7 –17.0 miles) than this alternative. The primary impact to golden eagles is increased disturbance during the nesting season compared to the other alternatives. Although a potential positive indirect effect could be additional forage in the form of road-killed carrion, this effect would be limited or not occur given the low speeds on these generally short spurs (maximum length of unauthorized route segment in golden eagle habitat is 0.3 miles, the mean length is 0.14 miles) and during cross-country travel.

Effects of Changes in Existing Season and Class of Use

This alternative does not have any changes to season of use or class of vehicle that may use any particular route segment. There are no impacts in this category for this alternative.

Cumulative Effects

The effects of Alternative 1 on the sage-steppe group would aggregate with the effects outlined above in table 3-84. Those effects include approximately 1,500 acres per year of treatments to improve sage-steppe, and 122,500 AUMs of grazing annually on the Modoc National Forest. There is also ongoing juniper removal and grazing on other public and private lands within and adjacent to the proclaimed boundary of the Forest as well as stochastic events such as wildfires and catastrophic insect outbreaks. However the dominant trends affecting this species group are a substantial trend of juniper encroachment and capture of sagebrush sites within and adjacent to the project area and a trend of increased extent of annual grasses such as cheatgrass and medusahead (US Forest Service and USDI Bureau of Land Management 2008).

Juniper and encroachment of annual grasses results in reduced forbs and perennial grasses which can reduce forage for the focal species pronghorn and sage-grouse and reduce the food for the prey of Swainson's hawks and golden eagles. Juniper encroachment may also make sage-grouse more susceptible to predation and reduce an area's suitability for pronghorn. Vegetation treatments and grazing have the potential to impact species in this group by removing grasses and forbs, impeding the growth of sagebrush, expediting the spread of annual grasses, or altering vegetative structure that provides cover. Past trends for this group have generally been negative for all species except golden eagles. Pronghorn populations in northeastern California appear to have dropped from near 100,000 in 1952 to approximately 25,000 by 1992 and have since appeared to stabilize (USFS 2007). Swainson's hawk populations in California appear to be slowly declining (USFS 2007). Sage grouse have sharply declined (see above also USFS and USDI Bureau of Land Management 2008).

This alternative would continue cross-country travel therefore impacts to species in this group would continue and aggregate with effects from vegetation management and the effects of juniper encroachment. Because the impacts from cross-country travel are estimated to be low, the continuation of cross-country travel under this alternative would add minor to imperceptible amounts to negative impacts from vegetation management activities. The impact of unauthorized

routes would be small. For example, the 31 miles of unauthorized route in pronghorn habitat, in this alternative, is equivalent to approximately 56 acres or about 0.09 percent of the potential pronghorn habitat. The 34 miles of unauthorized route in sage-grouse habitat (CWHR model), in this alternative, is equivalent to approximately 62 acres or about 0.05 percent of the area the model predicts may potentially provide sage-grouse habitat. Furthermore, the unauthorized routes do not constitute a change to habitats but an existing condition whose vegetation change impact has already occurred and whose conditions would continue into the future. Thus, the roadways have less impact than an acre of new vegetation manipulation. Overall, impacts from this alternative appear to be primarily related to disturbance and appear to aggregate with other impacts occurring on the landscape, particularly the trend of loss of habitat to juniper and annual grass encroachment. However, compared to the scope and intensity of habitat loss due to juniper and annual grass encroaching across the landscape, the impacts from Alternative 1 are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution for species in this group.

Alternative 2

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

This alternative would prevent disturbance to the focal species within the sage-steppe group by prohibiting cross-country travel, including continued use of approximately 213 miles of unauthorized routes, that are within the sage steppe habitat. In the long-term period (20 years), focal species habitat would be expected to recover from soil and vegetation impacts caused by unmanaged motorized travel, especially where unauthorized routes no longer receive motorized traffic. The potential impacts discussed under Alternative 1 from continued cross-country travel would not occur.

Effects of Adding Unauthorized Routes to the NFTS

This alternative would add 339 miles of unauthorized routes to the NFTS. Table 3-154 displays the route mileage within habitats used by the focal species in this group.

Table 3-154. Alternative 2: Miles of Routes within Potential Habitat for the Sage-Steppe Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Pronghorn	16.8 miles	194 miles
Swainson's hawk	15.6 miles (CWHR habitat model) 0.2 miles (2.2 km buffer of known sites) 0 miles (402.3 m buffer of known sites)	181 miles (CWHR habitat model) 40.2 miles (2.2 km buffer of known sites) 4.8 miles (402.3 m buffer of known sites)
Greater sage-grouse	3.9 miles (CWHR habitat model) 31.3 miles (active management area)	361 miles (CWHR habitat model) 426.1 miles (active management area)
Golden eagle	0.6 miles	17 miles

Alternative 2 would have a total of 194 miles of unauthorized routes within the CWHR modeled habitat for pronghorn. Of this total, approximately 16.8 miles of unauthorized routes would be added to the NFTS within potential pronghorn habitat in this alternative. This is 9 percent more than the route mileage that would be available for use under Alternative 3, which adds no unauthorized routes to the NFTS. Alternative 1 would have approximately 7 percent more route mileage than this alternative. Alternative 4 would have approximately 2 percent fewer miles added to the NFTS than this alternative. This alternative would have the same route mileage, in

the same locations, as Alternative 5. The slightly lower amount of route miles added to the NFTS would result in this alternative having somewhat less potential disturbance to pronghorn than the Alternative 1 which has the most routes available to public use. However, this disturbance effect is tempered by the average length of the unauthorized route segments. Approximately 84 percent of all unauthorized route segments are less than 0.5 miles in length or much shorter than the 1500-meter (0.93 mile) distance used to approximate pronghorn reactions. Analysis indicates that 100 percent of the unauthorized routes would lie within the influence zone of the existing NFTS routes. Thus, even though this alternative would have more routes than some other alternatives, the additional miles do not result in additional disturbance.

Indirectly, more route mileage would equal less available habitat. Assuming an average 15-foot route width, the 17 miles of unauthorized routes that would be added to the NFTS that occur in pronghorn habitat represents about 31 acres. In the long-term period of 20 years, Alternative 2 would not be in the process of growing the 31 acres into available pronghorn habitat. This would be approximately 26 acres less than would be available to grow into habitat in Alternative 3, and approximately 5 acres less than the available amount for Alternative 4. Alternative 2 would have the same amount of long-term habitat returned as Alternative 5. However, these acres appear to be insignificant additions compared to the more than 62,000 acres of modeled potential pronghorn habitat.

Alternative 2 would potentially have more disturbance to Swainson's hawks than Alternative 3 due to 16 more miles of unauthorized routes being added to the NFTS in Alternative 2. This is about 9 percent more route mileage than Alternative 3. Alternative 2 would also have approximately 2 percent more route mileage than Alternative 4, and approximately 7 percent less than Alternative 1. These impacts are somewhat speculative given the speculative nature of the CWHR model of habitat for Swainson's hawks. The known Swainson's hawk habitat at the 2.2-kilometer scale would only be impacted by 0.2 miles of unauthorized route in Alternative 1, or 0.2 miles of unauthorized routes added to the NFTS in Alternatives 2, 4, and 5. At the 402.3-meter scale, there are no unauthorized routes that would be added to the NFTS in any of the alternatives. It thus appears that there is a small, somewhat speculative, increase in disturbance to Swainson's hawk habitat away from the known nesting areas.

Alternative 2 would add to the NFTS approximately 24 miles of unauthorized routes in potential sage-grouse habitat across the Forest. When combined with existing NFTS routes a total of 362 miles would be available for public use within habitat for sage-grouse. This is 7 percent more mileage than would be available under Alternative 3 which does not add any routes to the NFTS. There is no difference in miles of route within potential habitat between Alternative 2 and 5 because both Alternatives have the same route system. There is no effective difference between Alternative 2 and Alternative 4 as the two alternatives differ by less than 0.7 miles or less than 0.2 percent. Alternative 2 would add 31.3 miles to the existing NFTS routes for a total of 426 miles within the active management area. This is seven percent more mileage within the active management area than would occur in Alternative 3. Alternative 2 would have 5.8 miles more available routes than Alternative 4 within the active management area. Thus alternative 2 would have more available routes than Alternatives 3 and 4, the same as Alternative 5, and less than Alternative 1. The additional route mileage when converted to acre-equivalents would be 43.5 acres of routes added within habitat (0.03 percent of the total available) and 57 acres of routes added within the active management area (0.03 percent of the active management area). These percentages appear to be so small as to be insignificant. Only 0.7 miles of added route would be within ¼-mile of a historic lek with no routes added within the active management area.

In the long-term, this alternative would potentially add approximately 19 acres of habitat compared to 0 acres added for Alternative 1, 63 acres added in Alternative 3, 20 acres added in Alternative 4 and 19 acres added in Alternative 5. This would appear to be an insignificant

change given approximately 129,000 acres that potentially could provide habitat for sage-grouse according to the CWHR model.

Golden eagle activity centers would have approximately 17.0 miles of NFTS route within a quarter-mile under this alternative. This is approximately 4 percent more route mileage than would occur under Alternative 3 and approximately 2 percent more route mileage than would occur under Alternative 4. Alternative 1would have approximately 5 percent more total route miles (17.8 miles) than this alternative. The primary impacts to golden eagles from the route system is increased disturbance during the nesting season compared to the Alternatives 3 and 4 with their lower total route mileage and the decreased disturbance compared to Alternative 4. However, these impacts are probably insignificant given the short length of added route segments and the low percentage of change over the entire route system. Although a potential positive indirect effect could be additional forage in the form of road-killed carrion, this effect would be limited or not occur given the low speeds on these generally short spurs (maximum length of unauthorized route segment in golden eagle disturbance zone is 0.3 miles, the mean length is 0.14 miles).

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may be disturbed less than under Alternatives 1 and 3 that do not implement closures.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance, whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 138 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 2 on the sage-steppe group would aggregate with the effects outlined above in table 3-84. Those effects include 1,500 acres per year of treatments to improve sage-steppe, and 122,500 AUMs of grazing annually on the Modoc National Forest. This alternative would discontinue cross-country travel which would include 152 miles of unauthorized routes, but would add 339 miles of unauthorized routes to the NFTS. Therefore impacts to species in this group would be less than those in Alternative 1 but more than those in Alternative 3. The impact of additional routes added to the NFTS is small. For example, the 17 miles of unauthorized route in pronghorn habitat, added to the NFTS in this alternative, is equivalent to approximately 31 acres or about 0.05 percent of the potential pronghorn habitat. The 24 miles of added unauthorized route in sage-grouse habitat (CWHR model), in this alternative, is equivalent to approximately 44 acres or about 0.03 percent of the area the model predicts may potentially provide sage-grouse habitat. Overall, impacts from this alternative appear to be primarily related to disturbance and appear to aggregate with other impacts occurring on the landscape, particularly the trend of loss of habitat to juniper and annual grass encroachment. However, compared to the scope and intensity of habitat loss due to juniper and annual grass encroachment across the landscape, the impacts from Alternative 2 are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution for species in this group.

Alternative 3

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

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

The sage-steppe species would not be affected by vehicle travel adjacent to nests or within foraging habitat. Changes to food resources caused by compaction or removal of vegetation would not occur.

This alternative would not add any unauthorized routes. However the linear effects of roads would still occur on the 4,580 miles of NFTS roads. Table 3-155. displays the NFTS route mileage currently within habitats used by the focal species in this group.

Table 3-155. Alternative 3: Miles of Routes within Potential Habitat for the Sage-Steppe Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Pronghorn	0 miles	177 miles
Swainson's hawk	0 miles (CWHR habitat model) 0 miles (2.2 km buffer of known sites) 0 miles (402.3 m buffer of known sites)	165 miles (CWHR habitat model) 40.0 miles (2.2 km buffer of known sites) 4.8 miles (402.3 m buffer of known sites)
Greater sage-grouse	0 miles (CWHR habitat model) 0 miles (active management area)	338 miles (CWHR habitat model) 395 miles (active management area)
Golden eagle	0 miles	16.4 miles

Alternative 3 would have a total of 177 miles of NFTS route within the CWHR modeled habitat for pronghorn. No unauthorized routes would be added to the NFTS under this alternative. Alternative 2 and 5 would have approximately 9 percent more route mileage than this alternative, and Alternative 4 would have approximately 8 percent more route mileage than this alternative in pronghorn habitat. The lower route mileage would result in this alternative having the least potential disturbance to pronghorn of the alternatives. However, this disturbance effect is tempered by the average length of the unauthorized route segments in the other alternatives. Approximately 84 percent of all unauthorized route segments are less than 0.5 miles in length or much shorter than the 1500-meter (0.93 mile) distance used to approximate pronghorn reactions. Analysis indicates that 100 percent of the unauthorized routes in Alternatives 1, 2, 4, and 5 would lie within the influence zone of the existing NFTS route system. Thus, even though this alternative would have fewer routes than the other alternatives, the additional miles in the other alternatives do not result in additional disturbance.

With no unauthorized routes being added to the NFTS, the prohibition of cross-country travel would result in all of the unauthorized routes slowly regaining habitat characteristics similar to the surrounding lands. Assuming an average 15-foot route width, the 31 miles of unauthorized route in pronghorn habitat in this alternative represents about 57 acres. In the long-term period of 20 years, Alternative 3 would be in the process of growing the 57 acres into available pronghorn habitat. This would be more than in Alternatives 1, 2, 4, and 5 (0 acres, 26 acres, 31 acres, and 26 acres respectively). However, this appears to be an insignificant addition compared to the more than 62,000 acres of modeled potential pronghorn habitat.

Alternative 3, at the Forest-wide scale of potential habitat to Swainson's hawks, would potentially have less disturbance than the other alternatives as no unauthorized routes would be added to the NFTS. The known Swainson's hawk habitat at the 2.2-kilometer scale would not be impacted by the 0.2 miles of unauthorized route that would be added to the NFTS in Alternatives 1, 2, 4, and 5. At the 402.3-meter scale, there are no unauthorized routes that would be added to the NFTS in any of the alternatives. This alternative (Alternative 3) appears to have no difference in effects to Swainson's hawks from the other alternatives at the scale of the known sites (2.2 km and 402.3 m scales).

Alternative 3 would not add any unauthorized routes in potential sage-grouse habitat or within the active management area. The existing NFTS routes would total 337 miles within sage-grouse habitat. There are 395 miles of NFTS routes within the active management area. Route mileage within habitat for Alternatives 2 and 5 is approximately 7 percent more than would occur in Alternative 3. Alternative 4 would have approximately 7 percent more miles than this alternative within habitat. In the long-term, this alternative would potentially add approximately 63 acres of habitat compared to 0 acres added for Alternative 1, 19 acres added in Alternative 2, 20 acres added in Alternative 4 and 19 acres added in Alternative 5. This would appear to be an insignificant change given approximately 129,000 acres that potentially could provide habitat for sage-grouse according to the CWHR model.

Golden eagle activity centers would have approximately 16.4 miles of NFTS routes under this alternative. This is approximately 4 percent less route mileage than would occur under Alternatives 2 and 5, and approximately 2 percent less route mileage than would occur under Alternative 4. The impacts to golden eagles, from the lower route mileage in this alternative, are primarily decreased disturbance during the nesting season compared to the other alternatives. However, these impacts are probably insignificant given the short length of added route segments in the other alternatives and the low percentage of change over the entire road system.

Effects of Adding Unauthorized Routes to the NFTS

No routes would be added to the NFTS under this alternative.

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would not occur under this alternative.

Cumulative Effects

This alternative would discontinue cross-country travel and would not add approximately 491 miles of unauthorized routes. The impacts to species in this group from the cross-country travel and from the unauthorized routes would cease and may partially counter some of the effects due to grazing or juniper and annual grass encroachment. However, the scope and intensity of the impact from ending cross-country travel is small (see the cumulative effects discussion above for Alternative 1). The positive effects from not adding the unauthorized routes begin to show immediately as disturbance would be immediately reduced. At the 20-year, long-term point, some additional sage habitat would have begun to accumulate on the unauthorized routes. However, the low rate and intensity of impacts from the cessation of cross-country travel do not appear to be sufficient to counter the impacts from ongoing grazing, juniper and annual grass encroachment or stochastic events such as wildfire or catastrophic disease. Overall, even though this alternative has the fewest negative effects of any of the alternatives, when aggregated with the overall effects of juniper and annual grass encroachment and grazing, long-term trends of declining habitat suitability for sage-steppe species remain unaffected. Overall, cumulative effects appear to be insufficient to alter the larger trends occurring on the landscape. Essentially, the impacts from Alternative 3 are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution for species in this group.

Alternative 4

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

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

Effects of Adding Unauthorized Routes to the NFTS

Table 3-156. displays the route mileage that would be added to the NFTS within habitats used by the focal species in this group.

Table 3-156. Alternative 4: Miles of Route within Potential Habitat for the Sage-Steppe Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Pronghorn	14.0 miles	191 miles
Swainson's hawk	12.8 miles (CWHR habitat model) 0.2 miles (2.2 km buffer of known sites) 0 miles (402.3 m buffer of known sites)	178 miles (CWHR habitat model) 40 miles (2.2 km buffer of known sites) 5 miles (402.3 m buffer of known sites)
Greater sage-grouse	23.2 miles (CWHR habitat model) 25.5 miles (active management area)	361 miles (CWHR habitat model) 765 miles (active management area)
Golden eagle	0.3 miles	16.7 miles

Alternative 4 would have a total of 191 miles of NFTS routes within the CWHR modeled habitat for pronghorn. Of that total, this alternative includes approximately 14 miles of unauthorized routes that would be added to the NFTS within potential pronghorn habitat . This is 8 percent more than the quantity of routes that would exist under Alternative 3, which adds no unauthorized routes to the NFTS. Alternative 1 would have approximately 8 percent more mileage than this alternative. Alternatives 2 and 5 would have approximately 1 percent more route mileage than Alternative 4. The additional route miles would result in this alternative having potentially more disturbance to pronghorn than the alternative which adds no routes to the NFTS (Alternative 3). As discussed above, even though this alternative would have more route mileage than some other alternatives, the additional miles do not result in additional disturbance.

Indirectly, more routes added to the NFTS would equal less available habitat. Assuming an average 15-foot route width, the 14 miles of unauthorized route added to the NFTS that occurs in pronghorn habitat represents about 25 acres. In the long-term period of 20 years, Alternative 4 would have 25 acres that would not be returning into available pronghorn habitat. This would be approximately 26 acres less than would be available to grow into habitat in Alternative 3, approximately 31 acres more than the available amount for Alternative 1 and approximately 5 acres more than the available amount for Alternatives 2 and 5. However, this appears to be an insignificant addition compared to the more than 62,000 acres of modeled potential habitat for pronghorn.

Alternative 4 would potentially have more disturbance to Swainson's hawks than Alternative 3 due to 13 additional miles of NFTS routes in Alternative 4. This is about 8 percent more route mileage than Alternative 3. Alternative 4 would also have approximately 2 percent less route mileage than Alternative 2 and 5, and approximately 9 percent less than Alternative 1. These

impacts are somewhat speculative given the speculative nature of the CWHR habitat model for Swainson's hawks. The known Swainson's hawk habitat at the 2.2-kilometer scale would only be impacted by 0.2 miles of unauthorized routes in Alternatives 1, 2, 4, and 5. At the 402.3-meter scale, there are no unauthorized routes in Swainson's hawk habitat that would be added to the NFTS in any of the alternatives.

Alternative 4 would add approximately 23 miles of unauthorized routes to the NFTS in potential sage-grouse habitat across the Forest. When combined with the existing NFTS the route mileage would total of 361 miles. This is 7 percent more route mileage than under Alternative 3 which has the lowest route mileage. Route mileage within habitat in Alternative 4 totals approximately 3 percent less than would occur in Alternative 1. There is no effective difference between Alternatives 2 and 5 and Alternative 4 as the three alternatives differ by less than 0.7 miles or less than 0.2 percent. Alternative 4 would add 25.5 miles of route within the active management area. This would equate to approximately 46 acres or 0.02 percent of the active management area. Alternative 4 would not add any routes within ¼-mile of a historic lek within the active management area and would only add 0.4 miles within ¼-mile of leks outside of the active management area. Given the lack of impact adjacent to leks, and the absence of cross-country travel this alternative would have no direct or indirect impacts on sage-grouse in the near-term.

In the long-term, this alternative (4) would potentially have 20 fewer acres of sage-grouse habitat compared to Alternative 3, 1 acre less than Alternative 2, and Alternative 5. This would appear to be an insignificant change given approximately 129,000 acres that potentially could provide habitat for sage-grouse according to the CWHR model. The larger impact would be a reduction in potential disturbance and avoidance of direct impacts due to the prohibition of cross-country travel.

Golden eagle activity centers would have approximately 16.7 miles of NFTS routes under this alternative. This is approximately 2 percent more route mileage than would occur under Alternative 3 and approximately 2 percent less route mileage than would occur under Alternatives 2 and 5. Alternative 1 would have approximately 6 percent more routes (17.8 miles) than this alternative. The primary impacts to golden eagles from the routes is increased disturbance during the nesting season compared to Alternative 3 with its lower total route mileage and decreased disturbance compared to Alternatives 1, 2 and 5. However, these impacts are probably insignificant given the short length of added route segments and the low percentage of change over the entire NFTS. Although a potential positive indirect effect could be additional forage in the form of road-killed carrion, this effect would be limited or not occur given the low speeds on these generally short spurs (maximum length of proposed route additions in golden eagle habitat is 0.3 miles, the mean length is 0.14 miles).

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 424 miles of route. These areas would have no disturbance from vehicles during the closure periods. Since the closure periods cover winter and early spring, early breeding activities may be disturbed less than Alternative 1 and Alternative 3 which do not have seasonal closures.

Changes to class of use would not occur with this alternative.

Cumulative Effects

The effects of Alternative 4 on the sage-steppe group would aggregate with the effects outlined above in table 3-84. Those effects include 1,500 acres per year of treatments to improve sage-steppe during the next decade, and 122,500 AUMs of grazing annually on the Modoc National Forest. This alternative would discontinue cross-country travel which would include 213 miles of unauthorized routes, but would add 286 miles of unauthorized routes to the NFTS. Therefore

impacts to species in this group would be less than those in Alternative 1 but more than those in Alternative 3. The impact of additional routes added to the NFTS is small. For example, the 14 miles of unauthorized route in pronghorn habitat, added to the NFTS in this alternative, is equivalent to approximately 26 acres or about 0.04 percent of the potential pronghorn habitat. The 23 miles of added unauthorized route in sage-grouse habitat (CWHR model), in this alternative, is equivalent to approximately 42 acres or about 0.03 percent of the area the model predicts may potentially provide sage-grouse habitat. Overall, impacts from this alternative appear to be primarily related to disturbance and appear to aggregate with other impacts occurring on the landscape, particularly the trend of loss of habitat to juniper and annual grass encroachment. However, compared to the scope and intensity of habitat loss due to juniper and annual grass encroachment across the landscape, the impacts from Alternative 2 are imperceptible and discountable and do not appear to affect existing trends to species population size, habitat or distribution for species in this group.

Alternative 5

Direct and Indirect Effects

Effects of the Prohibition of Cross-Country Motorized Vehicle Travel

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

This alternative does not continue the practice of cross-country, motorized vehicle travel. Therefore, there would be no impacts from cross-country, motorized travel.

Effects of Adding Unauthorized Routes to the NFTS

Table 3-157. displays the route mileage proposed to be added to the NFTS within habitats used by the focal species in this group. This alternative has the same route mileage and configuration as Alternative 2. Because the road system is the same, the effects to sage-steppe species are the same for this alternative (Alternative 5) and Alternative 2.

Table 3-157. Alternative 5: Miles of Routes within Potential Habitat for the Sage-Steppe Group

Species	Miles of Routes Added to the NFTS within Habitat on NF	Combined Miles of NFTS and Added Routes within Habitat on NF
Pronghorn	16.8 miles	194 miles
Swainson's hawk	15.6 miles (CWHR habitat model) 0.2 miles (2.2 km buffer of known sites) 0 miles (402.3 m buffer of known sites)	181 miles (CWHR habitat model) 40.2 miles (2.2 km buffer of known sites) 4.8 miles (402.3 m buffer of known sites)
Greater sage-grouse	3.9 miles	361 miles
Golden eagle	0.6 miles	17 miles

Effects of Changes in Existing Season and Class of Use

Changes to existing season of use would reduce impacts on 312 miles of route and be identical to those that would occur with Alternative 2. These closure areas would have no disturbance from vehicles during the closure periods. The impact is expected to be minor to undetectable.

Changes to class of use are not expected to have any detectable impact on wildlife. The source of disturbance; whether an auto, truck, or OHV, is assumed to be the same for this analysis. By allowing an additional 530 miles of mixed use there may be some additional vehicle travel but there are no indications that the amount of use would be greater than the existing variation in total use. Changing the mix of use is not expected to have any impacts on wildlife.

Cumulative Effects

The effects of Alternative 5 on the sage-steppe group would aggregate with the effects outlined above in table 3-77. Alternative 5 has the same effects as Alternative 2 with the exception of a different quantity of mixed use. Mixed use does not cause a difference in effects to sage-steppe species as compared to Alternative 2. This alternative has the same imperceptible and discountable cumulative effects as Alternative 2.

Comparison of Effects on Sage-Steppe Species, by Alternative

This section provides tabular comparisons of the five alternatives. Table 3-158. displays a comparison of habitat change metrics for the focal species in the sage-steppe group. Alternative 1 shows the most impacts to sage-steppe species and Alternative 3 the least.

Table 3-158. Comparison of Selected Effects on the Sage-Steppe Group, by Alternative

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Pronghorn (Modeled habitat on the MDF: 62,550)	NF habitat available for cross-country travel	62,530 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA*: 31.3 UA+NFTS: 209	UA: 16.8 UA+NFTS: 194 7%< A-1	UA: 0 UA+NFTS: 177 15%< A-1 9%< A-2	UA: 14.1 UA+NFTS: 191 8%< A-1 1%<A-2 8%> A-3	UA: 16.8 UA+NFTS: 194 7%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	57.0 (0.09%)	30.6 (0.05%)	0 (0%)	25.7 (0.04%)	30.6 (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	380.4 (0.6%)	353.1 (0.6%)	322.1 (0.5%)	347.6 (0.6%)	353.1 (0.6%)
Swainson's hawk (based on CWHR model potential habitat on the MDF: 59,450)	NF habitat available for cross-country travel	59,430 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 29.4 UA+NFTS: 194	UA: 15.6 UA+NFTS: 181 7%< A-1	UA: 0 UA+NFTS: 165 15%< A-1 9%< A-2	UA: 12.8 UA+NFTS: 178 9%< A-1 2%<A-2 8%> A-3	UA: 15.6 UA+NFTS: 181 7%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	53.5 (0.09%)	28.4 (0.05%)	0 (0%)	23.3 (0.04%)	28.4 (0.05%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	353.1 (0.6%)	329.4 (0.6%)	300.3 (0.5%)	324.0 (0.5%)	329.4 (0.6%)

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Swainson's hawk (based on 2.2 kilometer habitat zone around existing sites potential habitat on the MDF: 17,720)	NF habitat available for cross-country travel	17,722 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 0.2 UA+NFTS: 40	UA: 0.2 UA+NFTS: 40 0%< A-1	UA: 0 UA+NFTS: 40 <1%< A-1 <1%< A-2	UA: 0.2 UA+NFTS: 40 0%< A-1 0%<A-2 <1%> A-3	UA: 0.2 UA+NFTS: 40 0%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	0.4 (0.002%)	0.4 (0.002%)	0 (0%)	0.4 (0.002%)	0.4 (0.002%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	72.8 (0.4%)	72.8 (0.4%)	72.8 (0.4%)	72.8 (0.4%)	72.8 (0.4%)
Swainson's hawk (based on 402.3 meter habitat zone around existing sites, existing habitat on the MDF: 1,450)	NF habitat available for cross-country travel	1,450 acres	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 0 UA+NFTS: 5	UA: 0 UA+NFTS: 5 0%< A-1	UA: 0 UA+NFTS: 5 0%< A-1 0%< A-2	UA: 0 UA+NFTS: 5 0%< A-1 0%<A-2 0%> A-3	UA: 0 UA+NFTS: 5
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	9.1 (0.6%)	9.1 (0.6%)	9.1 (0.6%)	9.1 (0.6%)	9.1 (0.6%)
Greater sage-grouse (Modeled habitat on the MDF: 128,940)	NF habitat available for cross-country travel	128,300	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 34.3 UA+NFTS: 372	UA: 23.9 UA+NFTS: 362 3%< A-1	UA: 0 UA+NFTS: 338 9%< A-1 7%< A-2	UA: 23.2 UA+NFTS: 361 3%< A-1 0%<A-2 7%> A-3	UA: 23.9 UA+NFTS: 362 3%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	62.4 (0.05%)	43.5 (0.03%)	0 (0%)	42.2 (0.03%)	43.5 (0.03%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	677.0 (0.5%)	658.8 (0.5%)	615.2 (0.5%)	657.0 (0.5%)	658.8 (0.5%)
Greater sage-grouse (National Forest lands within the active management area: 212,710)	NF within the active management area available for cross-country travel	212,710	0 acres	0 acres	0 acres	0 acres
	Miles of route in active management area	UA: 43.1 UA+NFTS:	UA: 31.3 UA+NFTS:	UA: 0 UA+NFTS:	UA: 25.5 UA+NFTS:	UA: 31.3 UA+NFTS:

Species	Measure	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
		437.9	426.1 3%< A-1	394.8 10%< A-1 7%< A-2	420.3 4%< A-1 1%<A-2 6%> A-3	426.1 3%< A-1
	Equivalent acres of UA routes in habitat (% of active management area)	78.4 (0.04%)	57.0 (0.03%)	0 (0%)	46.4 (0.02%)	57.0 (0.03%)
	Equivalent acres of UA +NFTS routes in habitat (% of active management area)	797.0 (0.4%)	775.5 (0.4%)	718.5 (0.3%)	764.9 (0.4%)	775.5 (0.4%)
Golden eagle (Modeled habitat on the MDF: 5,550)	NF habitat available for cross-country travel	4,975	0 acres	0 acres	0 acres	0 acres
	Miles of route in habitat	UA: 1.5 UA+NFTS: 18	UA: 0.6 UA+NFTS: 17 5%< A-1	UA: 0 UA+NFTS: 16 8%< A-1 4%< A-2	UA: 0.3 UA+NFTS: 17 6%< A-1 2%<A-2 2%> A-3	UA: 0.6 UA+NFTS: 17 5%< A-1
	Equivalent acres of UA routes in habitat (% of MDF Habitat)	2.7 (0.05%)	1.1 (0.02%)	0 (0%)	0.5 (0.01%)	1.1 (0.02%)
	Equivalent acres of UA +NFTS routes in habitat (% of MDF Habitat)	32.8 (0.6%)	30.9 (0.6%)	29.1 (0.5%)	30.9 (0.6%)	30.9 (0.6%)

* UA = unauthorized routes that could continue to receive motorized use under continued cross-country travel (Alt 1) or that would be added to the NFTS (all other alternatives)
UA+NFTS = total miles of combined UA routes and NFTS routes

Sensitive Species Determinations

Swainson's hawk
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

For the Modoc Travel Management Project Alternative 1, the biologist found that the alternative may affect individual Swainson's hawks as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities. Alternatives 2, 3, 4 and 5 would have no impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS within ¼-mile of existing Swainson's hawk sites. Alternatives 2, 3, 4 and 5 would therefore have no effects on Swainson's hawks or their habitats. Thus it is the biologist's determination that the Modoc Travel Management Project Alternative 1 may affect individuals but is not likely to result in a trend toward Federal listing and that Alternatives 2, 3, 4 and 5 would not affect Swainson's hawks or their habitat.

Greater sage-grouse
In accordance with Forest Service Manual direction (FSM 2671.2 and 2672.42) a biological evaluation and assessment for this species was prepared for the Modoc National Forest motorized Travel Management Project and is hereby incorporated by reference.

For the Modoc Travel Management Project Alternative 1, the biologist found that the alternative may affect individual sage-grouse as cross-country travel could contribute disturbance or direct effects that may cause impacts to breeding and reproductive activities.

Alternatives 2, 4 and 5 would prohibit cross-country travel and reduce the potential disturbance and indirect effects from additional routes being added to the NFTS compared to the potential impacts of Alternative 1. This reduction appears to be sufficiently low as to be undetectable and thus Alternatives 2, 4 and 5 would have no effect on sage-grouse. Alternative 3 would have no impacts above the existing NFTS route system as motorized cross-country vehicle travel would be prohibited and no additional routes would be added to the NFTS. Alternative 3 would therefore have no effects on sage-grouse or their habitats. Thus it is the biologist's determination that the Modoc Travel Management Project Alternatives 2, 3, 4 and 5 would not affect greater sage-grouse or their habitat.

Summary of Effects Analysis Across all Alternatives

Table 3-159. provides a quick summary of the relative effects, in total, to wildlife of the alternatives. The reader is cautioned to consult the discussions for each effect as effects to some individual species may not follow this table. The summary tables at the end of each group display the raw difference that would occur for the focal species under each alternative. Those tables, along with the discussions provide a more complete picture of the potential effects of this project.

Table 3-159. Relative Ranking Comparison of Alternatives and Their Effects on Wildlife

Indicators – Terrestrial Biota	Rankings of Alternatives for Each Indicator[1]				
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Acres open to motorized travel	1	5	5	5	5
Miles of unauthorized routes within terrestrial biota habitat	1	3	5	2	3
Number of sensitive sites for TES species (e.g., PACs, nest sites, winter roost areas) within ¼ mile of an added route or area	1	3	5	2	3
The proportion of a species (or species group's) habitat that is affected by motorized routes	1	3	5	2	3
Average for Terrestrial Biota	1	3.5	5	2.75	3.5

[1] A score of 5 indicates the alternative is the best for terrestrial biota related to the indicator; a score of 1 indicates the alternative is the worst for terrestrial biota related to the indicator.

Compliance with the Forest Plan and Other Direction.

All alternatives would comply with Forest plan direction concerning wildlife and routes