Terrestrial and Aquatic Wildlife

Biological Assessment/Evaluation

Motorized Travel Management Plan

Stanislaus National Forest

Stanislaus National Forest
Pacific Southwest Region
USDA Forest Service
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1. INTRODUCTION

The purpose of this document is to evaluate and disclose the effects of the Stanislaus National Forest (STF) Motorized Travel Management project to threatened, endangered, and sensitive wildlife species; pursuant to the Endangered Species Act (ESA) of 1973, the National Forest Management Act (1976), Forest Service Manual (FSM) 2670.32, the Stanislaus National Forest Land Management Plan (USDA 1991), as amended by the Sierra Nevada Forest Plan Amendment (SNFPA) Final Supplemental Environmental Impact Statement (FSEIS) (USDA 2004). The STF "Forest Plan Direction" presents the current Forest Plan management direction, based on the original Forest Plan as modified through the Forest Plan appeals and amendment processes (USDA 2005).

On April 4, 2008, the United States Fish and Wildlife Service (FWS) website (USDI 2008) was accessed to obtain a list of threatened and endangered species that may occur on the STF (Table 1). It was re-accessed on October 27, 2009, to verify the list (USDI 2009). The Regional Forester's list of Sensitive Species for Region 5 identifies sensitive species that may occur on the STF (Table 1) (USDA 2007a). For detailed descriptions of these species and their habitat preferences, the reader is referred to the SNFPA FEIS (USDA 2001).

Table 1. Endangered, Threatened, and Sensitive species considered in this analysis.

Common Name	Scientific Name	Status[1]	Addressed in Detail in this BA/BE
Invertebrates			
Valley Elderberry Longhorn Beetle	*Desmocerus californicus dimorphus*	T	X
Fish			
Delta Smelt	*Hypomesus transpacificus*	T	
Lahontan Cutthroat Trout	*Oncorhynchus clarki henshawi*	T	X
Paiute Cutthroat Trout	*Oncorhynchus clarki seleniris*	T	
Central Valley Steelhead	*Oncorhynchus mykiss*	T	
Hardhead	*Mylopharodon conocephalus*	S	
Reptiles and Amphibians			
California Red-legged Frog	*Rana aurora draytonii*	T	X
California Tiger Salamander	*Ambystoma californiense*	T	
Relictual Slender (Hell Hollow) Salamander	*Batrachoseps relictus*	S	X
Limestone Salamander	*Hydromantes brunus*	S	
Yosemite Toad	*Bufo canorus*	S	X
Foothill Yellow-legged Frog	*Rana boylii*	S	X
Mountain Yellow-legged Frog	*Rana muscosa*	S	X
Western Pond Turtle	*Clemmys marmorata*	S	X
Birds			
Bald Eagle	*Haliaeetus leucocephalus*	S	X
California Spotted Owl	*Srix occidentalis occidentalis*	S, MIS	X
Great Gray Owl	*Strix nebulosa*	S	X
Northern Goshawk	*Accipiter gentilis*	S	X
Swainson's Hawk	*Buteo swainsoni*	S	
Peregrine Falcon	*Falco peregrinus*	S	X
Willow Flycatcher	*Epidonax traillii*	S	X
Mammals			
American Marten	*Martes americana*	S, MIS	X

Common Name	Scientific Name	Status[1]	Addressed
Pacific Fisher	*Martes pennanti pacifica*	S	X
California Wolverine	*Gulo gulo luteus*	S	X
Sierra Nevada Red Fox	*Vulpes vulpes necator*	S	X
Townsend's Big-eared Bat	*Corynorhinus townsendii*	S	X
Western Red Bat	*Lasiurus blossevillii*	S	X
Pallid Bat	*Antrozous pallidus*	S	X

[1]T = Threatened, S = Sensitive, MIS = Management Indicator Species

The delta smelt, hardhead, Paiute cutthroat trout, central valley steelhead, California tiger salamander, limestone salamander, and Swainson's hawk were considered but are excluded from further analysis because these species are not known to occur within the analysis area and the project alternatives are not expected to have any impacts on these species.

2. CONSULTATION TO DATE

To assist with the Travel Management Planning process, Region 5 USFS entered into programmatic consultation with the FWS for motorized vehicle route designation. On December 27, 2006, the FWS issued a Letter of Concurrence for 14 National Forests in California, including the STF. The Letter of Concurrence approved the Project Design Criteria (PDC) as outlined in the document entitled "Route Designation: Project Design Criteria for 'No Effect' or 'May Affect Not Likely to Adversely Affect' Determination for TE Species – October 2006 version 1." If the routes proposed for designation follow the PDC, and if the determination is either "No Effect" or "May Affect Not Likely to Adversely Affect," no further consultation with the FWS is required. If the determination is "May Affect And Likely to Adversely Affect," formal consultation is required.

The current wheeled motorized transportation system, including existing National Forest Transportation System (NFTS) routes that would be used to access the routes proposed for addition to the NFTS analyzed in this Biological Assessment, underwent ESA consultation in 2003, as part of the "Formal Endangered Species Consultation and Conference on the Biological Assessment for the Sierra Nevada Forest Plan Amendment Supplemental Environmental Impact Statement" (reference 1-1-03-F-2638). The actions on which consultation took place under this Biological Opinion were revised standards and guidelines identified in the Preferred Alternative for the management of 11 Sierra Nevada National Forests, including "wheeled vehicle travel on designated routes, trails, and off highway vehicle (OHV) areas" (Biological Opinion, p.32).

Effects of the proposed route additions, in combination with the existing NFTS routes, have been assessed and are displayed below as part of the NEPA cumulative effects analysis for each TE species.

3. CURRENT MANAGEMENT DIRECTION

General management direction for threatened, endangered, and sensitive (TES) species on the STF can be found in the following documents, available at the STF Supervisor's Office:

Forest Service Manual and Handbooks (FSM/H 2670)

Threatened and Endangered Species

- Review, through the biological evaluation process, actions and programs authorized, funded, or carried out by the Forest Service to determine their potential for effect on threatened and endangered species and species proposed for listing.
- Avoid all adverse impacts on threatened and endangered species and their habitats, except in the following situations: when it is possible to compensate adverse effects totally through alternatives identified in a biological opinion rendered by the Department of the Interior, FWS, or Department of Commerce, National Oceanic and Atmospheric Administration Fisheries

Service (NOAA Fisheries); when an exemption has been granted under the Endangered Species Act; or when the FWS or NOAA Fisheries biological opinion recognizes an incidental taking.

- Initiate consultation or conference with the FWS or NOAA Fisheries when the Forest Service determines that proposed activities may have an effect on threatened or endangered species; are likely to jeopardize the continued existence of a proposed species; or result in the destruction or adverse modification of critical or proposed critical habitat.

Sensitive Species

- As part of the National Environmental Policy Act process, review programs and activities, through a biological evaluation, to determine their potential effect on sensitive species.
- Avoid or minimize impacts to species whose viability has been identified as a concern.
- If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole.

National Forest Management Act (NFMA), and implementing regulations (CFR 219.19)

Sensitive Species

- Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area.

Stanislaus National Forest Land and Resource Management Plan (LRMP), as amended in January 2001 and January 2004.

TES Species

- Standards and guidelines from the LMP and the SNFPA Record of Decision (ROD) that are pertinent to this project are summarized for each species below.

A detailed analysis of project alternative compliance with the Riparian Conservation Objectives (RCO) is provided in the project record of the STF Travel Management EIS and is herein incorporated by reference.

4. PROJECT DESCRIPTION

Alternative 1 (Proposed Action)

This is the Proposed Action, as described in the Notice of Intent (72 Federal Register 222, November 19, 2007; p. 64988-64991), with corrections based on updated data and map information and refinements responding to the administration, motorized recreation, private property, recreation and resource issues raised during scoping (Chapter 1). These corrections and refinements provide additional motorized recreation opportunities, reduce conflicts and provide additional resource protection.

Alternative 1 (Proposed Action) is the Forest Service preferred alternative.

1. **Cross Country Travel**: Motor vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length[1] off of NFTS routes unless otherwise prohibited.

2. **Additions to the NFTS**: 151.64 miles of unauthorized routes would be added to the NFTS as motorized trails (see Table 2.05-2). Appendix I (Route Data) shows the specified vehicle class, season of use and mitigations.

[1] Vehicle Length equals the length of the vehicle along with the trailer it tows.

3. **Changes to the existing NFTS**: Vehicle class changes would occur on 616.80 miles of NFTS roads. Season of use on ***all routes*** based on elevation and wet weather closures on ***native surface routes*** replaces existing seasonal closures and restrictions (see Table 2.02-7). Appendix I (Route Data) shows the specified vehicle class, season of use and mitigations.

Vehicle Class: Table 2 shows vehicle class changes would occur on 622.70 miles of NFTS roads including: opening 67.84 miles of closed roads; converting 5.42 miles of closed roads to administrative use only; closing to public use 45.98 miles of open roads; converting 93.36 miles of roads from highway legal only to all vehicles; and, converting 400.57 miles of roads from all vehicles to highway legal only. This alternative also converts 62.64 miles of the 622.70 miles of NFTS roads to trails (the mileage overlaps with the other changes described above and shown in Table 2).

Table 2. Vehicle class changes: Alternative 1

↓ From ↓		← Vehicle Class Changes To →							
Class	**miles**	**ADM**	**ALL**	**ML1**	**HLO**	**t-ALL**	**t-ATV**	**t-MC**	**t-4WD**
ALL	453.42	27.37	0.00	15.94	400.56	0.30	0.00	1.98	7.26
ML1	67.37	0.00	12.57	0.00	2.17	26.06	1.94	1.58	23.05
HLO	96.02	2.66	93.36	0.00	0.00	0.00	0.00	0.00	0.00
Total	**616.80**	**30.03**	**105.92**	**15.94**	**402.73**	**26.36**	**1.94**	**3.56**	**30.31**

ADM=Administrative; **ALL**=All Vehicles; **ML1**=Maintenance Level 1; **HLO**=Highway Legal Only; t-**ALL**=All Vehicles trail; **t-ATV**=All Terrain Vehicle trail; **t-MC**=Motorcycle trail; t-**4WD**=4 Wheel Drive trail; **ADM** and **ML1** are closed to public motorized use

Season of Use: Except as allowed by permit or other authorization (i.e. wheeled over snow [WOS] routes), NFTS motorized routes are open to motorized use during the season of use shown below, unless specifically prohibited. Roads open year round are not maintained for winter travel; however, they are available for over snow travel consistent with the vehicle class designation.

1. Lower Elevations — Open year round
2. Middle Elevations — Open April 1 – November 30
3. Upper Elevations — Open May 15 – November 30

Wet Weather Closures: During the season of use, ***native surface routes*** are subject to wet weather closure when 1 inch of rainfall occurs in a 24 hour period and allowing for 72 hours of drying.

Wheeled Over-Snow Routes: WOS use is prohibited, except by ATVs when 12 inches or more of snow is present, on the routes listed in Table 3. These routes are dual designated as Snow Trails.

Table 3. Wheeled over-snow routes

Route	District	Miles[1]
03N01	Mi-Wok	24.99
03N01	Groveland	20.60
04N12	Summit	19.37
04N34Y	Summit	0.02
05N17	Summit	1.01
05N40Y	Summit	3.87
07N05	Calaveras	4.62
07N09	Calaveras	25.05
07N23	Calaveras	5.98
18EV306	Summit	0.41
	total	105.92

[1] National Forest System lands. **Note**: other roads open year round are available for over snow travel by 4WD and other vehicles consistent with the

vehicle class designation.

4. **Forest Plan Amendments:** includes the non-significant amendments shown in Tables 4, 5, and 6.

Table 4. Forest Plan amendments: Alternative 1

Practice	Existing S&G	Amendment
Forestwide S&Gs Restricted Motor Vehicle Management [10-G-2, C1i2] (USDA 2005a, p. 55-56)	Permit motor vehicle travel up to 100 feet from roads, routes and established travel ways for direct access to campsites, parking, woodcutting, or gathering forest products provided that: a. no resource damage occurs; and, b. such access is not otherwise prohibited.	Prohibit public motor vehicle travel off NFTS routes except as allowed by permit or other authorization. Allow parking within one vehicle length (vehicle and trailer) off of NFTS routes unless otherwise prohibited.

Table 5. Forest Plan amendments: Alternative 1

Practice	Existing S&G	Amendment	Route	Miles
Forestwide S&Gs Restricted Motor Vehicle Management [10-G-2, B3a4c1] (USDA 2005a, p. 52)	In areas adjacent to waters with known populations of western pond turtle: Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist.	In areas adjacent to waters with known populations of western pond turtle: Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist except for the routes identified in this table.	17EV192	0.63
			17EV192A	0.06
			17EV192B	0.15
			17EV194	0.39
			17EV195	0.50
			17EV196	0.19
			17EV197	0.35
			17EV197	0.46
			17EV197A	0.05
			17EV901	0.37
			1S1727	0.87
			1S17E35B	0.34
			1S17M	1.13
			1S1902	0.24
			1S1929	0.15
			1S1929C	0.19
			FR8516	0.05
			FR8601	0.47
			FR10178	0.64
			FR98482	0.06
			FR98486	0.21
			FR98504	0.07
			FR98508	0.06
			FR98509	0.03
			FR98510	0.04
			FR98511	0.15
			FR98513	0.03
			FR98514	0.04
			FR98515	0.09
			FR98520	0.03
			FR98537	0.09

Practice	Existing S&G	Amendment	Route	Miles
			FR98539	0.10
			FR98541	0.07
			FR98548	0.04
			FR98554	0.04
			FR98560	0.06
			FR98566	0.05
			FR98575	0.13
			FR98599	0.04
			total	**8.66**

Table 6. Forest Plan amendments: Alternative 1

Practice	Existing S&G	Amendment	Route	Miles
Forestwide S&Gs				
ROS Semi-primitive Non-motorized [10-B-2] (USDA 2005a, p. 51)	Motorized use is normally prohibited.	Motorized use is normally prohibited, except for the routes identified in this table.	4N80Y 5N02R **total**	0.20 1.50 **1.70**
Closed Motor Vehicle Travel Management [10-G-1a] (USDA 2005a, p. 51)	Closed to motorized use.	Closed to motorized use except for the routes identified in this table.		
Restricted Motor Vehicle Management [10-G-2, C1a] (USDA 2005a, p. 55)	Prohibit motorized use and close motorized routes in non-motorized areas.	Prohibit motorized use and close motorized routes in non-motorized areas, except for the routes identified in this table.		
Wild and Scenic River				
ROS Semi-primitive Non-motorized [10-B-2] (USDA 2005a, p. 105)	Manage to the ROS Class of Semi-primitive Non-motorized.	Manage to the ROS Class of Semi-primitive Non-motorized, except for the routes identified in this table.		
Closed Motor Vehicle Travel Management [10-G-1] (USDA 2005a, p. 105)	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management.	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management, except for the routes identified in this table.		

Alternative 2 (No Action)

The No Action Alternative provides a baseline for comparing the other alternatives. Under the No Action alternative, current management plans would continue to guide management of the project area. This alternative would ***not*** change the use of any NFTS roads and would ***not*** add any miles of NFTS motorized trails. Under this alternative the agency would take no affirmative action (no change from current management or direction) and cross country travel with continued use of unauthorized routes would occur. It would include only existing closures and would ***not*** include any restrictions on motorized dispersed recreation access.

No changes would be made to the current NFTS and no cross country travel prohibition would be put into place. The Travel Management Rule would not be implemented, and no MVUM would be produced. Motor vehicle travel by the public would not be limited to NFTS routes. Unauthorized routes would continue to have no status or authorization as NFTS facilities.

1. **Cross Country Travel**: Motor vehicle travel off NFTS routes by the public would continue except where prohibited by existing Forest Orders.
2. **Additions to the NFTS**: No unauthorized routes would be added to the NFTS.
3. **Changes to the existing NFTS**: No changes are made to the NFTS (see Table 7) or existing closures and restrictions based on current Forest Orders (see Table 8).

Table 7. Existing public motorized opportunities

Motorized Opportunity[1]		Miles
Type	**Vehicle Class**	
NFTS Road	All Vehicles (ALL)	1,744.29
NFTS Road	Highway Legal Only (HLO)	449.14
NFTS Trail	All Vehicles (ALL)	56.32
NFTS Trail	All Terrain Vehicle (ATV)	19.18
NFTS Trail	Motorcycle (MC)	9.45
NFTS Trail	4 Wheel Drive (4WD)	0.56
	subtotal	**2,278.94**
Unauthorized	Unauthorized Road/Trail	246.12
	total	**2,525.06**

[1] Baseline

Table 8. Existing NFTS Closures and Restrictions

Route	RD	MI	Order	Closure	Closure/Restriction
1N14	GR	5.50	82-22	Year round	Use by any motorized vehicle or other mechanical transport
1N14A	GR	1.50	82-22	Year round	Use by any motorized vehicle or other mechanical transport
1N45Y	GR	2.50	82-22	Year round	Use by any motorized vehicle or other mechanical transport
1N97	GR	4.00	82-22	Year round	Use by any motorized vehicle or other mechanical transport
1S16A	GR	0.20	82-13	Year round	Use by any motorized vehicle or other mechanical transport
2N24	GR	0.10	82-08	Year round	Use by any motorized vehicle or other mechanical transport
2S13	GR	0.10	82-08	Year round	Use by any motorized vehicle or other mechanical transport
2S32	GR	3.00	82-08	Year round	Use by any motorized vehicle or other mechanical transport
3N08	MW	4.00	80-07	Year round	Use by any motorized vehicle or other mechanical transport
3N09	MW	0.05	80-07	Year round	Use by any motorized vehicle or other mechanical transport
3N56Y	MW	0.75	80-07	Year round	Use by any motorized vehicle or other mechanical transport
3N86	MW	0.50	80-07	Year round	Use by any motorized vehicle or other mechanical transport
4N12M	SU	0.20	81-17	Year round	Use by any motorized vehicle or other mechanical transport
4N50Y	MW	3.00	80-07	Year round	Use by any motorized vehicle or other mechanical transport
4N70	SU	1.00	84-14	Year round	Use by any motorized vehicle or other mechanical transport
4N85	SU	3.00	84-14	Year round	Use by any motorized vehicle or other mechanical transport
4N88	SU	3.50	84-14	Year round	Use by any motorized vehicle or other mechanical transport
5N01Y	SU	8.80	77-05	Year round	Use by any motorized vehicle or other mechanical transport
5N01YA	SU	0.50	77-05	Year round	Use by any motorized vehicle or other mechanical transport
5N02Y	SU	5.00	77-05	Year round	Use by any motorized vehicle or other mechanical transport
5N03Y	SU	2.40	77-05	Year round	Use by any motorized vehicle or other mechanical transport
5N03YA	SU	0.70	77-05	Year round	Use by any motorized vehicle or other mechanical transport
5N06	SU	2.80	80-10	Year round	Use by any motorized vehicle or other mechanical transport
5N06Y	SU	0.50	81-17	Year round	Use by any motorized vehicle or other mechanical transport
5N10Y	SU	0.20	81-17	Year round	Use by any motorized vehicle or other mechanical transport
5N59Y	SU	0.50	81-17	Year round	Use by any motorized vehicle or other mechanical transport
5N92C	SU	1.25	82-30	Year round	Use by any motorized vehicle or other mechanical transport
Cedar	MW	NA	92-08	NA	OHVs must stay on designated OHV routes

Route	RD	MI	Order	Closure	Closure/Restriction
Ridge					

GR=Groveland; **MI**=Miles; **MW**=Mi-Wok; **OHV**=Off-Highway Vehicle; **RD**=Ranger District; **SU**=Summit

4. **Forest Plan Amendments:** none.

Alternative 3 (Cross Country Prohibited)

Alternative 3 responds to the administration and resource issues by prohibiting cross country travel without adding any new facilities to the NFTS. This alternative also provides a baseline for comparing the impacts of other alternatives that propose changes to the NFTS in the form of new facilities (roads and trails). None of the currently unauthorized routes would be added to the National Forest System under this alternative. Alternative 3 would not change the use of the NFTS and would not add any miles to the NFTS. Under this alternative the agency will prohibit cross country travel eliminating continued use of unauthorized routes. It would include seasonal closures on NFTS routes with existing closures and prohibit motorized access beyond existing NFTS routes.

1. **Cross Country Travel**: Motor vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length[2] off of NFTS routes unless otherwise prohibited.
2. **Additions to the NFTS**: No unauthorized routes would be added to the NFTS.
3. **Changes to the existing NFTS**: No changes are made to the NFTS (see Table 7) or existing closures and restrictions based on current Forest Orders (see Table 8).
4. **Forest Plan Amendments**: none.

Alternative 4 (Recreation)

Alternative 4 responds to the motorized recreation opportunities issue by providing additional routes and reducing restrictions. This alternative would maximize motorized recreation opportunities (including those accessing dispersed recreation activities thereby partially replacing the need for travel corridors).

1. **Cross Country Travel**: Motor vehicle travel off NFTS routes by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length[3] off of NFTS routes unless otherwise prohibited.
2. **Additions to the NFTS**: 177.35 miles of unauthorized routes would be added to the NFTS as trails. Appendix I of the EIS shows the specified vehicle class, season of use and required mitigations.
3. **Changes to the existing NFTS**: Vehicle class changes would occur on 370.89 miles of NFTS roads. Season of use on ***native surface routes*** based on elevation and wet weather closures on ***native surface routes*** replace existing closures and restrictions (see Table 8). All ***surfaced routes***, except WOS routes (see Table 3), are open year round. Appendix I (Route Data) shows the specified vehicle class, season of use and required mitigations.

   Vehicle Class: Table 9 shows vehicle class changes that would occur on 370.89 miles of NFTS roads including the following: opening 101.71 miles of closed roads; converting 2.47 miles of closed roads to administrative use only; closing to public use 10.66 miles of open roads; converting 99.52 miles of roads from highway legal only to all vehicles; and, converting 145.69 miles of roads from all vehicles to highway legal only. This alternative also converts 99.74 miles of the 370.89 miles of NFTS roads to trails (the mileage overlaps with the other changes described above and shown in Table 9).

[2] Vehicle Length equals the length of the vehicle along with the trailer it tows.
[3] Vehicle Length equals the length of the vehicle along with the trailer it tows.

Table 9. Vehicle Class Changes: Alternative 4

Existing↓	← Vehicle Class Changes To →								Total (miles)
	ADM[1]	ALL	ML1[1]	HLO	t-ALL	t-ATV	t-MC	t-4WD	
ALL	5.18	0.00	2.81	145.69	2.21	0.00	1.98	6.65	164.52
ML1[1]	2.47	12.08	0.00	0.73	74.48	2.09	2.34	10.00	104.18
HLO	2.66	99.52	0.00	0.00	0.00	0.00	0.00	0.00	102.19
Total	**10.32**	**111.60**	**2.81**	**146.41**	**76.69**	**2.09**	**4.32**	**16.65**	**370.89**

[1]**ADM** and **ML1** are closed to public motorized use

Season of Use: Except as allowed by permit or other authorization (i.e. WOS routes), NFTS motorized routes are open to motorized use during the season of use shown below, unless specifically prohibited. Roads open year round are not maintained for winter travel; however, they are available for over snow travel consistent with the vehicle class designation.

1. Lower Elevations Open year round
2. Middle Elevations Open April 1 – December 31
3. Upper Elevations Open April 1 – December 31

Wet Weather Closures: During the season of use, ***native surface routes*** are subject to wet weather closure when 1 inch of rainfall occurs in a 24 hour period and allowing for 72 hours of drying.

Wheeled Over-Snow Routes: WOS use is prohibited, except by ATVs when 12 inches or more of snow is present, on the routes listed in Table 3. These routes are dual designated as Snow Trails.

4. **Forest Plan Amendments:** includes the non-significant amendments shown in Tables 10, 11, and 12.

Table 10. Forest Plan Amendments: Alternative 4

Practice	Existing S&G	Amendment
Forestwide S&Gs		
Restricted Motor Vehicle Management [10-G-2, C1i2] (USDA 2005, p. 55-56)	Permit motor vehicle travel up to 100 feet from roads, routes and established travel ways for direct access to campsites, parking, woodcutting, or gathering forest products provided that: a. no resource damage occurs; and, b. such access is not otherwise prohibited.	Prohibit public wheeled motor vehicle travel off NFTS routes except as allowed by permit or other authorization. Allow parking within one vehicle length (vehicle and trailer) off of NFTS routes unless otherwise prohibited.

Table 11. Forest Plan Amendments: Alternative 4

Practice	Existing S&G	Amendment	Route	Miles
Forestwide S&G				
ROS Semi-primitive Non-motorized [10-B-2] (USDA 2005, p. 51)	Motorized use is normally prohibited.	Motorized use is normally prohibited, except for the routes identified in this table.	4N80Y 5N02R 1N09	0.20 1.50 3.50
Closed Motor Vehicle	Closed to motorized use.	Closed to motorized use	**total**	**5.20**

Practice	Existing S&G	Amendment	Route	Miles
Travel Management [10-G-1a] (USDA 2005, p. 51)		except for the routes identified in this table.		
Restricted Motor Vehicle Management [10-G-2, C1a] (USDA 2005, p. 55)	Prohibit motorized use and close motorized routes in non-motorized areas.	Prohibit motorized use and close motorized routes in non-motorized areas, except for the routes identified in this table.		
Wild and Scenic River				
ROS Semi-primitive Non-motorized [10-B-2] (USDA 2005, p. 105)	Manage to the ROS Class of Semi-primitive Non-motorized.	Manage to the ROS Class of Semi-primitive Non-motorized, except for the routes identified in this table.		
Closed Motor Vehicle Travel Management [10-G-1] (USDA 2005, p. 105)	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management.	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management, except for the routes identified in this table.		
Near Natural				
ROS Semi-primitive Non-motorized [10-B-2] (USDA 2005, p. 110)	Manage to ROS Class of SPNM.	Manage to ROS Class of SPNM, except for the routes identified in this table.		
Closed Motor Vehicle Travel Management [10-G-1] (USDA 2005, p. 110)	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management.	Manage to Forestwide S&Gs for Closed Motor Vehicle Travel Management, except for the routes identified in this table.		

Table 12. Forest Plan Amendments: Alternative 4

Practice	Existing S&G	Amendment	Route	Miles
Forestwide S&Gs				
Restricted Motor Vehicle Management [10-G-2, B3a4c1] (USDA 2005, p. 52)	In areas adjacent to waters with known populations of western pond turtle: Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist.	In areas adjacent to waters with known populations of western pond turtle: Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist except for the routes identified in this table.	17EV192	0.63
			17EV192A	0.06
			17EV192B	0.15
			17EV194	0.39
			17EV195	0.50
			17EV196	0.19
			17EV197	0.35
			17EV197	0.46
			17EV197A	0.05
			17EV901	0.37
			1S1727	0.87
			1S17E35B	0.34
			1S17M	1.13

Practice	Existing S&G	Amendment	Route	Miles
			1S1902	0.24
			1S1907A	0.39
			1S1929	0.15
			1S1929C	0.19
			FR8516	0.05
			FR8601	0.47
			FR10178	0.64
			FR98482	0.06
			FR98486	0.21
			FR98504	0.07
			FR98508	0.06
			FR98509	0.03
			FR98510	0.04
			FR98511	0.15
			FR98513	0.03
			FR98514	0.04
			FR98515	0.09
			FR98520	0.03
			FR98537	0.09
			FR98539	0.10
			FR98541	0.07
			FR98548	0.04
			FR98554	0.04
			FR98560	0.06
			FR98566	0.05
			FR98575	0.13
			FR98599	0.04
			total	**9.05**

Alternative 5 (Resources)

Alternative 5 responds to the administration, private property, recreation and resource issues by limiting additions to the NFTS and increasing restrictions that would reduce conflicts and provide additional resource protection. This alternative would limit motorized recreation opportunities (including those accessing dispersed recreation activities) by providing greater protection for forest resources.

1. **Cross Country Travel**: Motor vehicle travel off NFTS roads and NFTS trails by the public would be prohibited except as allowed by permit or other authorization. Parking is allowed within one vehicle length[4] off of NFTS routes unless otherwise prohibited.
2. **Additions to the NFTS**: 28.91 miles of unauthorized routes would be added to the NFTS as trails. Appendix I of the EIS shows the specified vehicle class, season of use and required mitigations.
3. **Changes to the existing NFTS**: Vehicle class changes would occur on 531.16 miles of NFTS roads. Season of use on ***all routes*** based on elevation and wet weather closures on ***native surface routes*** replace existing closures and restrictions (see Table 8). Appendix I shows the specified vehicle class, season of use and required mitigations.

Vehicle Class

[4] Vehicle Length equals the length of the vehicle along with the trailer it tows.

Table 13 shows vehicle class changes would occur on 531.16 miles of NFTS roads including: opening 11.66 miles of closed roads; converting 5.42 miles of closed roads to administrative use only; closing to public use 59.03 miles of open roads; and, converting 440.94 miles of roads from all vehicles to highway legal only. This alternative also converts 21.51 miles of the 531.16 miles of NFTS roads to trails (the mileage overlaps with the other changes described above and shown in Table 13).

Table 13. Vehicle Class Changes: Alternative 5

Existing↓	← Vehicle Class Changes To →								Total (miles)
	ADM[1]	ALL	ML1[1]	HLO	t-ALL	t-ATV	t-MC	t-4WD	
ALL	27.37	0.00	28.99	440.94	5.77	0.00	1.69	6.65	511.41
ML1[1]	5.42	2.88	0.00	1.44	5.52	1.82	0.00	0.00	17.08
HLO	2.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.66
Total	**35.46**	**2.88**	**28.99**	**442.38**	**11.29**	**1.82**	**1.69**	**6.65**	**531.16**

[1]**ADM** and **ML1** are closed to public motorized use

Season of Use: Except as allowed by permit or other authorization, NFTS motorized routes are open to motorized use during the season of use shown below, unless specifically prohibited. Roads open year round are not maintained for winter travel; however, they are available for over snow travel consistent with the vehicle class designation.

1. Lower Elevations Open year round
2. Middle Elevations Open April 15 – November 15
3. Upper Elevations Open May 15 – November 15

Wet Weather Closures: During the season of use, ***native surface routes*** are subject to wet weather closure when 1 inch of rainfall occurs in a 24 hour period and allowing for 72 hours of drying.

Wheeled Over Snow Routes: none.

4. **Forest Plan Amendments:** includes the non-significant amendments shown in Table 14.

Table 14. Forest Plan Amendments: Alternative 5

Practice	Existing S&G	Amendment
Forestwide S&Gs		
Restricted Motor Vehicle Management [10-G-2, C1i2] (USDA 2005, p. 55-56)	Permit motor vehicle travel up to 100 feet from roads, routes and established travel ways for direct access to campsites, parking, woodcutting, or gathering forest products provided that: a. no resource damage occurs; and, b. such access is not otherwise prohibited.	Prohibit public wheeled motor vehicle travel off NFTS routes except as allowed by permit or other authorization. Allow parking within one vehicle length (vehicle and trailer) off of NFTS routes unless otherwise prohibited.

Mitigation and Other Requirements Common to All Alternatives

Appendix I of the EIS (Route Data) lists routes with mitigations and other requirements by alternative, while the specific mitigations and requirements are further defined in Appendix F of the EIS (Maintenance and Mitigation Definitions). Specific mitigations must be completed prior to designation of the route for public motorized use.

Mitigation Measures

Mitigation activities may use one or more of the following hand tools or mechanized equipment depending on route location and accessibility:

- Mechanized equipment: ATV, auger, chainsaw, compactor, pole saw, rock rake, tractor, trailer, etc.
- Hand tools: hand saw, McLeod, pick, posthole digger, pruning shear, rake, shovel, etc.

The following mitigation measures apply to the action alternatives:

1. **Annual Maintenance**: maintenance and repair of a route annually due to less favorable soil type, steeper tread gradient, and/or higher trail use.
2. **Boardwalk**: trail tread reinforcement structure resembling a low bridge and constructed over wet or otherwise unstable soil.
3. **Cattleguard**: motorcycle/ATV cattleguard (width 60 inches or less) installed along existing fence line, causing minimal ground disturbance as structure requires leveling of surface only.
4. **Combined Use Sign Plan**: prepare and implement sign plan for identified portions of high standard (passenger car) roads for Combined Use by highway legal and non-highway legal vehicles.
5. **Drain Dips**: Constructed erosion control technique which reverses the grade of a trail for a distance of 15-20 feet before returning to the prevailing grade. The change in grade forces water to run off the trail surface rather than gaining additional velocity and volume. Hardened drain dips include additional tread hardening.
6. **Fence Barrier**: wood fence constructed using 4 to 6 inch vertical posts with horizontal rails bolted through posts, 30 inches above ground surface. Requires digging up to 8 inch wide by 24 inch deep hole for installation of post.
7. **Full Bench**: trail resting entirely on an excavation into a steep side slope, no fill is used to support the trail.
8. **Log Barrier**: logs placed in a shallow trench along a travel way restricting vehicle traffic to desired locations.
9. **Low Impact Barrier**: low resource impact, vehicle barrier constructed by placing full-length railroad ties on top of 24 inch ties, held in place by driving rebar through ties into ground approximately 24 inches. Requires no digging of holes, but sometimes leveling of ground is required for placement.
10. **Mixed Use Sign Plan**: prepare and implement sign plan for identified portions of certain (high clearance) roads available for use by both highway legal and non-highway legal motor vehicles.
11. **No Vehicles Sign**: small standard traffic signs posted alongside routes to control and direct traffic.
12. **Padding**: fabric placed on native surface and covered with a layer of soil to protect sensitive resources.
13. **Rock Barrier**: large rock boulders, usually 36 to 48 inch diameter, placed in shallow holes along a travel way to restrict vehicle traffic to desired locations.
14. **Tread Harden**: tread or stream crossing treatment using concrete blocks, geosynthetics, logs, mechanical compaction, rock ballast, soil cement or timbers to protect the trail surface.
15. **Waterbars**: constructed log, rock or soil berm that diverts water from the trail tread.

Other Requirements

The following requirements apply to the action alternatives:

1. **RLF Surveys**: conduct surveys to determine presence/absence of the California red-legged frog (CRLF) using the FWS protocol.
2. **RLF FWS Consultation**: further Forest Service consultation with the FWS to comply with Section 7 of the Endangered Species Act, if CRLF are found in the surveys and if the determination is that the alternative may adversely affect the CRLF.
3. **SHPO Consultation**: Forest Service consultation with the State Historic Preservation Officer (SHPO) to comply with Section 106 of the National Historic Preservation Act.

5. ASSUMPTIONS

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

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

6. EFFECTS OF THE PROJECT ALTERNATIVES

General Effects

The use of a variety of motorized wheeled vehicles has become an increasingly popular form of recreation on National Forest System lands. As it has become more popular, vast improvements in technology have also been incorporated into the sport, resulting in more powerful vehicles that are capable of cross-country travel in more areas. Large increases in the number of users and improved vehicles have resulted in the proliferation of routes throughout many National Forests, including the Stanislaus. Route proliferation and the use of motorized wheeled vehicles have a broad range of direct and indirect effects on terrestrial and aquatic wildlife. The direct and indirect effects of motorized use on wildlife can be placed in three general categories: (1) human-caused mortality, (2) changes in behavior, and (3) habitat modification (Gaines et al. 2003). These categories were further broken down in Gaines et al. (Ibid.) into specific effects that were documented in the literature (Table 15). The project alternatives may result in these effects through five types of actions: (1) prohibiting cross-country travel, (2) adding a motorized route that is currently unauthorized to the transportation system, (3) changing the type of use associated with an existing route, (4) changing the season of use associated with an existing route, or (5) implementing mitigation measures.

Table 15. Road and trail associated factors with documented effects on habitat or populations of wildlife species and the effected wildlife species group.

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

Human-caused Mortality: Death or injury from a vehicle hitting or running over an animal is well documented and affects the vast majority of terrestrial species, though to varying degrees (Trombulak and Frissell 2000). In general, road mortality increases with traffic volume and speed, and road kill on native surface forest roads is generally not significant for large mammals. Small mammals and herpetofauna (reptiles and amphibians) are more vulnerable because individuals

are inconspicuous and slow-moving. Amphibians may be especially vulnerable to road mortality because their life histories often involve migration between wetland and upland habitats (Ibid.). Raptors may also be vulnerable to collisions on forest roads due to their foraging behaviors, but the most substantial documented mortality has been along highways.

Changes in Behavior (displacement or avoidance, impacts on breeding behavior, and physiological impacts): Frid and Dill (2002) cite the assumption that that wildlife exhibit a predator-avoidance response when they become non-lethally disturbed by humans. When a motorized vehicle or human triggers a predator-avoidance response in an individual, it may directly or indirectly affect that individual's fitness. Direct effects of disturbance to an individual's fitness are commonly measured through increases in stress hormone levels. Significant increases in stress hormone levels have been found to reduce reproductive success of individuals of some species. The indirect effects of disturbance are commonly displayed through changes in an individual's time and energy budget. As a vehicle or human approaches an individual, the most obvious and common disturbance response is for that individual to avoid the threat and seek cover. After an individual exhibits the disturbance response, a period of time will elapse until that individual resumes pre-disturbance behavior. Since this change in an individual's time budget may result in less time feeding or resting (fitness-enhancing activities), the disturbance may result in changes to the individual's energy budget and potentially impact their fitness. If an individual is repeatedly disturbed in an area, they may eventually avoid the area; essentially being displaced from the habitat.

Gaines et al. (2003) reviewed literature on road- and trail-associated effects upon wildlife and found that alteration of use of habitats in response to roads or road networks was the most common interaction reported. Fifty to sixty percent of the 29 focal species reviewed were impacted in this manner (Gaines et al. 2003). Studies have documented shifts in an animal's home range area, shifts in foraging patterns, and disturbance of nesting or breeding behaviors resulting from motorized road or trail use and associated increased human recreation activity facilitated by motorized access (Foppen and Reijnen 1994, Johnson et al. 2000, Rost and Bailey 1979). Recreation activities (hiking, camping, fishing, shooting, etc.) that are associated with the access provided by motorized routes, result in indirect disturbance and displacement effects that often exceed the direct influence of the roads and trails. Many species avoid areas in proximity to roads or trails, or exhibit flight behavior within a certain distance of route use, though studies documenting the magnitude and duration of behavioral responses are limited. Road usage by vehicles has a significant role in determining an animal's road avoidance behavior. Black bear, for example, crossed roads with low traffic volume more frequently than roads with high traffic volume, and almost never crossed interstate highways (Brody and Pelton 1989). Perry and Overly (1977) documented displacement of deer up to 800 meters (approximately 0.5 mile) from major roads, and from 200 to 400 meters (approximately 0.125 to 0.25 mile) from secondary and primitive roads. Van Dyke et al. (1986) documented that mountain lions avoided improved native surface roads and surfaced roads, and selected home range areas with lower road densities than the study area average. Activities that create elevated sound levels or result in close visual proximity of human activities at sensitive locations (e.g., nest trees), have the potential to disrupt normal behavior patterns. Studies of the effects of human disturbance upon wildlife have revealed that the immediate postnatal period in mammals and the breeding period in birds are time periods when individuals are most vulnerable to disturbance. Intrusion-induced behaviors such as nest abandonment and decreased nest attentiveness have led to reduced reproduction and survival in species that are intolerant of intrusion (Knight and Gutzwiller 1995). Foppen and Reijnen (1994), for example, found that the reproductive success of forest bird species declined in areas fragmented by roads. Anthony and Isaacs (1989) found that the mean productivity of bald eagle nests was negatively correlated with their proximity to main logging roads, and the most recently used nests were located in areas farther from all types of roads and recreational facilities when compared to older nests in the same territory. Wasser et al. (1997) found that stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located less than 0.25 miles from a major logging road compared to spotted owls in areas greater than 0.25 miles from a major logging road. Chronic high levels of stress hormones may have

negative consequences on reproduction or physical condition of birds, though these effects are not well understood.

Habitat Modification (habitat loss, fragmentation, edge effects, snag and down log reduction, routes for competitors, movement barriers)**:** Road and trail networks remove habitat but also have a broader effect than just the conversion of a small area of land to route surfaces. Andren (1994) suggested that as landscapes become fragmented, the combination of increasing isolation and decreasing patch size of suitable habitat is negatively synergistic, compounding the effects of simple habitat loss. In particular, species associated with old forest habitats may be impacted by such effects. One study determined that the total landscape area affected by roads was 2.5 to 3.5 times the actual area occupied by the road feature, assuming a 50-meter (approximately 164-foot) influence along the road's edge (Reed et al. 1996). A decrease in interior forest patch size results in habitat loss and greater distance between suitable interior forest patches for sensitive species like the California spotted owl and American marten. As roads and trails break up forest patches, this may increase nest predation and parasitism rates by species such as jays or cowbirds (Miller et al. 1998), or provide increased access for generalist competitors or predators, such as coyotes (Buskirk and Ruggiero 1994).

Additional habitat modification occurs as an indirect effect of managing roads or trails for public wheeled motor vehicle use. Trees posing a potential safety hazard ("hazard trees") are removed along Maintenance Level 2, 3, 4 and 5 roads (not along Maintenance Level 1 roads and rarely alo9ng trails). These trees are typically snags that are within a tree-height distance from the road. This safety policy results in a "snag free" zone of 200 to 300 feet from a road's edge, also affecting the recruitment of large down wood within this zone.

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

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

- The prohibition of cross-country travel;
- Adding facilities (presently unauthorized roads, trails, and/or areas) to the NFTS;
- Changing the type of use on an existing NFTS route;
- Changing the season of use on the NFTS;
- Implementation of mitigation measures.

Terrestrial Wildlife

Threatened and Endangered Species

Valley Elderberry Longhorn Beetle, *Desmocerus californicus dimorphus*

Species and Habitat Account

The valley elderberry longhorn beetle (VELB) occurs primarily in the lower Sacramento River and upper San Joaquin Valley, and their range extends as far north as Redding, south to Kern County and into the foothills on either side of the Valley (Barr 1991, USDI 1984). FWS surveys resulted in locating VELB in Sierra Nevada foothill river canyons as high as 3,000 feet in elevation (Ibid). Comprehensive surveys for VELB or their habitat have not occurred on the STF, but numerous surveys have been completed for site-specific analysis of other projects below 3000 feet in elevation. Their presence has been detected on the STF.

General habitat for VELB is considered moist valley oak woodlands and riparian areas, as well as upland river canyons (USDI 1984). VELB is an herbivore that specializes on elderberry shrubs (*Sambucus mexicana* and *S. racemosa*). The majority of its life is spent as larvae inside elderberry stems. Individual beetles rely on the same plant throughout their life cycle, and because of their limited dispersal capability, they are considered to occur almost exclusively where its host plant occurs (Barr 1991). Elderberry shrubs are sparsely distributed in the analysis area, and thus provide limited suitable habitat for VELB.

Management Direction

On August 8, 1980, the VELB was listed as a threatened species (Federal Register 1980). Critical habitat was also designated at this time, but does not occur on the STF. PDC for route designation were determined through a programmatic consultation with the FWS. If the routes proposed for designation follow the PDC, no further consultation with the FWS is required. PDC for VELB are the following:

- Staging areas are not within 100 feet of occupied VELB sites or suitable habitat of elderberry plants containing stems measuring 1.0 inches or greater in diameter at ground level.
- Routes or areas are not within 20 feet of occupied VELB sites or suitable habitat of elderberry plants containing stems measuring 1.0 inches or greater in diameter at ground level.

Direct & Indirect Effects

General - All Alternatives

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

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

The project alternatives would not add any staging areas to the NFTS. Therefore, routes are the only facility being added to the NFTS that may have adverse impacts to the VELB. These actions may have direct and indirect effects on these VELB through human-caused mortality and habitat modification.

Human-Caused Mortality: Allowing motorized travel near occupied or suitable habitat may result in inadvertent crushing of VELB. Since all suitable habitat was not surveyed for occupancy, all suitable habitat is assumed occupied.

Habitat Modification: Allowing cross-country travel or authorizing routes at less than 3000 feet in elevation would result in soil surface perturbation and soil compaction under the tread of the vehicle tires, potentially preventing the growth of elderberry plants.

Indicators

The following indicators were chosen to provide a relative measure of the direct and indirect effects to the VELB and to determine if the project alternatives would comply with FWS PDC. Thresholds for one of these indicators were established by the FWS PDC (see above).

- Miles of routes added to the NFTS under 3000 feet in elevation.
- Number of elderberry plants (with stems greater than 1 inch) observed in field surveys within 20 feet of routes added to the NFTS.

Alternative 1

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near suitable VELB habitat. This would reduce the risk of direct and indirect effects to the VELB from motorized travel over the short and long term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: This alternative would add approximately 9.69 miles of routes to the NFTS under 3000 feet in elevation (Table 16). Field surveys were completed on these routes during the spring/summer of 2008. Results from these surveys indicate that there would not be any routes added to the NFTS within 20 feet of suitable VELB habitat (Table 16). Therefore, there would not likely be any direct or indirect effects to the VELB from additions to the system. Changing the type of use on routes would have no effect on VELB habitat.

Table 16. Valley Elderberry Longhorn Beetle: Direct and Indirect Effects Indicators - Alternative 1

Alternative 1 - Valley Elderberry Longhorn Beetle - Direct and Indirect Effects Indicators	
Miles of routes added to the NFTS under 3000 feet in elevation	9.69
Number of elderberry plants (with stems greater than 1 inch) observed in field surveys within 20 feet of routes added to the NFTS.	0

Season of Use: Seasonal closures would primarily be implemented at higher elevations (as identified for each route in Appendix I of the STF Travel Management EIS) within the project area and would not likely have any direct or indirect effects to the VELB.

Mitigation Measures: The types of mitigation measures that would be implemented under 3000 feet in elevation include the following: tread hardening, drain dips, fence/log/rock barriers, and hardened stream crossings. Implementation of these mitigation measures would include hand tool and machine work that would occur within the current trail tread of routes being added to the NFTS. Since there was not any suitable VELB habitat identified within 20 feet of any routes being added to the NFTS, the implementation of mitigation measures would not have any direct or indirect effects.

Alternative 2

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would not be prohibited. Therefore, it is assumed that wheeled motorized vehicles would continue to use all of the documented unauthorized routes previously identified and continue to create new routes over the long term. Since all unauthorized routes within the project area have not been surveyed for the presence of suitable VELB habitat, that habitat is assumed occupied. The use of these routes and the continued proliferation of new routes would likely result in disturbance to suitable VELB habitat and would not comply with the FWS PDC.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Seasonal closures would not likely have any direct or indirect effects on the VELB.

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

Alternative 3

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within VELB habitat. This would reduce the risk of direct and indirect effects to the VELB from motorized travel over the short and long term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Seasonal closures would not likely have any direct or indirect effects to the VELB.

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

Alternative 4

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near suitable VELB habitat. This would reduce the risk of direct and indirect effects to the VELB from motorized travel over the short and long-term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: This alternative would add approximately 10.22 miles of routes to the NFTS under 3000 feet in elevation (Table 17). Field surveys were completed on these routes during the spring/summer of 2008. Results from these surveys indicate that there would not be any routes added to the NFTS within 20 feet of suitable VELB habitat (Table 17). Therefore, there would not likely be any direct or indirect effects to the VELB from additions to the system. Changing the type of use on routes would have no effect on VELB habitat.

Table 17. Valley Elderberry Longhorn Beetle: Direct and Indirect Effects Indicators - Alternative 4

Alternative 4 - Valley Elderberry Longhorn Beetle - Direct and Indirect Effects Indicators	
Miles of routes added to the NFTS under 3000 feet in elevation	10.22
Number of elderberry plants (with stems greater than 1 inch) observed in field surveys within 20 feet of routes added to the NFTS.	0

Season of Use: Seasonal closures would primarily be implemented at higher elevations (as identified for each route in Appendix I of the STF Travel Management EIS) within the project area and would not likely have any direct or indirect effects to the VELB.

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

Alternative 5

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near suitable VELB habitat. This would reduce the risk of direct and indirect effects to the VELB from motorized travel over the short and long-term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: This alternative would add approximately 2.38 miles of routes to the NFTS under 3000 feet in elevation (Table 18). Field surveys were completed on these routes during the spring/summer of 2008. Results from these surveys indicate that there would not be any routes added to the NFTS within 20 feet of suitable VELB habitat (Table 18). Therefore, there would not likely be any direct

or indirect effects to the VELB from additions to the system. Changing the type of use on routes would have no effect on VELB habitat.

Table 18. Valley Elderberry Longhorn Beetle: Direct and Indirect Effects Indicators - Alternative 5

Alternative 5 - Valley Elderberry Longhorn Beetle - Direct and Indirect Effects Indicators	
Miles of routes added to the NFTS under 3000 feet in elevation	2.38
Number of elderberry plants (with stems greater than 1 inch) observed in field surveys within 20 feet of routes added to the NFTS.	0

Season of Use: Seasonal closures would primarily be implemented at higher elevations (as identified for each route in Appendix I of the STF Travel Management EIS) within the project area and would not likely have any direct or indirect effects to the VELB.

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

Cumulative Effects

Appendix B (STF Travel Management EIS) provides a list and description of past, present, and reasonably foreseeable projects on the STF and on private lands within the forest boundary. Some, but not all, of these activities will likely contribute to effects upon the VELB. Primary factors likely impacting VELB habitat within the project area include the following: (1) loss of suitable habitat from wildfire; (2) loss or modification of suitable habitat from fuels/vegetation treatments; and (3) livestock grazing.

Based on GIS analysis, 14 wildfires have burned at or below 3000 feet in elevation since 2000. Past timber harvest and more recent fuels reduction treatments have been completed at various locations throughout the Forest. A GIS analysis indicated that from 2000 to 2008, less than 1% of all land below 3000 feet within the project area were treated with vegetation/fuels thinning projects. Although these vegetation treatments may reduce the amount of suitable habitat, mitigation measures and project design criteria have been used to reduce or eliminate short-term adverse effects from these treatments. Vegetation/fuels reduction projects will continue to be one of the primary activities affecting suitable VELB habitat on the STF (Appendix B STF Travel Management EIS). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Some, but not all, of them may affect the VELB but will be implemented with mitigation measures designed to reduce the adverse effects. Furthermore, past, present and future thinning treatments will likely reduce the risk of stand replacing wildfire over the long-term; providing long-term beneficial effects.

The California Department of Forestry and Fire Protection currently lists approximately 2,365 acres of private land within the STF administrative boundary for which timber harvest plans have been submitted. The portion of these projects occurring near suitable VELB habitat has not been determined.

Livestock grazing occurs on 35 active grazing allotments on the STF, totaling approximately 792,042 acres of NFS and private lands. On the STF, the impacts of livestock grazing on riparian area habitats has been steadily decreasing as forage utilization levels are being reduced by stricter standards established by the Sierra Nevada Forest Plan Amendment.

Alternatives 1, 3, 4, and 5 would be unlikely to have any adverse direct or indirect effects to the VELB. The prohibition on cross-country travel would have a positive effect. Therefore, these alternatives would reduce the cumulative adverse effects for this species. Since there would not be a prohibition on cross-country travel under Alternative 2, this alternative would likely result in additional direct and indirect effects to the VELB through human-caused mortality and habitat modification.

Determinations

Alternative 1

Cross-country travel would be prohibited, there would not be any staging areas added, and there was not any suitable VELB habitat identified within 20 feet of routes being added to the NFTS. Prohibiting cross-country travel would reduce potential impacts to suitable VELB habitat over the short and long term.

Therefore, this alternative would be consistent with FWS PDC

.It is my determination that Alternative 1 *"May affect, but is not likely to adversely affect"* the valley elderberry longhorn beetle.

Alternative 2

This alternative would not prohibit cross-country travel. All unauthorized routes would continue to be used within the project area. All unauthorized routes were not surveyed for suitable VELB habitat and it is likely that routes would continue to be proliferated near suitable over the long-term.

Therefore, this alternative would be inconsistent with FWS PDC.

It is my determination that Alternative 2 *"May affect, and is likely to adversely affect"* the valley elderberry longhorn beetle

Alternative 3

Cross-country travel would be prohibited and there would not be any motorized routes added to the NFTS in this alternative. Prohibiting cross-country travel would reduce potential impacts to suitable VELB habitat over the short and long term.

This alternative would be consistent with FWS PDC

It is my determination that Alternative 3 *"May affect, but is not likely to adversely affect"* the valley elderberry longhorn beetle.

Alternative 4

Cross-country travel would be prohibited, there would not be any staging areas added, and there was not any suitable VELB habitat identified within 20 feet of routes being added to the NFTS. Prohibiting cross-country travel would reduce potential impacts to suitable VELB habitat over the short and long term.

This alternative would be consistent with FWS PDC

It is my determination that Alternative 4 *"May affect, but is not likely to adversely affect"* the valley elderberry longhorn beetle.

Alternative 5

Cross-country travel would be prohibited, there would not be any staging areas added, and there was not any suitable VELB habitat identified within 20 feet of routes being added to the NFTS. Prohibiting cross-country travel would reduce potential impacts to suitable VELB habitat over the short and long term.

This alternative would be consistent with FWS PDC

It is my determination that Alternative 5 *"May affect, but is not likely to adversely affect"* the valley elderberry longhorn beetle.

Sensitive Species

American Marten, *Martes americana*

Species and Habitat Account

The American marten is a wide-ranging member of the *Mustelidae* family. Marten are widely distributed throughout the coniferous habitats of North America and currently occupy much of their historic range in California (Kucera et al. 1995). Incidental observations of marten have been recorded throughout the higher elevations of the STF. Marten are morphologically adapted to be mobile in deep snow, and typically inhabit higher elevations receiving snow depths greater than 23 centimeters (approximately 9.1 inches) per winter month (Krohn et al. 1997). Numerous mesocarnivore surveys have been completed on the STF with the use of baited camera stations and track plates. Results of these further indicate that marten use higher elevations within the project area. Marten were not found at survey stations below 5000 feet in elevation and the majority of them were above 7000 feet. Although the presence of marten has been documented within the project area, there are no known den sites on STF.

Martens typically prefer late seral coniferous forests above 5,000 feet in elevation that have moderate- to high-canopy closure interspersed with riparian areas and meadows (Freel 1991, Zeiner et al. 1990b). These habitats typically contain an abundance of snags and downed logs needed to provide the coarse woody debris that is necessary for effective winter foraging (Sherburne and Bissonette 1994). Marten den in cavities in large trees, snags, stumps, or logs or burrows, caves, and crevices in rocky areas (Zeiner et al. 1990b). Important habitat attributes are the following: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1987). In one study, martens were found to select stands with 40 to 60 percent canopy closure for both resting and foraging and avoided stands with less than 30 percent canopy closure (Spencer et al. 1983). Martens generally avoid habitats that lack overhead cover, presumably because these areas do not provide protection from avian predators (Allen 1982, Buskirk and Powell 1994, Spencer et al. 1983). Although martens tend to spend the majority of their time in mature forests, meadows are important component of foraging habitat. Spencer et al. (1983) found that marten preferred areas within 60 meters (approximately 200 feet) of meadows and were rarely found further than 400 meters (approximately ¼ mile) from a meadow. For the purposes of this analysis, preferred marten habitat on the STF has been mapped as follows: California Wildlife Habitat Relationships (CWHR) types PPN, SMC, WFR, RFR; classes 5 and 6; canopy closures M and D (USDA 2007b). There are approximately 143,100 acres of marten habitat on the STF.

Management Direction

The American marten was identified by the Regional Forester as a Sensitive Species and Management Indicator Species (MIS) on the STF (USDA 2007a, USDA 2007b). The FSEIS amended the STF Forest Plan with updated guidelines for managing furbearers, including the marten (USDA 2004). The Forest Plan Direction contains the following management direction associated with the proposed project for marten:

- Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (particularly fisher and marten) in biological evaluations.
- Mitigate impacts where there is documented evidence of disturbance to the den site from existing recreation, off-highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes, and recreational and other developments for their potential to disturb den sites.

Direct & Indirect Effects

General – All Alternatives

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

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

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

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

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

While there is little research disclosing the specific effects of disturbance to marten den sites, other forest carnivores have been shown to abandon the den site upon human disturbance (Copeland 1996). Wet meadows have been shown to be particularly important foraging areas for marten (USDA 2001). Routes added to the NFTS near and through meadows may increase disturbance within the meadow, thereby reducing the meadow's value as a foraging habitat for martens.

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

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

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

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

Indicators

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

- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, highway-legal-only {HLO} roads, all-vehicle trails, all-terrain-vehicle {ATV} trails, motorcycle {MC} trails, or four-wheel-drive {4WD} trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within preferred marten habitat.
- Net change from existing NFTS in miles of routes within meadows.
- Existing density (mi/mi^2) of NFTS routes within preferred marten habitat (outside wilderness areas).
- Density (mi/mi^2) of NFTS routes within preferred marten habitat (outside wilderness areas) with proposed designated routes.
- Net change from existing NFTS in percentage of preferred marten habitat occurring within a 400 meter “zone of influence” (percentage of preferred marten habitat occurring within a 400 meter “zone of influence” of routes added to the NFTS PLUS percentage of preferred marten habitat occurring within a 400 meter “zone of influence” of routes converted from closed to open status MINUS percentage of preferred marten habitat occurring within a 400 meter “zone of influence” of routes converted from open to closed status)

Alternative 1

<u>Cross-Country Travel</u>: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred marten habitat and near meadows. This would reduce the risk of direct and indirect effects to martens from motorized travel over the short and long term.

<u>Additions to the NFTS or Changes to the Existing NFTS</u>: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 20). Actions proposed in this alternative would not likely result in any human-caused mortality, but would likely increase disturbance to some marten within the project area. Although there are no documented den sites within the project area, it is assumed that they occur. The routes already exist on the ground, den sites are specifically selected by individuals of the species, and, as verified by field review for this and other projects, there are many suitable denning locations throughout the

project area. So individuals can select and perhaps already have selected den sites that are not disturbed by motor vehicle travel.

Table 20. American Marten: Direct and Indirect Effects Indicators - Alternative 1

Indicators	
Net change from existing NFTS in miles of routes within preferred marten habitat[1]	+ 29.37
Net change from existing NFTS in miles of routes within meadows[1]	+ 0.83
Existing density (mi/mi^2) of open NFTS routes within preferred marten habitat	1.94
Density (mi/m^{l2}) of open NFTS routes within preferred marten habitat with proposed designated routes (additional density)	2.08 (+ 0.15)
Net change from existing NFTS in percentage of preferred marten habitat occurring within a 400 meter "zone of influence" [2]	9.13%

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

[2] Percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

The disturbance from the existing NFTS is on-going. Disturbance to martens may reduce some individuals' fitness, but, since only about 9% of the habitat would be subject to a net increase over the existing NFTS (Table 20), these impacts would not result in any population level impacts to the marten.

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

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

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

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

3.10 Water Resources), and therefore meadow habitat. Because of the low level of disturbance and the relatively minor improvements to marten habitat, the mitigation measures would not result in any population level impacts within the project area.

Alternative 2

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. Approximately 143,100 acres of preferred marten habitat are open to cross-country travel.

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although any seasonal closures implemented within this alternative would somewhat reduce potential disturbance to marten, these seasonal closures would not adequately protect all meadows from mechanical damage that may occur since cross-country travel would be allowed. Therefore, it may be assumed that hydrology within some meadows may be affected and that it may result in impacts to marten prey base.

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

Alternative 3

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to marten to a certain extent.

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

Alternative 4

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 21). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the net change in the NFTS system within preferred marten habitat and within meadows, there would be a slight increase in the direct and indirect effects to marten within the project area. This alternative would result in a net increase over the existing NFTS of about 11% of preferred marten habitat lying within a 400-meter (¼-mile) zone of influence (Table 21). Although these increases would result in more individuals being impacted, they would not likely be significant enough to result in impacts to marten populations within the project area.

Table 21. American Marten: Direct and Indirect Effects Indicators - Alternative 4

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

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

[2] Percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

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

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

Alternative 5

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 21). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a substantial decrease from Alternative 1 in the net change to the NFTS within preferred marten habitat and within meadows, there would be a substantial decrease in the direct and indirect effects to marten within the project area. These impacts would affect only about 1% less of marten habitat than under the existing NFTS (Table 21), these actions would

likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Table 21. American Marten: Direct and Indirect Effects Indicators - Alternative 5

Indicators	
Net change from existing NFTS in miles of routes within preferred marten habitat[1]	-- 5.94
Net change from existing NFTS in miles of routes within meadows[1]	+ 1,33
Existing density (mi/mi^2) of open NFTS routes within preferred marten habitat	1.94
Density (mi/m^{l2}) of open NFTS routes within preferred marten habitat with proposed designated routes (additional density)	1.91 (-- 0.03)
Net change from existing NFTS in percentage of preferred marten habitat occurring within a 400 meter "zone of influence" [2]	-- 0.92%

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

[2] Percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of preferred marten habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

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

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

Cumulative Effects

In 2001 and 2004, the Forest Service amended 11 Sierra Nevada Forest Plans to better address the needs of old forest-associated species (USDA 2001 and 2004). In this assessment, the following key risk factors were identified for marten in the Sierra Nevada: (1) habitat alteration, particularly the removal of overhead cover, large diameter trees, or coarse woody material; (2) livestock grazing and other activities that might reduce the availability of prey in meadows; and (3) the use of roads and associated human access. Appendix B provides a list and description of past, present, and reasonably foreseeable vegetation and fuels management projects on NFS lands and private lands within the STF boundary. Some, but not all, of these activities have contributed to effects on marten and have the potential to impact marten in the near future.

On the STF, several activities have influenced these risk factors for marten. Past timber harvest and more recent fuels reduction treatments have reduced important habitat components in marten habitats. Between 2000 and 2008, vegetation/fuels thinning treatments on NFS lands have occurred within less than 5% of marten habitat. These vegetation treatments have reduced habitat quality for marten by reducing canopy cover, structural complexity, and coarse woody material within treated units. At the larger landscape scale, these treatments may affect the size and connectivity of patches of high quality habitat. Vegetation/fuels reduction projects will continue to be one of the primary activities affecting marten habitat on the STF (Appendix B). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Some, but not all of the projects will affect marten habitat. Over time, fuels treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat removed by stand replacing wildfires will be reduced in response to these treatments (USDA 2004).

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

Livestock grazing occurs on 35 active grazing allotments on the STF, totaling approximately 792,042 acres of NFS and private lands. In some meadows, livestock grazing has reduced the suitability of meadow vegetation for microtine rodents and other marten prey (USDA 2001). On the STF, the impacts of livestock grazing on meadows has been steadily decreasing as fewer allotments are grazed and as forage utilization levels are being reduced by stricter standards established by the SNFPA. These past and present effects contribute to the effects of the project alternatives on meadow habitat and condition.

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

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

Direct and indirect effects of the project alternatives, as described previously, cumulatively contribute to each of the risk factors identified for marten. Table 22 shows the total drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would cause the most disturbance to individuals. Because Alternative 2 does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon marten. Alternatives 1, 3, 4, and 5 contribute cumulatively to the disturbance and habitat alteration from fuels treatments and habitat alteration from livestock grazing in meadows. Alternatives 4, 1, 3, and 5 would result in progressively lower risk to martens due to the amount of motorized routes under each alternative. While Alternative 3 would not add any routes to the NFTS, Alternative 5 would have fewer miles of routes in preferred marten habitat because of the miles of NFTS routes closed under this alternative. Alternatives 1, 3, 4, and 5 do not result in a loss of habitat (no route construction), but may influence marten habitat. This influence, combined with fuels treatment and livestock grazing effects upon marten habitat, would likely impact individuals throughout the project area. Inventoried Roadless Areas and adjacent wilderness areas may become increasingly important as the cumulative effect of fuels treatment activities expand within other portions of marten habitat. Considering the proportion of marten habitat influenced by motorized routes and projections for future increases in recreation uses and OHV activity, the alternatives could result in cumulative impacts when combined with other factors affecting marten habitat (Zielinski et al. 2008). Although the action alternatives may result in cumulative impacts, they are very minor in comparison to existing road densities and other potentially significant impacts (fire, fuels/vegetation treatments).

Table 22. Total drivable routes in American marten habitats

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

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

Determinations

Alternative 1

This alternative would result in disturbance within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual marten. Seasonal closures would reduce disturbance during most of the breeding season. Damage to some meadows from motorized routes would be mitigated. These effects would not likely result in any impacts to marten populations within the project area over the short or long term. This alternative would have the third most impact to marten.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the American marten.

Alternative 2

Although this alternative would result in increased amounts of disturbance and habitat fragmentation within the project area, continued route proliferation would ultimately be limited by topography, vegetation, and wilderness areas. Disturbance resulting from this alternative would likely result in adverse impacts to some individual marten. Increased habitat fragmentation from route proliferation would likely result in impacts to individuals over the short term and may result in minor impacts to populations within the project area over the long-term. Marten occupy much of their historic range in California, are widespread in the Sierra Nevada Mountains, and occupy higher elevations common within wilderness areas. Therefore, there are significant amounts of marten habitat in areas that are inaccessible to motorized vehicles over the short and long-term. Therefore, population level impacts would be minor and limited within the project area, and would not threaten the long-term viability of the species. This alternative would have the most impact to marten.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the American marten.

Alternative 3

This alternative would result in disturbance within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual marten. Some seasonal closures would reduce disturbance during most of the breeding season, but would be limited in scope. These effects would not likely result in any impacts to marten populations within the project area over the short or long term. This alternative would have the second least impact to individual marten.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the American marten.

Alternative 4

This alternative would result in disturbance within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual marten. Seasonal closures would reduce disturbance during most of the breeding season. Damage to some meadows from motorized routes would be mitigated. These effects would not likely result in any impacts to marten populations within the project area over the short or long term. This alternative would have the second most impact to individual marten.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the American marten.

Alternative 5

This alternative would result in disturbance within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual marten. Seasonal closures would reduce disturbance during most of the breeding season. Damage to some meadows from motorized routes would be mitigated. These effects would not likely result in any impacts to marten populations within the project area over the short or long term. This alternative would have the least impact on marten.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the American marten.

Pacific Fisher, *Martes pennanti pacifica*

Species and Habitat Account

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

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

Management Direction

The Pacific fisher was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). In 2004, the FWS found that the west coast population of fisher warranted

protection under the Endangered Species Act, but that listing this distinct population was precluded by higher priorities. The FSEIS amended the STF Forest Plan with updated guidelines for managing furbearers, including the fisher (USDA 2004). The Forest Plan Direction contains the following management direction associated with the proposed project for fisher:

- Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (particularly fisher and marten) in biological evaluations.
- Mitigate impacts where there is documented evidence of disturbance to the den site from existing recreation, OHV route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, OHV routes, and recreational and other developments for their potential to disturb den sites.

Direct & Indirect Effects

General - All Alternatives

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

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

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

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

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

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

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

Indicators

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

- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads

{closed} converted to all-vehicle roads, HLO roads, ATV trails, MC trails, or 4WD trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within preferred fisher habitat.

- Existing density (mi/mi^2) of NFTS routes within preferred fisher habitat.
- Density (mi/mi^2) of NFTS routes within preferred fisher habitat with proposed designated routes.

Alternative 1

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 23). Actions proposed in this alternative would not likely result in any human-caused mortality, but would likely increase disturbance to some fisher (if re-established) within the project area over the long term. There are no documented fisher den sites within the project area. Since fisher are not known to currently occupy the STF, it is unlikely that there are any existing den sites. Therefore, this alternative would not have the potential to disturb fisher den sites.

Table 23. Pacific Fisher: Direct and Indirect Effects Indicators - Alternative 1

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

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

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

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

Season of Use: Preferred fisher habitat is primarily located throughout mid-elevations within the project area. Therefore, motorized use would be seasonally restricted in approximately 50% of preferred fisher habitat. These closures would reduce disturbance to foraging fisher over the long term (if fisher were re-established). The season of use would not apply to WOS routes (see Table 3), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

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

individual fisher's fitness and would not result in any population level impacts within the project area.

Alternative 2

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to fisher (if re-established).

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

Alternative 3

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the short and long term.

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to fisher (if re-established).

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

Alternative 4

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 24). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within preferred fisher habitat, there would be a slight increase in the direct (if the fisher were re-established) and indirect effects to fisher within the project area. Although these increases would result in more individuals being impacted, these

increases would not likely be significant enough to result in impacts to fisher populations within the project area.

Table 24. Pacific Fisher: Direct and Indirect Effects Indicators - Alternative 4

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

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

Season of Use: Preferred fisher habitat is primarily located throughout mid-elevations within the project area. Therefore, motorized use would be seasonally restricted in approximately 50% of preferred fisher habitat. These closures would reduce disturbance to foraging fisher (if re-established) over the long term. The season of use would not apply to WOS routes (see Table 3), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

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

Alternative 5

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred fisher habitat. This would reduce the risk of direct and indirect effects to fisher from motorized travel over the long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 25). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a substantial decrease from Alternative 1 in the number of routes added to the system or converted to a trail within preferred fisher habitat, there would be a substantial decrease in the direct (if fisher were re-established) and indirect effects to fisher within the project area. These decreases would result in fewer individuals being impacted and less habitat being fragmented, and this alternative is unlikely to result in impacts to fisher populations within the project area.

Table 25. Pacific Fisher: Direct and Indirect Effects Indicators - Alternative 5

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

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

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

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

Cumulative Effects

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

On the STF, past timber harvest and more recent hazardous fuels reduction projects have reduced large trees, canopy cover, structural complexity, and coarse woody material within treated units. Between 2000 and 2008, vegetation/fuels thinning treatments on NFS lands have occurred within less than 4% of fisher habitat. These vegetation treatments have reduced habitat quality for fisher by reducing canopy cover, structural complexity, and coarse woody material within treated units. At the larger landscape scale, these treatments may affect the size and connectivity of patches of high quality habitat. Vegetation/fuels reduction projects will continue to be one of the primary activities affecting fisher habitat on the STF (Appendix B). These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. Some, but not all, of them will affect fisher habitat. Over time, fuels treatments are expected to alter 20 to 30 percent of the landscape, with a resulting expectation that the amount of habitat removed by stand replacing wildfires will be reduced in response to these treatments (USDA 2004).

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

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

Table 26 shows the total drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. Since routes proposed within the action alternatives are native surfaced routes that do not generally have high rates of travel, these road-related effects are expected to be minimal. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would cause the most disturbance to individuals. Because this alternative does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon fisher. The action alternatives do not result in a loss of habitat (no route construction), but noise and traffic disturbance would influence habitat use and availability where fisher may be present (if re-established). If fisher were to recolonize or to be reintroduced on the STF, project alternatives would still contribute to the past, current, and reasonably foreseeable conditions described above. While Alternative 3 would not add any routes to the NFTS, Alternative 5 would have fewer miles of routes in preferred fisher habitat because of the miles of routes closed under this alternative. The greatest influence upon fisher habitat occurs under Alternative 2 and progressively lower levels of impact occur under Alternatives 4, 1, 3, and 5. Thus, the combined effect of the project alternatives and current levels of hazardous fuels reduction treatments may result in adverse cumulative effects to a few individual fisher (if re-established).

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

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

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

Table 26. Total drivable routes in Pacific fisher habitat

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

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

Determinations

Alternative 1

This alternative would result in disturbance to fisher if re-established within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual fisher. Seasonal closures would reduce disturbance during most of the breeding season. These effects would not likely result in any impacts to fisher populations within the project area over the short or long term. This alternative would have the third most impact on the fisher.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the Pacific fisher.

Alternative 2

Although this alternative would result in increased amounts of disturbance to fisher (if re-established) and habitat fragmentation within the project area, continued route proliferation would ultimately be limited by topography, vegetation, and wilderness areas. Disturbance to fisher (if re-established) resulting from this alternative would likely result in adverse impacts to some individual fisher. Increased habitat fragmentation from route proliferation may result in impacts to individuals over the long term. Although route proliferation may impact some individual fisher and their habitat over the long term, restricted access by topography, vegetation, and wilderness areas would result in significant amounts of unimpacted suitable habitat over the short and long term. Therefore, potential impacts from this alternative would not likely have measurable impacts to populations (if re-established) within the project area. This alternative would have the most impact on the fisher.

Therefore, it is my determination that this alternative "*may impact individuals or habitat of a species that has been found warranted for federal listing, but would not likely cause a loss of viability to the population or species*" for the Pacific fisher.

Alternative 3

This alternative would result in disturbance to fisher if re-established within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual fisher. Seasonal closures would reduce disturbance during most of the breeding season. These effects would not likely result in any impacts to fisher populations within the project area over the short or long term. This alternative would have the second least impact on the fisher.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the Pacific fisher.

Alternative 4

This alternative would result in disturbance to fisher if re-established within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual fisher. Seasonal closures would reduce disturbance during most of the breeding season. These effects would not likely result in any impacts to fisher populations within the project area over the short or long term. This alternative would have the second most impact on the fisher.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the Pacific fisher.

Alternative 5

This alternative would result in disturbance to fisher if re-established within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual fisher. Seasonal closures would reduce disturbance during most of the breeding season. These effects would not likely result in any impacts to fisher populations within the project area over the short or long term. This alternative would have the least impact on the fisher.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the Pacific fisher.

California Wolverine, *Gulo gulo luteus*

Species and Habitat Account

The wolverine is a wide-ranging mammal that once occupied high elevation habitat throughout the western United States. Recent research by Schwartz et al. (2007) found that wolverines which inhabited the Sierra Nevada Mountains of California were isolated and genetically distinct from extant populations. The California wolverine was once relatively common in the Sierra Nevada, but the last verifiable record from the Sierra Nevada is from 1922 and it is widely accepted that these wolverines were extirpated in the 1930s (Aubry et al. 2007, Schwartz et al. 2007). Significant effort has been exerted to detect wolverines in the Sierra Nevada Mountains through bait stations, cameras, and helicopter surveys (Kucera and Barrett 1993, Aubry and Lewis 2003, Zielinski et al. 2005, Aubrey et al. 2007). These surveys and numerous other track-plate and camera surveys have resulted in no wolverine detections until recently. In February and

March 2008, verified wolverine photographic detections were taken from 4 separate remote controlled camera stations on the Tahoe NF between the towns of Truckee, CA, and Sierraville, CA. Genetic results indicate the DNA evidence that has been collected to date is from a single individual and is a male. DNA testing also indicates this individual is not related to the wolverine population from the southern Sierra Nevada region and it is also not related to wolverine populations in the Cascades region of Washington. DNA results indicate that this particular wolverine has haplotype A, which is ubiquitous and shared with wolverine populations in the Rocky Mountains, Canada, and Alaska. At this time, the origin of this individual is unknown. Although numerous mesocarnivore surveys have been completed on the STF with the use of baited camera stations and track plates, there have been no recent wolverine detections within the project area.

Wolverines prefer high elevation areas that are often associated with subalpine or tree line habitats, but many of their life history needs are met in forested habitat types (Banci 1994, Aubry et al. 2007, Copeland et al. 2007). Subalpine and tree line habitats typically occur above 8000 feet in elevation on the STF. Since wolverines use forested habitats and lower elevations during the winter, this analysis will assume that suitable wolverine habitat exists above 7000 feet in elevation.

Management Direction

The California wolverine was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction does not provide any specific management direction related to this project for the California wolverine.

Direct & Indirect Effects

General – All Alternatives

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

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

The activities listed above may have direct and indirect effects on wolverines through he following: human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: Types of human-caused mortality that may result from the project alternatives include collisions with vehicles. Although wolverines occur in very low densities and are rarely hit by vehicles, wolverines have large home ranges and may travel significant distances everyday. Adding routes to the NFTS may result in increased probability of wolverines being hit by vehicles. Collisions typically occur along well-maintained roadways that allow high rates of travel. Routes proposed for designation within the project alternatives are native surfaced routes that allow only much slower rates of travel. These types of routes would result in far fewer collisions.

Changes in Behavior: Wolverines are considered to be sensitive to human presence and recreational activities (Banci 1994, May et al. 2006). Allowing cross-country travel or using existing routes could result in displacement or avoidance or disturbance at a specific location, such as a den site (Copeland 1996). There are no known natal den sites on the STF, but such sites would most likely occur on talus slopes in rocky areas in deep snow above timberline (Banci 1994, USDA 2001). The majority of such habitat occurs above 8000 feet in elevation within the Emigrant, Carson-Iceburg, and Mokelumne Wilderness areas on the STF.

Habitat Modification: Since wolverines once occurred throughout high-elevation habitats in the Sierra Nevada Mountains, allowing cross-country travel may result in indirect effects to

wolverines through habitat fragmentation. Wolverines are known to have large home ranges, sometimes exceeding 300 square miles (Banci 1994). May et al. (2006) found that the presence of human development formed a more important factor in home range selection than did vegetation or habitat type. Although route density thresholds have not been established in the literature, increasing road densities in high elevation habitats between wilderness areas would result in reduced habitat suitability.

Alternative 1

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred wolverine habitat. This would reduce the risk of direct and indirect effects to wolverine from motorized travel over the long-term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: The direct or indirect effects of these actions would be insignificant and discountable to wolverines for the following reasons:

- Despite significant survey efforts, there have not been any recent documented wolverine sightings within the project area.
- The majority of suitable habitat within the project area exists within the wilderness areas and would not be impacted by this alternative.

Season of Use: Preferred wolverine habitat is primarily located throughout the highest elevations within the project area. Motorized use would be seasonally restricted (as identified for each route in Appendix I of the STF Travel Management EIS) in all preferred wolverine habitat outside wilderness areas, providing further beneficial impacts. The season of use would not apply to WOS routes (see Table 3), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Mitigation Measures: The types of mitigation measures that would be implemented within preferred wolverine habitat include the following: tread hardening, drain dips, and fence/log/rock barriers. Implementation of these mitigation measures would include hand tool and machine work that would result in short-term noise disturbance within the project area. This short-term noise disturbance would not likely affect wolverines (see above).

Alternative 2

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized routes because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of disturbance. Habitat fragmentation/modification would increase because of the proliferation of new routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Although they would be limited, the seasonal closures implemented within this alternative would provide beneficial impacts to wolverines.

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

Alternative 3

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred wolverine habitat. This would reduce the risk of direct and indirect effects to wolverines from motorized travel over the short and long-term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Although they would be limited, the seasonal closures implemented within this alternative would provide beneficial impacts to wolverines.

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

Alternative 4

The direct and indirect effects of this alternative would be similar to those discussed for Alternative 1.

Alternative 5

The direct and indirect effects of this alternative would be similar to those discussed for Alternative 1, with one exception. There would be no WOS routes under this alternative, so there would be no exceptions to the seasonal closures.

Cumulative Effects

When completing its status review of the Pacific fisher, the FWS concluded that road-related effects on low density carnivores like fishers “are more severe than most other wildlife species due to their large home ranges, relatively low fecundity, and low natural population density.” These same concerns would seem to apply equally to the wolverine.

Assuming that the wolverine’s suitable habitat on the STF is limited to all but the most minimally developed and roaded areas, land management activities other than human recreation are generally not affecting wolverine habitat. The Forest Service (2001) described human presence and high country activity, including snowmobile use, backcountry hiking, and high country motorized use, as being the most substantial factors potentially limiting the recovery of wolverine. Existing human settlement and dispersal barriers, such as major highways, in and of themselves result in uncertainty about the potential for wolverine persistence in the Sierra Nevada (Banci et al. 1984).

Alternatives 1, 3, 4, and 5 would have limited adverse direct or indirect effects to the California wolverine. There would be beneficial effects due to the prohibition on cross-country travel. These alternatives would for the most part counter the cumulative adverse effects for this species. Since there would not be a prohibition on cross-country travel, Alternative 2 presents the greatest risk to wolverine disturbance and to habitat modification/fragmentation within the project area. Since the majority of suitable wolverine habitat within the project area and the Sierra Nevada of California is located within wilderness and roadless areas, the impacts of Alternative 2 would be limited over the long term. The combined effects of these factors and the additional access provided to high country areas in Alternative 2 could result in adverse impacts to wolverines through further habitat fragmentation.

Determinations

Alternative 1

The direct, indirect, and cumulative effects of this alternative would be minor because the majority of suitable habitat within the project area exists within the wilderness areas and would not be impacted by this alternative.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the California wolverine.

Alternative 2

Although this alternative would result in increased amounts of habitat fragmentation within the project area, continued route proliferation would ultimately be limited by topography, vegetation, and wilderness areas. Increased habitat fragmentation may result in minor impacts over the long term, but suitable wolverine habitat largely exists outside of areas that are currently roaded and that may become more roaded through route proliferation.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the California wolverine.

Alternative 3

The direct, indirect, and cumulative effects of this alternative would be minor because the majority of suitable habitat within the project area exists within the wilderness areas and would not be impacted by this alternative.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the California wolverine.

Alternative 4

The direct, indirect, and cumulative effects of this alternative would be minor because the majority of suitable habitat within the project area exists within the wilderness areas and would not be impacted by this alternative.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the California wolverine.

Alternative 5

The direct, indirect, and cumulative effects of this alternative would be minor because the majority of suitable habitat within the project area exists within the wilderness areas and would not be impacted by this alternative.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the California wolverine.

Sierra Nevada Red Fox, *Vulpes vulpes necator*

Species and Habitat Account

The Sierra Nevada red fox (SNRF) is a small candid that once occupied high-elevation habitat throughout much of the Sierra Nevada Mountains (Grinnell 1937). Despite significant amounts of effort, there have been no recent detections of the SNRF in the Sierra Nevada and the only known population currently exists in the Lassen Peak region (Perrine 2005, Zielinski et al. 2005).

Although numerous mesocarnivore surveys have been completed on the STF with the use of baited camera stations and track plates, there have been no detections of the SNRF within the project area.

The SNRF inhabits high-elevation forests and subalpine habitat that are interspersed with riparian and meadow habitat (Perrine 2005). Preferred forest types include red fir, lodgepole pine and subalpine fir (Schempf and White 1977). They occur primarily at elevations greater than 7000 feet and meadows are thought to be important foraging areas (Schempf and White 1977, USDA 2001). Subalpine habitats typically occur above 8000 feet in elevation on the STF, but for the purposes of this analysis it will be assumed that suitable SNRF habitat exists above 7000 feet in elevation.

Management Direction

The SNRA was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction does not provide any specific management direction related to this project for the SNRA.

Direct & Indirect Effects

General – All Alternatives

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

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

The activities listed above may have direct and indirect effects on the SNRF through the following: human-caused mortality, changes in behavior, and habitat modification.

Human-Caused Mortality: Types of human-caused mortality that may result from the project alternatives include collisions with vehicles. The effects of collisions are similar to those discussed above in the wolverine section.

Changes in Behavior: SNRA are considered to be sensitive to human disturbance (Grinnel 1937). Allowing cross-country use or using existing routes could result in disturbance or displacement at a specific location, such as den sites. There are no known den sites and there have not been any documented sightings of a SNRF within the project area. Therefore, disturbance or displacement at a specific location is unlikely to occur.

Habitat Modification: Allowing cross-country travel or using existing routes within high elevation meadows could decrease their value as foraging areas for SNRF. Although numerous vegetation types above 7000 feet in elevation provide habitat for the SNRF, meadows appear to be particularly important foraging areas (USDA 2001).

Alternative 1

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred SNRF habitat. This would reduce the risk of direct and indirect effects to the SNRF from motorized travel over the long-term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: The direct or indirect effects of these actions would be insignificant and discountable to the SNRF for the following reasons:

- Despite significant survey efforts, there have not been any recent documented sightings of the SNRF within the project area. The closest documented population is over 150 miles away, located in the Lassen Peak area.
- The majority of suitable habitat within the project area exists within wilderness areas that would not be impacted by the project alternatives.

Season of Use: Preferred SNRF habitat is primarily located throughout the highest elevations within the project area. Motorized use would be seasonally restricted (as identified for each route in Appendix I of the STF Travel Management EIS) in all preferred SNRF habitat outside wilderness areas; providing further beneficial impacts. The season of use would not apply to WOS routes (see Table 3), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

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

Alternative 2

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed below for adding routes to the NFTS.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of disturbance. Proliferation of new routes would also result in an increase in habitat fragmentation/modification.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Although they would be limited, the seasonal closures implemented within this alternative would provide beneficial impacts to the SNRF.

Mitigation Measures: There would not be any mitigation measures implemented as part of this alternative. The hydrologic conditions of meadow habitat would continue to degrade, affecting prey species of the fox.

Alternative 3

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within preferred SNRF habitat. This would reduce the risk of direct and indirect effects to the SNRF from motorized travel over the short and long term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Although they would be limited, the seasonal closures implemented within this alternative would provide beneficial impacts to the SNRF.

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

Alternative 4

The direct and indirect effects of this alternative would be similar to those discussed for Alternative 1.

Alternative 5

The direct and indirect effects of this alternative would be similar to those discussed for Alternative 1, with one exception. There would be no wheeled over-snow (WOS) routes under this alternative, so there would be no exceptions to the seasonal closures.

Cumulative Effects

The SNRF is currently considered "extremely endangered;" its population size, extent, and trend are unknown (CDFG 2009). Cumulative effects are similar to those described for the wolverine. The EIS for the Sierra Nevada Forest Plan Amendment (USDA 2001) concluded that, based upon historic descriptions of habitat and behavior, any actions taken to minimize new and open roads, to limit human encroachment into the higher elevations, and to improve conditions of high-elevations meadow would likely benefit the SNRA.

Alternatives 1, 3, 4, and 5 would have limited adverse direct or indirect effects to the SNRF. There would be beneficial effects due to the prohibition on cross-country travel. These alternatives would for the most part counter the cumulative adverse effects for this species. Since there would not be a prohibition on cross-country travel under Alternative 2, it presents the greatest risk to SNRF disturbance and to habitat modification/fragmentation within the project area. Since the majority of suitable SNRF habitat within the project area and the Sierra Nevada of California is located within wilderness and roadless areas, the impacts of Alternative 2 would be limited over the long term.

Determinations

Alternative 1

The direct, indirect, and cumulative effects of this alternative would be minor because the majority of suitable habitat within the project area exists within wilderness areas that would not be impacted by the alternative.

Therefore, it is my determination that this alternative "may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species" on the Sierra Nevada red fox.

Alternative 2

Although this alternative would result in increased amounts of habitat fragmentation and in increased disturbance within the project area, continued route proliferation would ultimately be limited by topography, vegetation, and wilderness areas. Increased habitat fragmentation may result in minor impacts over the long term, but suitable SNRF habitat largely exists outside of areas that are currently roaded and that may become more roaded through route proliferation.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the Sierra Nevada red fox.

Alternative 3

The direct, indirect, and cumulative effects of this alternative would be minor because the majority of suitable habitat within the project area exists within wilderness areas that would not be impacted by the alternative.

Therefore, it is my determination that this alternative "may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species" on the Sierra Nevada red fox.

Alternative 4

The direct, indirect, and cumulative effects of this alternative would be minor because the majority of suitable habitat within the project area exists within wilderness areas that would not be impacted by the alternative.

Therefore, it is my determination that this alternative *"may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species"* on the Sierra Nevada red fox.

Alternative 5

The direct, indirect, and cumulative effects of this alternative would be minor because the majority of suitable habitat within the project area exists within wilderness areas that would not be impacted by the alternative.

Therefore, it is my determination that this alternative *"may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species"* on the Sierra Nevada red fox.

Townsend's Big-eared Bat, *Corynorhinus townsendii*

Species and Habitat Account

Townsend's bat populations have experienced serious declines in recent history in parts of California (Pierson and Rainey 1998). They are typically found in low desert to mid-elevation montane habitats throughout the West and are distributed from the southern portion of British Columbia south along the Pacific Coast to central Mexico and east into the Great Plains, with isolated populations occurring in the south and southeastern United States (Kunz and Martin 1982). The Townsend's big-eared bat is a rare cavity-dwelling bat that is largely dependent upon suitable roost sites (Kunz and Martin 1982). These bats are known to primarily roost in caves or cave-like dwellings that are often found in and around historic mines (Sherwin et al. 2000). Since these bats are so loyal to natal sites, protection of maternity roosts is important for conservation of the species (Pierson and Rainey 1998). While comprehensive bat surveys have not been completed over the STF, Gellman (1994) found Townsend's bats at two sample sites on the Forest. Although there are no known active maternal roost colonies located on the Forest there is one historical colony located at Bower Cave that receives periodic Townsend bat use (Pierson and Rainey 1998). Bower Cave is managed as a Special Interest Area and has restricted public access.

Management Direction

The Townsend's big-eared bat was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction does not provide any specific management direction related to this project for the Townsend's big-eared bat.

Direct & Indirect Effects

General – All Alternatives

The use of motorized routes is not known or suspected to have direct or indirect effects upon this species, unless routes were to create or improve human access to a maternal roost colony. There are no known active maternal roosts on the STF and Bower Cave is the only location thought to have supported a historic colony. The project alternatives would not improve access to Bower Cave, which is protected by a fence and a locked gate. Therefore the project alternatives would not likely have any direct or indirect effects to the Townsend's big-eared bat.

Cumulative Effects

The lack of direct or indirect effects of the project alternatives precludes them from having any cumulative effects to this species.

Determinations

It is my determination that the project alternatives would have *"No Impact"* on the Townsend's big-eared bat.

Western Red Bat, *Lasiurus blossevillii*

Species and Habitat Account

The western red bat is considered to be rare in the State, but sparsely occurs throughout lower elevations in much of California west of the Sierra Nevada crest (Zeiner et al. 1990b). These bats are a solitary species that do not form colonies and typically roost in vegetation near riparian areas. There are many gaps in the knowledge about this species, and more information is required on roosting requirements, altitudinal distribution, migration patterns, effects of controlled burns, and effects of pesticide use (Pierson et al. 2004). Comprehensive bat surveys have not been completed on the STF. Although Gellman (1994) did not find any western red bats at 12 survey sites that were sampled across the Forest, they have been found on the STF (Corben 2002).

Management Direction

The western red bat was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction does not provide any specific management direction related to this project for the western red bat.

Direct & Indirect Effects

General – All Alternatives

The use of motorized routes is not known or suspected to have direct or indirect effects upon this species. Therefore, the project alternatives would not likely have any direct or indirect effects to the Western red bat.

Cumulative Effects

The lack of direct or indirect effects of the project alternatives precludes them from having any cumulative effects to this species.

Determinations

It is my determination that the project alternatives would have *"No Impact"* on the Western red bat.

Pallid Bat, *Antrozous pallidus*

Species and Habitat Account

Pallid bats are a gregarious colony-forming species that occur throughout most of California. They are roosting habitat generalists and have been known to roost in rock crevices, tree hollows, and man-made structures (USDA 2001). Tree roosting has been documented in large conifer snags, inside basal hollows of redwoods and giant sequoias, and bole cavities in oaks (Sherwin 1998). While comprehensive bat surveys have not been completed over the STF, Gellman (1994) found pallid bats at 3 of the 12 survey sites that were sampled across the Forest. Although pallid bat roost sites have not been inventoried on STF, it is assumed that they are present in a wide variety of locations.

Management Direction

The pallid bat was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction does not provide any specific management direction related to this project for the pallid bat.

Direct & Indirect Effects

General – All Alternatives

The use of motorized routes is not known or suspected to have direct effects upon this species. Pallid bats are roosting habitat generalists and may use snags for roosting. Forest policy requires that hazard trees are removed along roads for public safety, often resulting in a reduction of snags within a 60-meter (approximately 200-foot) zone along both sides of NFTS roads. Hazard tree removal along NFTS roads has the potential to reduce potential roost sites for the pallid bat. Hazard tree removal is typically conducted along Maintenance Level 2, 3, 4, and 5 roads (not Maintenance Level 1 roads or trails). Closures that are proposed on ML 2 and 3 roads within Alternatives 1, 4, and 5 would result in a reduction in miles of road on which hazard trees may be removed. On the other hand, opening roads currently closed (converting ML1 routes to ML2 or ML3) would result in an increase in miles of road on which hazard trees may be removed. The net amount of impact that the 3 alternatives may have on future hazard tree removal would be minor.

As no roads are being converted from ML1 to ML2 or ML3, or from ML2 or ML3 to ML1, under Alternatives 2 and 3, there would be no indirect effects from those alternatives on the pallid bat.

Cumulative Effects

Since there would be no direct or indirect effects under Alternatives 2 and 3, there would be no cumulative effects under those alternatives.

Past and current cumulative effects to pallid bat habitat consists of effects on snags, including loss of snags through catastrophic wildfires, timber and fuels management where snags have been reduced or removed, and hazard tree removal along open system roads..

Appendix B (STF Travel Management EIS) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the STF boundary. Some, but not all, of these activities would contribute to impacts on snags in pallid bat habitat.

From 2000 through 2008, vegetation/fuels thinning treatments were implemented on approximately 25,000 acres to reduce the potential for catastrophic wildfire. These treatments resulted in some removal of snags. The snag component of pallid bat habitat may be better protected from loss due to wildfire because of fuels reduction projects.

From 2000 through 2008, approximately 37,000 acres burned on the STF. Wildfire removes snags and creates them.

Hazard tree removal along open NFTS roads is on-going. While the number of snags within 300 feet of roads decreases initially, not all snags are removed in these projects. And new snags develop over time. The amount of habitat affected by these activities is very small.

Determinations

Alternative 1

There would be no direct effects from this alternative on the species. The change in miles of roads along which snags may be removed would have an indirect effect on this species, but it would be small because the net change in miles would be small. The cumulative effects of this alternative would be minor.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" on the pallid bat.

Alternative 2

There would be no direct effects from this alternative on the species. There would be no change in miles of roads along which snags may be removed so there would be no indirect effects.

Therefore, it is my determination that this alternative would have "*no effect*" on the pallid bat.

Alternative 3

There would be no direct effects from this alternative on the species. There would be no change in miles of roads along which snags may be removed so there would be no indirect effects.

Therefore, it is my determination that this alternative would have "*no effect*" on the pallid bat.

Alternative 4

There would be no direct effects from this alternative on the species. The change in miles of roads along which snags may be removed would have an indirect effect on this species, but it would be small because the net change in miles would be small. The cumulative effects of this alternative would be minor.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" on the pallid bat.

Alternative 5

There would be no direct effects from this alternative on the species. The change in miles of roads along which snags may be removed would have an indirect effect on this species, but it would be small because the net change in miles would be small. The cumulative effects of this alternative would be minor.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" on the pallid bat.

Bald Eagle, *Haliaeetus leucocephalus*

Species and Habitat Account

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

Management Direction

The bald eagle was listed by the FWS as a federally endangered species in 1978 and was removed from the federal list of Threatened and Endangered Species on June 28, 2007. The bald eagle was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a).

Management direction for the bald eagle is now provided by the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) and the Migratory Bird Treaty Act (16 USC 703-712) of 1972. Under these acts, disturbance that is likely to cause injury, substantial interference with normal breeding, feeding or sheltering behavior, or nest abandonment is prohibited (USDI 2007). The USDI (2007) provided the following management guidelines to minimize disturbance to bald eagles:

- Off-road vehicle use (including snowmobiles). No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within 330 feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet.
- Minimize potentially disruptive activities and development in the eagles' direct flight path between their nest and roost sites and important foraging areas.

The Forest Plan Direction contains the following management direction associated with the proposed project for the bald eagle:

- Within Designated Territories (delineated bald eagle management areas, or additional territories, based on nesting occupancy):
  - Implement a Limited Operating Period (LOP) from January 1 through August 31.
    - Apply LOP restriction to motor vehicle activities on Level 1 roads and OHV routes open to the general public.
  - Prohibit motor vehicle activity in wetlands, streamside management zones, and within 200 feet of lake shorelines that are used by bald eagles.
- Outside Designated Territories (new active bald eagle nests outside of designated management territories):
  - From January 1 through August 31, implement the following restriction around the nest for a distance determined by the Wildlife Biologist on a site-specific basis.
    - Re-route existing OHV use to routes at a safe distance from the nest.
    - Close or detour existing roads in the proximity of the nest site.
    - Prohibit motor vehicle activities in the roost area.

Direct & Indirect Effects

General – All Alternatives

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

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

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

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

Changes in Behavior: In general, the road and trail-associated factors related to changes in behavior that have been identified for the bald eagle include disturbance at specific sites (nests and roost sites), and avoidance and displacement (Skagen et al. 1991, Stalmaster and Newman 1978). Individuals will show different thresholds of tolerances for disturbance, but are particularly vulnerable during the breeding season. Several studies reported that eagles avoid or are adversely affected by human disturbance during the breeding period and such disturbance may result in nest abandonment and reproductive failure (Stalmaster and Newman 1978, Andrew and Mosher 1982, Fraser et al. 1985, Knight and Skagen 1988, Buehler et al. 1991, Grubb and King

1991, Grubb et al. 1992, Chandler et al. 1995, Grubb 1995, Trombulak and Frissell 2000). Although disturbance has been shown to adversely affect nesting bald eagles, individual pairs of bald eagles may be more tolerant to disturbance. For example, the Tahoe National Forest documented a bald eagle nest, in 2005, near a county road that was used to access a popular reservoir. A similar case has been documented on the STF where the pair continues to successfully reproduce.

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

Habitat Modification: Travel management and motorized activity may also indirectly affect bald eagles through impacts to potentially suitable roost or nest trees and to their prey base. Forest policy requires that hazard trees be removed along roads for public safety, often resulting in a reduction of snags within a 60-meter (approximately 200-foot) zone along both sides of some NFTS roads. Hazard tree removal along NFTS roads has the potential to reduce potential nest and roost sites for bald eagles. Hazard tree removal is typically conducted along ML2, 3, 4 and 5 roads (not trails or ML1 roads). Closures that are proposed on ML1 and 2 roads within any of the project alternatives would result in a reduction in miles of road on which hazard trees may be removed. On the other hand, opening roads currently closed (converting ML1 routes to ML2) would result in an increase in miles of road on which hazard trees may be removed. The net amount of impact that the project alternatives may have on future hazard tree removal would be minor.

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

Indicators

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

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

Alternative 1

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 27). Actions proposed in this alternative would not likely result in any human-caused mortality, but would likely increase disturbance to bald eagles within the project area. This alternative would result in a net increase over the existing NFTS of approximately 1.73 miles within 400 meters (0.25 mile) of bald eagle foraging areas. This change would likely result in disturbance to some individual eagles, but would not likely result in impacts to populations within the project area over the short or long-term.

Table 27. Bald Eagle: Direct and Indirect Effects Indicators - Alternative 1

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

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

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

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

Mitigation Measures: Mitigation measures would not be implemented near any bald eagle nest sites or within any Designated Territories. The only types of mitigation measures that would be implemented near reservoirs used for foraging are tread hardening and drain dips. Implementation of these mitigation measures would include hand tool and machine work that may result in short-term disturbance to individual foraging eagles within the project area. This amount of disturbance would not likely reduce any individual bald eagle's fitness and would not result in any population level impacts within the project area. The proposed mitigation measures are designed to reduce sedimentation, which could improve habitat for the bald eagle's prey (fish).

Alternative 2

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to bald eagles.

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

Alternative 3

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to bald eagles.

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

Alternative 4

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 28). Direct and indirect effects of the actions proposed in this alternative would be the same as those discussed in Alternative 1.

Table 28. Bald Eagle: Direct and Indirect Effects Indicators - Alternative 4

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

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

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

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

Alternative 5

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 29). Direct

and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a decrease from Alternative 1 in the number of routes added to the system or converted to a trail near foraging habitat, there would be a decrease in the direct effects to bald eagles within the project area. These impacts would affect a very small percentage of foraging habitat. Thus, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Table 29. Bald Eagle: Direct and Indirect Effects Indicators - Alternative 5

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

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

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

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

Cumulative Effects

Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the Forest boundary. Some, but not all, of these activities will contribute to effects upon bald eagles. The primary risks to the bald eagles have been identified as the following: (1) ingestion of poisonous substances; (2) collision with stationary or moving structures or objects; (3) degradation of wintering or breeding habitat through human development or habitat alteration; and (4) disturbance at nest and roost sites (USDI 2007; Zeiner et al. 1990a).

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

Table 30 shows the total drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. The direct and indirect effects of the project alternatives contribute to two of the four risk factors described above. Alternative 2 has the greatest potential to result in disturbance to nesting and foraging bald eagles since cross-country travel would not be prohibited and vehicles could potentially gain access near foraging areas and nest sites. Since the action alternatives would only result in small amounts of route near foraging areas and nest sites, they would only have very minor impacts to individual foraging bald eagles within the project area. The effects of the action alternatives when combined with the effects of current and future recreation activities may result in minor adverse cumulative effects to some individuals and would not likely measurably impact populations.

Table 30. Total drivable routes in bald eagle habitats

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

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

Determinations

Alternative 1

This alternative would result in disturbance to nesting and foraging bald eagles within the project area. These impacts would be minimized over the long term since cross-country travel would be prohibited. Since impacts from this alternative would be limited, seasonal closures would be implemented, and cross-country travel would be prohibited, effects of this alternative would be limited to individual bald eagles. Since the effects of this alternative would be limited to some individuals, bald eagle populations are increasing throughout their range, and the project area represents such a small portion of their range, the effects of this alternative would not likely result in any impacts to the viability of bald eagle populations over the short or long-term. This alternative would have the third greatest impact on bald eagles.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the bald eagle.

Alternative 2

Although this alternative would likely result in increased amounts of disturbance to nesting and foraging bald eagles within the project area, continued route proliferation would ultimately be limited by topography and wilderness areas. Disturbance resulting from this alternative would likely result in adverse impacts to individual bald eagles over the short and long-term. Since bald eagle populations are increasing throughout their range, and the project area represents such a small portion of their range, the effects of this alternative would not likely result in any impacts to the viability bald eagle populations over the short or long term. This alternative would have the greatest impact on bald eagles.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the bald eagle.

Alternative 3

This alternative would result in disturbance to nesting and foraging bald eagles within the project area. These impacts would be minimized over the long term since cross-country travel would be prohibited. Since impacts from this alternative would be limited, seasonal closures would be implemented, and cross-country travel would be prohibited, effects of this alternative would be limited to individual bald eagles. Since the effects of this alternative would be limited to some individuals, bald eagle populations are increasing throughout their range, and the project area represents such a small portion of their range, the effects of this alternative would not likely result in any impacts to the viability of bald eagle populations over the short or long-term. This alternative would have the least impact on bald eagles.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the bald eagle.

Alternative 4

This alternative would result in disturbance to nesting and foraging bald eagles within the project area. These impacts would be minimized over the long term since cross-country travel would be prohibited. Since impacts from this alternative would be limited, seasonal closures would be implemented, and cross-country travel would be prohibited, effects of this alternative would be limited to individual bald eagles. Since the effects of this alternative would be limited to some individuals, bald eagle populations are increasing throughout their range, and the project area represents such a small portion of their range, the effects of this alternative would not likely result in any impacts to the viability of bald eagle populations over the short or long-term. This alternative would have the second greatest impact on bald eagles.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the bald eagle.

Alternative 5

This alternative would result in disturbance to nesting and foraging bald eagles within the project area. These impacts would be minimized over the long term since cross-country travel would be prohibited. Since impacts from this alternative would be limited, seasonal closures would be implemented, and cross-country travel would be prohibited, effects of this alternative would be limited to individual bald eagles. Since the effects of this alternative would be limited to some individuals, bald eagle populations are increasing throughout their range, and the project area represents such a small portion of their range, the effects of this alternative would not likely result in any impacts to the viability of bald eagle populations over the short or long-term. This alternative would have the second least impact on bald eagles.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the bald eagle.

California Spotted Owl, *Strix occidentalis occidentalis*

Species and Habitat Account

The California spotted owl is one of three recognized subspecies of spotted owls. They are currently found throughout most of their historic range, which primarily occurs on the west side of the Sierra Nevada Mountains of California. The STF is located in the central portion of their range, and they are dispersed throughout the Forest. Surveys for spotted owls have been conducted on the Forest for approximately 20 years. Although these surveys have not covered the Forest in its entirety, they have covered a large majority of it. Protected Activity Centers (PACs) and Home Range Core Areas (HRCAs) are comprised of the best available habitat around to known spotted owl pairs or territorial singles. PACs encompass approximately 300 acres, and HRCAs encompass approximately 1000 acres, including the associated PAC. Based on systematic surveys and incidental sightings, there are currently 218 documented PACs on the STF. Spotted owls inhabit a wide variety of forest types generally characterized by dense forest, high canopy closure, high structural diversity, large residual trees, and downed woody debris (Call et al. 1992, Moen and Gutierrez 1997). For the purposes of this analysis, preferred California spotted owl habitat on the STF has been mapped as the following: CWHR types PPN, SMC, WFR, RFR; classes 5 and 6; canopy closures M and D.

Management Direction

The California spotted owl was identified by the Regional Forester as a Sensitive Species and Management Indicator Species (MIS) on the STF (USDA 2007a, USDA 2007b). The Forest Plan Direction contains the following management direction associated with the proposed project for the California spotted owl:

- Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, off-highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes, and recreational and other developments for their potential to disturb nest sites.

Direct & Indirect Effects

General – All Alternatives

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

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

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

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

Changes in Behavior: Types of changes in behavior that may result from the project alternatives include the following: displacement or avoidance, disturbance at a specific location, or physiological response. The use of motorized vehicles in spotted owl habitat may result in disturbance to owls that are nesting, roosting, or foraging. The Forest Service, Region 5, has generally assumed that activities (including road and trail use) occurring farther than 0.25 miles (400 meters) from California spotted owl nest sites have little potential to affect owl nesting (USDA 2004). Delaney et al. (1999) found that Mexican spotted owls were found to show an alert response to chainsaws at distances less than 400 meters. Available literature indicates that the likelihood of owls flushing from a nest is greater when disturbance occurs within 60 meters (approximately 200 feet) (Delaney et al. 1999, Swarthout and Steidl 2001). Although it is unclear whether these levels of disturbance would result in high levels of stress, Marra and Holberton (1998) found that chronic high levels of stress hormone may have negative effects on reproduction. A study by Wasser et al. (1997) found that stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located <0.41 km (0.26 mile) from a major logging road compared to spotted owls in areas >0.41 km from a major logging road. In the absence of further research, it is assumed that motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting owls and that effects from motorized activities within 60 meters of an activity center will result in negative effects to reproduction over the short term. California spotted owls have been known to shift their nest site. Over the long term, spotted owls that were experiencing significant disturbance at their current nest site would likely move to another suitable nest site within the PAC.

Habitat Modification: Roads and trails modify habitat by directly removing it or indirectly by reducing its quality. While simple habitat loss is the most obvious, roads and trails also reduce habitat quality through fragmentation. California spotted owls may be affected by edge effects from roads when roads and trails fragment suitable habitat. Several studies indicate the California spotted owl are sensitive to changes in forest canopy closure and habitat fragmentation (Seamans 2005, Blakesley 2003) that could result from a network of roads. Roads and trails can result in a reduction in interior forest patch size which decreases the amount of habitat available

and increases the distance between suitable interior forest patches for late-successional species such as the California spotted owl.

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

Indicators

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

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

Alternative 1

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 31). Standards and guidelines in the STF LMP direct that impacts be mitigated where there is documented evidence of disturbance to a spotted owl nest site from existing road or motorized trail use. The Forest has not monitored spotted owl nest sites in proximity to roads or trails and has not documented specific instances of disturbance. Actual nest locations are often difficult to locate and may move around from year-to-year within a PAC. Therefore, actual nest locations remain unknown for many of the PACs and those nests that have been located may have moved since it was last located. Furthermore, it is not well known why owls choose certain nest sites from year to year but it is likely that the nest sites will continue to move within the PAC over the long term. Therefore, activity centers may be defined as a nest site, a pair roost location, or a territorial single located within the PAC. In the absence of recent nest site locations for every PAC, the relative risk of project alternatives resulting in disturbance to nesting spotted owls is evaluated by considering the indicators shown in Table 31.

Table 31. California Spotted Owl: Direct and Indirect Effects Indicators - Alternative 1

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

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

[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

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

A detailed PAC-by-PAC analysis was conducted on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. A spreadsheet in the project record (CSO_CHANGES_BY_PAC) shows the details of that analysis.

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

The following table summarizes the information from the spreadsheet. In the table, the column labeled “LEVEL OF CONTRIBUTION TO DISTURBANCE” refers to the contribution of the routes under the alternative to the disturbance to the owls at each PAC’s activity center.

Table 32. California spotted owl: PAC-by-PAC analysis—Alternative 1

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC TL041 - ROSE CREEK	16EV123	0.33									
Spotted Owl PAC TL041 - ROSE CREEK	16EV124	0.15									
Spotted Owl PAC TL041 - ROSE CREEK	16EV296	0.36									
Spotted Owl PAC TL041 - ROSE CREEK	16EV303	0.03									
Spotted Owl PAC TL041 - ROSE CREEK	16EV79	0.85									
Spotted Owl PAC TL041 - ROSE CREEK	22	0.03									
TOTAL		1.74					1.74	35.68%	35.68%	HIGH	Route being added within 60 meters (60 meters) of acuity center. A lot of routes being added.
Spotted Owl PAC MP006 - NED GULCH			02S37YB	0.25			0.25	16.84%	16.84%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC MP082 - DEER LICK CR			02S39B	0.50			0.50	18.29%	18.29%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL028 - BEAR MTN.	FR98537	0.09									
Spotted Owl PAC TL028 - BEAR MTN.	FR98548	0.04									
Spotted Owl PAC TL028 - BEAR MTN.			01S51A	0.38							
TOTAL		0.13		0.38			0.51	16.78%	16.78%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL049 - EAGLE CK CAMP	16EV152	0.03									
Spotted Owl PAC TL049 - EAGLE CK CAMP	16EV155	0.05									
Spotted Owl PAC TL049 - EAGLE CK CAMP	FR98686	0.03									

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
TOTAL		0.11					0.11	4.75%	4.75%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL052 - CRANDALL	17EV118	0.70									
Spotted Owl PAC TL052 - CRANDALL	17EV120	0.11									
TOTAL		0.81					0.81	26.79%	26.79%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL128 - LOW. TROUT CR.	18EV100	0.08									
Spotted Owl PAC TL128 - LOW. TROUT CR.	18EV100	0.31									
Spotted Owl PAC TL128 - LOW. TROUT CR.	18EV106	0.00									
Spotted Owl PAC TL128 - LOW. TROUT CR.	18EV67	0.32									

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC TL128 - LOW. TROUT CR.			03N26YB	0.14							
Spotted Owl PAC TL128 - LOW. TROUT CR.			03N26YB	0.10							
TOTAL		0.71		0.24			0.94	22.64%	22.64%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL129 - UPP. 2-MILE CK	17EV34	0.01									
Spotted Owl PAC TL129 - UPP. 2-MILE CK	17EV37	0.61									
TOTAL		0.61					0.61	26.01%	26.01%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL130 - CAMP CLAVEY	17EV299	0.16									
Spotted Owl PAC TL130 - CAMP CLAVEY	18EV258	0.00									

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC TL130 - CAMP CLAVEY	18EV56	0.33									
TOTAL		0.50					0.50	20.38%	20.38%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL132 - HULL CK CAMP	18EV257	0.14									
Spotted Owl PAC TL132 - HULL CK CAMP	18EV304	0.16									
Spotted Owl PAC TL132 - HULL CK CAMP	18EV88	0.03									
Spotted Owl PAC TL132 - HULL CK CAMP	18EV88	0.70									
Spotted Owl PAC TL132 - HULL CK CAMP	18EV90	0.81									
TOTAL		1.84					1.84	35.12%	35.12%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC TL165 - FAHEY CABIN	17EV162	0.04									
Spotted Owl PAC TL165 - FAHEY CABIN	17EV303	0.24									
Spotted Owl PAC TL165 - FAHEY CABIN	FR98601	0.05									
TOTAL		0.32					0.32	7.92%	7.92%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL174			06N17P	0.41			0.41	27.97%	27.97%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL177 - ASCENSION M. W.			01S04	0.52							
Spotted Owl PAC TL177 - ASCENSION M. W.			01S04	0.12							

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
TOTAL				0.64			0.64	28.15%	28.15%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL187 - THOMPSON MDW	16E182	0.20									
Spotted Owl PAC TL187 - THOMPSON MDW	16E182A	0.01									
TOTAL		0.20					0.20	6.75%	6.75%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL193			06N17D	0.03							
Spotted Owl PAC TL193			06N17B	0.00							
TOTAL				0.03			0.03	3.27%	3.27%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC TL203 - RUBY FIRE	16EV257	1.39									
Spotted Owl PAC TL203 - RUBY FIRE	16EV272	0.52									
Spotted Owl PAC TL203 - RUBY FIRE	16EV306	0.16									
Spotted Owl PAC TL203 - RUBY FIRE	16EV78	0.19									
Spotted Owl PAC TL203 - RUBY FIRE	16EV79	0.42									
Spotted Owl PAC TL203 - RUBY FIRE	16EV81	0.19									
TOTAL		2.87					2.87	47.80%	47.80%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL208 - UPP. DEER CK	16EV101	0.07									
Spotted Owl PAC TL208 - UPP. DEER CK	16EV108	0.00									
Spotted Owl PAC TL208 - UPP. DEER CK	16EV229	0.28									

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC TL208 - UPP. DEER CK	16EV269	0.08									
Spotted Owl PAC TL208 - UPP. DEER CK	16EV54	0.06									
Spotted Owl PAC TL208 - UPP. DEER CK	31614C	0.05									
Spotted Owl PAC TL208 - UPP. DEER CK	FR98693	0.01									
TOTAL		0.56					0.56	29.94%	29.94%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL217 - WAGNER RIDGE	FR6550	1.15					1.15	96.39%	96.39%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL223	17EV231	0.32									
Spotted Owl PAC TL223	FR98704	0.15									

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
TOTAL		0.47					0.47	20.75%	20.75%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL261 - UPPER CAMP 25	17EV58	0.53									
Spotted Owl PAC TL261 - UPPER CAMP 25	18EV56	0.69									
TOTAL		1.22					1.22	70.57%	70.57%	MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography
Spotted Owl PAC TL055 - LOW. DEER CK	16EV210	0.09									
Spotted Owl PAC TL055 - LOW. DEER CK	16EV211	0.08									
Spotted Owl PAC TL055 - LOW. DEER CK	16EV265	0.01									

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
TOTAL		0.18					0.18	6.74%	6.74%	LOW	Routes being added less than 400 meters but more than 0.2 mile from activity center. Activity center on other side of ridge from loop. Additions less than 10% of total mileage currently drivable in pac.
Spotted Owl PAC TL057 - N. FORK TUOLUMNE	17EV71	0.20					0.20	5.82%	5.82%	LOW	Route being added 0.20 mile from activity center. Less than 6% of total drivable miles now in pac. Existing routes less than 60 meters on either side activity center, so disturbance from the existing routes would greatly outweigh the potential increased disturbance from the addition
Spotted Owl PAC TL012 - ACKERSON CR	FR98555	0.01									
Spotted Owl PAC TL012 - ACKERSON CR			01S97	0.08							

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
TOTAL		0.01		0.08			0.10	7.24%	7.24%	LOW	Route that is less than 400 meters from activity center is short spur (<0.01 mile) off existing route on edge of pac 0.14 mile from activity center..
Spotted Owl PAC TL159 - UPPER BOURLAND	FR98699	0.05									
Spotted Owl PAC TL159 - UPPER BOURLAND	FR98700	0.02									
TOTAL		0.07					0.07	2.60%	2.60%	LOW	Route that's within 400 meters of activity center is short spur (0.02 mile) off existing route 0.23 mile from activity center.
Spotted Owl PAC - Middle Fork	1S1822B	0.05									
Spotted Owl PAC - Middle Fork	FR98506	0.13									
Spotted Owl PAC - Middle Fork	FR98507	0.05									
Spotted Owl PAC - Middle Fork	FR98523	0.03									
Spotted Owl PAC - Middle Fork					01S11Y	0.01					
Spotted Owl PAC - Middle Fork					01S15Y	0.17					
Spotted Owl PAC - Middle Fork					01S15Y	0.99					

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC - Middle Fork					01S15YA	0.91					
TOTAL		0.25				2.07	-1.82	9.70%	-69.67%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC CA024			07N14C	0.32							
Spotted Owl PAC CA024			07N56YA	0.00							
TOTAL				0.32			0.32	30.96%	30.96%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC CA027	FR14617	0.01					0.01	0.65%	0.65%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC MP005 - MARBLE GULCH	FR98486	0.12					0.12	4.29%	4.29%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC MP085 - COALPIT HILL	17EV183	0.05									

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC MP085 - COALPIT HILL	FR98485	0.05									
TOTAL		0.10					0.10	5.10%	5.10%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL011 - BIG CREEK			02S64C	0.26			0.26	6.38%	6.38%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL029 - GRANITE CREEK	FR98581	0.10									
Spotted Owl PAC TL029 - GRANITE CREEK			01N81	0.26							
TOTAL		0.10		0.26			0.37	12.74%	12.74%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL039 - ACKERSON MTN	FR98555	0.00					0.00	0.07%	0.07%	LOW	Addition that is within 400 meters of activity center short segment (>0.01 mile) on edge of pac. Part of spur that is total of 0.01 mile in length.

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC TL040 - MID.FK. TUOL.	FR8762	0.09					0.09	4.68%	4.68%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL051 - SCHOETTGEN PASS	16EV178	0.20									
Spotted Owl PAC TL051 - SCHOETTGEN PASS	16EV268	0.09									
Spotted Owl PAC TL051 - SCHOETTGEN PASS	17EV117	0.28									
TOTAL		0.57					0.57	35.24%	35.24%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL058 - MILE 23	17EV236	0.13					0.13	7.56%	7.56%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL095 - CORRAL CR	1N1829	0.08									
Spotted Owl PAC TL095 - CORRAL CR			01N01D	0.04							

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
TOTAL		0.08		0.04			0.12	2.94%	2.94%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL097	18EV295	0.27									
Spotted Owl PAC TL097	18EV295A	0.06									
TOTAL		0.33					0.33	32.35%	32.35%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL105 - FRENCH CAMP	15EV43C	0.09					0.09	5.91%	5.91%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL139 - CEDAR RIDGE	FR98617	0.00									
Spotted Owl PAC TL139 - CEDAR RIDGE	FR98618	0.01									
TOTAL		0.01					0.01	0.43%	0.43%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL152 - UPP. SOUTH FK.	17EV249	0.12									

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC TL152 - UPP. SOUTH FK.	17EV249A	0.10									
Spotted Owl PAC TL152 - UPP. SOUTH FK.	17EV267	0.22									
Spotted Owl PAC TL152 - UPP. SOUTH FK.	17EV268	0.13									
TOTAL		0.57					0.57	20.58%	20.58%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL163 - RUSHING MDW	16EV112	0.17									
Spotted Owl PAC TL163 - RUSHING MDW	16EV115	0.20									
TOTAL		0.37					0.37	86.05%	86.05%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL173 - ROCK CK. SADDLE	18EV77	0.01					0.01	0.62%	0.62%	LOW	All additions and conversions from closed to open >400 meters from activity center

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC TL205 - NORTH NIAGRA			02N64	0.60			0.60	37.73%	37.73%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL214 - CAMP IDA	17EV78	0.01									
Spotted Owl PAC TL214 - CAMP IDA			03N60	0.09							
TOTAL		0.01		0.09			0.10	3.25%	3.25%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL216 - MILE 16	17EV104	0.28									
Spotted Owl PAC TL216 - MILE 16	17EV210	0.01									
TOTAL		0.29					0.29	10.57%	10.57%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL222 - DRY MEADOW	16EV115	0.07					0.07	5.45%	5.45%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL257 - WESTSIDE EAST	17EV299	0.07									

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC TL257 - WESTSIDE EAST	17EV51	1.02									
TOTAL		1.09					1.09	48.48%	48.48%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL258 - WESTSIDE WEST	17EV11	0.03									
Spotted Owl PAC TL258 - WESTSIDE WEST	17EV11	0.03									
Spotted Owl PAC TL258 - WESTSIDE WEST	17EV51	0.64									
TOTAL		0.69					0.69	61.67%	61.67%	LOW	All additions and conversions from closed to open >400 meters from activity center
Spotted Owl PAC TL026 - RUSH CREEK	FR98496	0.26									
Spotted Owl PAC TL026 - RUSH CREEK					01S70A	0.22					
TOTAL		0.26				0.22	0.05	8.85%	1.58%	LOW	Route being added >400 meters from activity center, and route being closed in pac

PAC NUMBER/NAME	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED		NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH					
Spotted Owl PAC TL031 - REED CREEK					01N15	1.08	-1.08	0.00%	-65.26%	NONE--DECREASE	No routes are being added or converted from closed to open, but routes are being converted from open to closed
Spotted Owl PAC TL043 - BRIGHTMAN					06N36Y	0.54	-0.54	0.00%	-69.76%	NONE--DECREASE	No routes are being added or converted from closed to open, but routes are being converted from open to closed
Spotted Owl PAC TL256 - CLAVEY RIVER					02N58	0.34	-0.34	0.00%	-24.35%	NONE--DECREASE	No routes are being added or converted from closed to open, but routes are being converted from open to closed

Following is a discussion of each PAC.

Spotted Owl PAC TL041 - ROSE CREEK: Would add 1.74 miles of routes to PAC. Result is a reduction of 0.55 mile from the current situation (Alternative 2—No Action). One addition within 60 meters (200 feet) of activity center. This route (16EV79) has been rated as 4, where 4 indicates that the route was considered, a field visit was made, and a determination was made that the effects could not be mitigated. The route is not recommended for inclusion in the NFTS. Two additions 60 to 400 meters from activity center. Three other additions more than 400 meters from activity center. Because of mileage/number of routes being added, and because of the proximity of one route to the PAC's activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered high.

Spotted Owl PAC MP006 - NED GULCH: No additions. Two segments being converted from closed to open. The mileage would be the same as under the current situation (Alternative 2—No Action). Because routes are between 60 and 400 meters of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC MP082 - DEER LICK CREEK: No additions. Segment being converted from closed to open. Result of alternative is a reduction of 0.65 mile from the current situation (Alternative 2—No Action). Because route being converted is between 60 and 400 meters of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL028 - BEAR MOUNTAIN: Two additions more than ¼ mile from activity center. One route being converted from closed to open is 0.07 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Reproduction in PAC confirmed in 2007. Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL049 - EAGLE CREEK CAMP: Three additions to NFTS. Result of alternative is a reduction of 0.30 mile from the current situation (Alternative 2—No Action). Because routes are between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL052 – CRANDALL: One addition more than ¼ mile from activity center. One addition is 0.13 mile from activity center. Result of alternative is a reduction of 0.43 miles from the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL128 - LOWER TROUT CREEK: Three additions and two segments being converted from a closed to open status more than ¼ mile from activity center. One addition is 0.16 mile from activity center. Result of alternative is a reduction of 0.85 miles from the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL129 - UPPER 2-MILE CREEK: One addition more than ¼ mile from activity center. One addition is 0.13 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL130 - CAMP CLAVEY: Two routes more than ¼ mile from activity center. One addition is 0.16 mile from activity center. Result of alternative is a reduction of 0.39 miles from the current situation (Alternative 2—No Action). Because routes are between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL132 - HULL CREEK CAMP: One route more than ¼ mile from activity center. One addition is 0.20 mile from activity center, another 0.18 mile from activity center, and a third 0.24 mile from activity center. Result of alternative is a reduction of 0.39 miles from the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL165 - FAHEY CABIN: Two routes more than ¼ mile from activity center. One addition is 0.06 mile from activity center. Result of alternative is a reduction of 0.61 miles from the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL174: No additions. Segment being converted from closed to open. Result of alternative is a reduction of 0.09 mile from the current situation (Alternative 2—No Action). Because route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL177 - ASCENSION MOUNTAIN WEST: No additions. Segment being converted from closed to open. Result of alternative is a reduction of 0.02 mile from the current situation (Alternative 2—No Action). Because route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL187 - THOMPSON MEADOW: One addition more than ¼ mile from activity center. One addition is 0.20 mile from activity center. Result of alternative is a reduction of 1.57 miles from the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL193: No additions. Two segments being converted from closed to open, one more than ¼ mile from activity center and one 0.14 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL203 - RUBY FIRE: Two additions more than ¼ mile from activity center. Four additions are between 60 meters and ¼ mile of activity center Result of alternative is a reduction of 0.45 mile from the current situation (Alternative 2—No Action). Because routes are between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL208 - UPPER DEER CREEK: Six additions more than ¼ mile from activity center. One addition is 0.16 mile from activity center. Result of alternative is a reduction of 0.57 mile from the current situation (Alternative 2—No Action). Because routes are between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to

reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL217 - WAGNER RIDGE: Addition 0.22 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL223: One addition is 0.08 mile, another 0.19 mile from activity center. Result of alternative is a reduction of 0.40 mile from the current situation (Alternative 2—No Action). Because routes are between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL261 - UPPER CAMP 25: Two segments being added to NFTS. Result is a reduction of 0.11 miles from the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL055 - LOWER DEER CREEK: 3 additions part of narrow loop off existing route. Result is a reduction of 0.52 miles from the current situation (Alternative 2—No Action). Because end of loop closest to activity center is 0.23 mile away and on other side of ridge, and the additions are less than 10% of the total mileage currently drivable in the PAC, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL057 - NORTH FORK TUOLUMNE: One addition is 0.20 mile from activity center. Result of alternative is a reduction of 0.52 mile from the current situation (Alternative 2—No Action). This addition constitutes less than 6% of the total drivable miles now in the PAC. There are existing routes less than 60 meters on either side of the activity center, so disturbance from the existing routes would greatly outweigh the potential increased disturbance from the addition. For these reasons, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL012 - ACKERSON CREEK: One addition more than ¼ mile from activity center. One addition is 0.14 mile from activity center. Result of alternative is a reduction of 1.02 miles from the current situation (Alternative 2—No Action). Because the route that is less than 400 meters from activity center is a short spur (<0.01 mile) off an existing route on the edge of the PAC the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL159 - UPPER BOURLAND: One addition more than ¼ mile from activity center. One addition is 0.23 mile from activity center. Result of alternative is a reduction of 1.02 miles from the current situation (Alternative 2—No Action). Because the route that is less than 400 meters from activity center is a short spur (<0.02 mile) off an existing route on the edge of the PAC, and the route is 0.23 mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC - MIDDLE FORK: All additions more than ¼ mile from activity center. Route closures, one 120 feet and another 0.02 mile from activity center, total 2.07 miles in PAC. Result of alternative is a reduction of 1.08 miles from the current situation (Alternative 2—No Action). Reproduction in PAC confirmed in 2007. Because the additions and the routes converted from open to closed are more than ¼ mile from activity center and because of the route closures, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC CA024: All additions and routes converted from an open to closed status more than ¼ mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because the additions and the routes converted from open to closed

are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC CA027: Addition more than ¼ mile from activity center. Result of alternative is a reduction of 0.10 mile from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC MP005 - MARBLE GULCH: Addition more than ¼ mile from activity center. Result of alternative is a reduction of 0.41 mile from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC MP085 - COALPIT HILL: Addition more than ¼ mile from activity center. Result of alternative is a reduction of 0.12 mile from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL011 - BIG CREEK: No additions. Segment being converted from closed to open more than ¼ mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because the route being converted is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL029 - GRANITE CREEK: Addition and route converted from an open to closed status more than ¼ mile from activity center. Result of alternative is a reduction of 0.27 mile from the current situation (Alternative 2—No Action). Presence was confirmed in PAC in 2007. Because the addition and the route being converted are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL039 - ACKERSON MOUNTAIN: Addition is 0.15 mile from activity center. Result of alternative is a reduction of 0.55 mile from the current situation (Alternative 2—No Action). Because the route is part of a short spur (0.1 mile in length, <0.01 mile in this PAC) on the edge of the PAC off an existing route, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL040 – MIDDLE FORK TUOLUMNE: Addition more than ¼ mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Pair detected in PAC in 2007; reproduction believed unlikely. Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL051 - SCHOETTGEN PASS: Additions more than ¼ mile from activity center. Result of alternative is a reduction of 0.09 mile from the current situation (Alternative 2—No Action). Because the additions are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL058 - MILE 23: Addition more than ¼ mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Pair detected in PAC in 2007; reproduction believed unlikely. Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL095 - CORRAL CREEK: Additions more than ¼ mile from activity center. Result of alternative is a reduction of 0.34 mile from the current situation (Alternative 2—No Action). Reproduction was confirmed in the PAC in 2007. Because the additions are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL097: Additions more than ¼ mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because the additions are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL105 - FRENCH CAMP: Addition more than ¼ mile from activity center. Result of alternative is a reduction of 0.18 mile from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL139 - CEDAR RIDGE: Additions more than ¼ mile from activity center. Result of alternative is a reduction of 0.08 mile from the current situation (Alternative 2—No Action). Because the additions are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL152 - UPPER SOUTH FORK: Additions more than ¼ mile from activity center. Result of alternative is a reduction of 0.47 mile from the current situation (Alternative 2—No Action). Because the additions are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL163 - RUSHING MEADOW: Additions more than ¼ mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because the additions are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL173 - ROCK CREEK SADDLE: Addition more than ¼ mile from activity center. Result of alternative is a reduction of 0.35 mile from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL205 - NORTH NIAGRA: Addition more than ¼ mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). A non-reproducing pair was found in the PAC in 2007. Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL214 - CAMP IDA: Addition and route converted from an open to closed status more than ¼ mile from activity center. Result of alternative is a reduction of 0.09 mile from the current situation (Alternative 2—No Action). Because the addition and the route being converted are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL216 - MILE 16: Additions more than ¼ mile from activity center. Result of alternative is a reduction of 0.02 mile from the current situation (Alternative 2—No Action). Because the additions are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL222 - DRY MEADOW: Addition more than ¼ mile from activity center. Result of alternative is a reduction of 0.18 mile from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL257 - WESTSIDE EAST: Additions more than ¼ mile from activity center. Result of alternative is a reduction of 0.29 mile from the current situation (Alternative 2—No Action). Because the additions are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL258 - WESTSIDE WEST: Additions more than ¼ mile from activity center. Result of alternative is a reduction of 0.42 mile from the current situation (Alternative 2—No Action). Because the additions are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL026 - RUSH CREEK: Addition more than ¼ mile from activity center. One route in PAC being closed. Result of alternative is a reduction of 0.86 mile from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center and because one route is being closed, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL031 - REED CREEK: No additions and no conversions from a closed to open status. One route would be closed. Result is a reduction of 0.34 miles from the current situation (Alternative 2—No Action). Nesting was confirmed in this PAC in 1987, 1995, and 2000. There would be a decrease in disturbance to owls in this PAC because of the route closures.

Spotted Owl PAC TL043 – BRIGHTMAN: No additions and no conversions from a closed to open status. One route would be closed. Result is a reduction of 0.54 miles from the current situation (Alternative 2—No Action). There would be a decrease in disturbance to owls in this PAC because of the route closures.

Spotted Owl PAC TL256 - CLAVEY RIVER: No additions and no conversions from a closed to open status. One route would be closed. Result is a reduction of 0.34 miles from the current situation (Alternative 2—No Action). There would be a decrease in disturbance to owls in this PAC because of the route closures.

Table 33 summarizes the findings from the analysis.

Table 33. California spotted owl: summary of PAC-by-PAC analysis—Alternative 1

Level of contribution to disturbance	Rationale	PAC count	% of total
HIGH	Route being added within 60 meters (60 meters) of activity center. A lot of other routes being added.	1	<1%
MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography	20	9%
LOW	Routes being added less than 400 meters but more than 0.2 mile from activity center. Activity center on other side of ridge from loop. Additions less than 10% of total mileage currently drivable in PAC.	1	<1%
LOW	Route being added 0.20 mile from activity center. Less than 6% of total drivable miles now in PAC. Existing routes less than 60 meters on either side of activity center, so disturbance from the existing routes would greatly outweigh the potential increased disturbance from the addition	1	<1%
LOW	Route that is less than 400 meters from activity center is short spur (<0.01 mile) off existing route on edge of PAC 0.14 mile from activity center	1	<1%
LOW	All additions and conversions from closed to open >400 meters from activity center	24	11%
LOW	Route being added >400 meters from activity center, and route being closed in PAC	1	<1%
Total of LOW		28	13%
NONE--DECREASE	No routes being added or converted from closed to open, but routes are being converted from	3	1%

	open to closed		
	Total PACs in which routes are being added and/or being converted from closed to open	49	22%

Routes would be added and/or routes would be converted from a closed to open status in 49 PACs, 22% of the PACs in the project area. One PAC (TL041) would have a route added to the NFTS within 60 meters (200 feet) of the activity center on which the PAC is based. Because of the proximity of the route to the activity center, there would be a high level of contribution to disturbance of the owls at this PAC's activity center (less than 1% of the total).

In 24 of the PACs, the routes to be added and the routes to be converted from a closed to open status would be more than ¼ mile from the activity center at their closest point. The level of contribution to disturbance of the owls at these PACs' activity centers is considered low because of the distance of these routes from the PACs' activity centers.

One PAC (TL206) in which the one route to be added would be more than ¼ mile from the activity center also has a route which would be closed. The level of contribution to disturbance of the owls at this PAC's activity center is considered low because of the distance of the one addition from the PAC's activity center.

In one PAC (TL055), while the routes to be added are less than ¼ mile from the PAC's activity center, the level of contribution to disturbance at this PAC's activity center is considered low for the following reasons: (1) the routes form parts of a loop that is on the other side of a ridge from the activity center; (2) the closest part of the loop is 0.20 mile from the activity center; (3) the additions are less than 10% of the total mileage currently drivable in the PAC.

The level of contribution to disturbance at PAC TL057's activity center, while the one route to be added is within ¼ mile of the activity center, is also considered low for the following reasons: (1) the addition is less than 6% of the total mileage currently drivable in the PAC; (2) there are existing routes that would still be part of the system less than 60 meters on either side of the activity center, so disturbance from the existing routes would greatly outweigh the potential increased disturbance from the addition; (3) the route being added is 0.20 mile from the activity center.

The route that is being added in PAC TL012 within ¼ mile of the PAC's activity center contributes a low level of disturbance to the PAC's activity center, because it is a short spur (less than 0.01 mile in length) off an existing route on the edge of a PAC 0.14 mile from the activity center.

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

The contribution to disturbance in 20 PACs (9% of the total) is considered at a moderate level because there are additions and/or conversion from a closed to open status from 60 meters to ¼ mile from the PACs' activity centers, and there is no intervening topography to shield the activity centers from the noise along those routes.

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

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

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

- It is assumed that motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting owls and that effects from motorized activities within 60 meters of an activity center would result in negative effects to reproduction over the short term.

- Only one PAC (less than 1% of the total number of PACs in the project area) would have routes added to the NFTS or routes converted from closed to open within 60 meters of that PAC's activity center.
- In three PACs disturbance would be reduced from that currently existing because the only change within those PACs would be route closures.

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

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

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

Alternative 2

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 3). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to spotted owls.

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

Alternative 3

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to spotted owls.

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

Alternative 4

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

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 34). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above.

Table 34. California Spotted Owl: Direct and Indirect Effects Indicators - Alternative 4

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

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

[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

The same detailed PAC-by-PAC analysis was conducted for Alternative 4 as for Alternative 1 on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. The same assumptions were used in ranking the routes within the alternative as contributing a high,

moderate, or low level of disturbance to the owls at each activity center. A spreadsheet in the project record (CSO_CHANGES_BY_PAC) shows the details of that analysis.

For information on PACs in which the changes under Alternative 4 would be the same as the changes under Alternative 1, please see the discussion above under Alternative 1.

There are some PACs under Alternative 4 which would have additions and/or conversions from a closed to open status in them but which would not have either of those types of changes under Alternative 1. Some PACs which would have those types of changes under Alternative 1 would have more changes under Alternative 4. Some PACs which would have changes from an open to a closed status under Alternative 1 would have none of or fewer than those types of changes under Alternative 4. The following table summarizes the information for the PACs in which the changes would be different under Alternative 4 from those under Alternative 1.

Table 35. California spotted owl: PAC-by-PAC analysis. PACs in which changes under Alternative 4 would be different than under Alternative 1

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC MP085 - COALPIT HILL	17EV183	0.05									
Spotted Owl PAC MP085 - COALPIT HILL	FR98485	0.05									
Spotted Owl PAC MP085 - COALPIT HILL			03S06	0.12							
TOTAL		0.10					0.10	5.10%	5.10%	MOD	ROUTES BEING ADDED OR CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters AND MORE THAN 60 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY
Spotted Owl PAC TL024 - S.F.TUOLUMNE			01S79	0.34192			0.34	11.59%	11.59%	MOD	ROUTES BEING ADDED OR CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters AND MORE THAN 60 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC TL053 - BRUSHY CR	17EV28	0.47					0.47	18.41%	18.41%	MOD	ROUTES BEING ADDED OR CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters AND MORE THAN 60 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY
Spotted Owl PAC TL128 - LOW. TROUT CR.	18EV100	0.08									
Spotted Owl PAC TL128 - LOW. TROUT CR.	18EV100	0.31									
Spotted Owl PAC TL128 - LOW. TROUT CR.	18EV101A	0.12									
Spotted Owl PAC TL128 - LOW. TROUT CR.	18EV101B	0.42									
Spotted Owl PAC TL128 - LOW. TROUT CR.	18EV106	0.00									

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC TL128 - LOW. TROUT CR.	18EV67	0.32									
Spotted Owl PAC TL128 - LOW. TROUT CR.			03N26YB	0.14							
Spotted Owl PAC TL128 - LOW. TROUT CR.			03N26YB	0.10							
TOTAL		1.25		0.24			1.48	35.52%	35.52%	MOD	ROUTES BEING ADDED OR CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters AND MORE THAN 60 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY
Spotted Owl PAC TL130 - CAMP CLAVEY	17EV299	0.16									
Spotted Owl PAC TL130 - CAMP CLAVEY	17EV51	0.39									
Spotted Owl PAC TL130 - CAMP CLAVEY	18EV258	0.00									

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC TL130 - CAMP CLAVEY	18EV56	0.33									
TOTAL		0.88					0.88	36.42%	36.42%	MOD	ROUTES BEING ADDED OR CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters AND MORE THAN 60 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY
Spotted Owl PAC TL152 - UPP. SOUTH FK.	17EV212	0.43									
Spotted Owl PAC TL152 - UPP. SOUTH FK.	17EV249	0.12									
Spotted Owl PAC TL152 - UPP. SOUTH FK.	17EV249A	0.10									
Spotted Owl PAC TL152 - UPP. SOUTH FK.	17EV266	0.03									
Spotted Owl PAC TL152 - UPP. SOUTH FK.	17EV267	0.22									

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC TL152 - UPP. SOUTH FK.	17EV268	0.13									
TOTAL		1.03					1.03			MOD	ROUTES BEING ADDED OR CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters AND MORE THAN 60 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY
Spotted Owl PAC TL181 - LILY LAKE			04N09	0.22			0.22	14.83%	14.83%	MOD	ROUTES BEING ADDED OR CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters AND MORE THAN 60 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY
Spotted Owl PAC TL203 - RUBY FIRE	16EV257	1.39									
Spotted Owl PAC TL203 - RUBY FIRE	16EV272	0.52									
Spotted Owl PAC TL203 - RUBY FIRE	16EV273	0.19									

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC TL203 - RUBY FIRE	16EV306	0.16									
Spotted Owl PAC TL203 - RUBY FIRE	16EV78	0.19									
Spotted Owl PAC TL203 - RUBY FIRE	16EV79	0.42									
Spotted Owl PAC TL203 - RUBY FIRE	16EV81	0.19									
TOTAL		3.06					3.06	51.00%	51.00%	MOD	ROUTES BEING ADDED OR CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters AND MORE THAN 60 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY
Spotted Owl PAC TL255 - BOX SPRING	17EV14	0.03158					0.03	78.95%	78.95%	MOD	ACTIVITY CENTER NOT KNOWN. >400 meters FROM BEST HABITAT.
Spotted Owl PAC - Middle Fork	1S1822B	0.05									

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC - Middle Fork	FR98506	0.13									
Spotted Owl PAC - Middle Fork	FR98507	0.05									
Spotted Owl PAC - Middle Fork	FR98523	0.03									
Spotted Owl PAC - Middle Fork	1S1822C	0.08									
TOTAL		0.33					0.33	12.72%	12.72%	LOW	ALL ADDITIONS AND CONVERSIONS FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER
Spotted Owl PAC TL009 - SHANAHAN FLAT			01S39	0.45							
Spotted Owl PAC TL009 - SHANAHAN FLAT			01S42	0.13							
TOTAL				0.58			0.58	20.36%	20.36%	LOW	ALL ADDITIONS AND CONVERSIONS FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC TL026 - RUSH CREEK	FR98496	0.26					0.26	8.85%	8.85%	LOW	ALL ADDITIONS AND CONVERSIONS FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER
Spotted Owl PAC TL051 - SCHOETTGEN PASS	16EV268	0.09									
Spotted Owl PAC TL051 - SCHOETTGEN PASS	17EV117	0.28									
TOTAL		0.57					0.57	35.24%	35.24%	LOW	ALL ADDITIONS AND CONVERSIONS FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER
Spotted Owl PAC TL109 - DEER CK. WEST			03N24A	0.00			0.00	0.22%	0.22%	LOW	ALL ADDITIONS AND CONVERSIONS FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC TL222 - DRY MEADOW	16EV115	0.07									
Spotted Owl PAC TL222 - DRY MEADOW	17EV233	0.10									
TOTAL		0.17					0.17	12.82%	12.82%	LOW	ALL ADDITIONS AND CONVERSIONS FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER

Following is a discussion of each PAC in which the changes would be different under Alternative 4 from those under Alternative 1.

Spotted Owl PAC MP085 - COALPIT HILL: Two additions more than ¼ mile from activity center. One addition 0.11 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from the route, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL024 – SOUTH FORK TUOLUMNE: No additions. One route being converted from closed to open 0.24 mile from activity center. Result of alternative is a reduction of 0.23 mile from the current situation (Alternative 2—No Action). Because route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL053 - BRUSHY CREEK: One addition 0.18 mile from activity center. Result of alternative is a reduction of 0.06 mile from the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from the route, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL128 - LOWER TROUT CREEK: Five additions and two segments being converted from a closed to open status more than ¼ mile from activity center. One addition is 0.16 mile from activity center. Result of alternative is a reduction of 0.32 miles from the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL130 - CAMP CLAVEY: Two additions more than ¼ mile from activity center. One addition is 0.16 mile from activity center, another 0.21 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because routes are between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL152 - UPPER SOUTH FORK: Five additions more than ¼ mile from activity center. One addition is 0.15 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because routes are between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL181 - LILY LAKE: No additions. One route being converted from a closed to open status 0.13 mile from activity center. Result of alternative is a reduction of 0.06 miles from the current situation (Alternative 2—No Action). Because one route is between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL203 - RUBY FIRE: Two additions more than ¼ mile from activity center. Five additions are between 60 meters and ¼ mile of activity center Result of alternative is a reduction of 0.26 mile from the current situation (Alternative 2—No Action). Because routes are between 60 meters and ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from routes, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL255 - BOX SPRING: Activity center location not known. Addition 0.83 mile from best habitat in PAC (CWHR 5D). Result of alternative is a reduction of 0.40 mile from the current situation (Alternative 2—No Action). Because the location of the activity center is not known, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC - MIDDLE FORK: All additions more than ¼ mile from activity center. Result of alternative is a reduction of 0.09 mile from the current situation (Alternative 2—No Action). Reproduction in PAC confirmed in 2007. Because the additions are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL009 - SHANAHAN FLAT: No additions. All routes proposed to be converted from a closed to an open status more than ¼ mile from activity center. Result of alternative is a reduction of 0.29 mile from the current situation (Alternative 2—No Action). Because the routes to be converted from closed to open are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL026 - RUSH CREEK: Addition more than ¼ mile from activity center. Result of alternative is a reduction of 0.86 mile from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL109 - DEER CREEK WEST: No additions. Route being converted from a closed to open status is a spur less than 0.005 mile in length, more than ¼ mile from activity center. Result of alternative is a reduction of 0.12 mile from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center and because one route is being closed, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL222 - DRY MEADOW: Additions more than ¼ mile from activity center. Result of alternative is a reduction of 0.04 mile from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Spotted Owl PAC TL055 - LOWER DEER CREEK: One addition more than ¼ mile from activity center. 3 additions part of narrow loop off existing route. Result of alternative is a reduction of 0.52 miles from the current situation (Alternative 2—No Action). Because one addition is more than ¼ mile from the activity center, because the end of the loop closest to activity center is 0.23 mile away and on other side of the ridge, and because the additions are less than 10% of the total mileage currently drivable in the PAC, the level of contribution to disturbance of the owls at this PAC's activity center is considered moderate.

Table 36 summarizes the findings from the analysis.

Table 36. California spotted owl: summary of PAC-by-PAC analysis—Alternative 4

Level of contribution to disturbance	Rationale	PAC count	% of total
HIGH	Route being added within 60 meters (60 meters) of activity center. A lot of other routes being added.	1	<1%
MOD	Routes being added or converted from closed to open less than 400 meters and more than 60 meters from activity center, and no intervening topography	25	11%

Level of contribution to disturbance	Rationale	PAC count	% of total
LOW	Routes being added less than 400 meters but more than 0.2 mile from activity center. Activity center on other side of ridge from loop. Additions less than 10% of total mileage currently drivable in PAC.	1	<1%
LOW	Route being added 0.20 mile from activity center. Less than 6% of total drivable miles now in PAC. Existing routes less than 60 meters on either side of activity center, so disturbance from the existing routes would greatly outweigh the potential increased disturbance from the addition	1	<1%
LOW	Route that is less than 400 meters from activity center is short spur (<0.01 mile) off existing route on edge of PAC 0.14 mile from activity center	1	<1%
LOW	All additions and conversions from closed to open >400 meters from activity center	26	12%
Total of LOW		29	13%
	Total PACs in which routes are being added and/or being converted from closed to open	55	25%

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

In 26 of the PACs (12% of the PACs), the routes to be added and the routes to be converted from a closed to open status would be more than ¼ mile from the activity center at their closest point. The level of contribution to disturbance is considered low because of the distance of these routes from the PACs' activity centers.

One PAC (TL206) in which the one route to be added would be more than ¼ mile from the activity center also has a route which would be closed. The level of contribution to disturbance in this PAC is considered low because of the distance of the one addition from the PAC's activity center.

In one PAC (TL055), while the routes to be added are less than ¼ mile from the PAC's activity center, level of contribution to disturbance is considered low for the following reasons: (1) the routes form parts of a loop that is on the other side of a ridge from the activity center; (2) the closest part of the loop is 0.20 mile from the activity center; (3) the additions are less than 10% of the total mileage currently drivable in the PAC.

The level of contribution to disturbance in PAC TL057, while the one route to be added is within ¼ mile of the activity center, is also considered low for the following reasons: (1) the addition is less than 6% of the total mileage currently drivable in the PAC; (2) there are existing routes that would still be part of the system less than 60 meters on either side of the activity center, so disturbance from the existing routes would greatly outweigh the potential increased disturbance from the addition; (3) the route being added is 0.20 mile from the activity center.

The level of contribution to disturbance is considered low in PAC TL012 because, although the route that is being added in PAC TL012 within ¼ mile of the PAC's activity center, it is a short spur (less than 0.01 mile in length) off an existing route on the edge of a PAC 0.14 mile from the activity center.

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

The level of contribution to disturbance to owls at the activity centers of twenty-five PACs (11% of the total) is considered moderate because there are additions and/or conversion from a closed to open status from 60 meters to ¼ mile from the PACs' activity centers, and there is no intervening topography to shield the activity centers from the noise along those routes.

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

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

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

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

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

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

Alternative 5

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 37). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above. In the absence of further research, it is assumed that motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting owls. Based on that assumption, less than 1% of activity centers would receive some disturbance from adding routes to the NFTS and opening routes currently closed. Without further research, this analysis will assume that effects within 60 meters (approximately 200 feet) of an activity center will result in negative effects to reproduction over the short term. This alternative would not result in increased amounts of motorized use over the existing NFTS within 60 meters of any activity centers. Since there is a decrease from Alternative 1 in the number of routes added to the system

or converted to a trail within PACs, near activity centers, and within preferred habitat, there would be a decrease in the direct and indirect effects to individual spotted owls within the project area. Although these effects would impact individuals over the short term, they would not result in impacts to populations within the project area over the short or long term.

Table 37. California Spotted Owl: Direct and Indirect Effects Indicators - Alternative 5

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

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

[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

The same detailed PAC-by-PAC analysis was conducted for Alternative 5 as for Alternative 1 on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. The same assumptions were used in ranking the routes within the alternative as contributing a high, moderate, or low level of disturbance to the owls at each activity center. A spreadsheet in the project record (CSO_CHANGES_BY_PAC) shows the details of that analysis.

For information on PACs in which the changes under Alternative 5 would be the same as the changes under Alternative 1, please see the discussion above under Alternative 1.

There are some PACs under Alternative 1 which would have additions and/or conversions from a closed to open status in them but which would not have either of those types of changes under Alternative 5. Some PACs which would have those types of changes under Alternative 1 would have fewer changes under Alternative 5. Some PACs which would have changes from an open to a closed status under Alternative 5 would have none of or fewer than those types of changes under Alternative 1. The following table summarizes the information for the PACs in which the changes would be different under Alternative 5 compare to those under Alternative 1.

Table 38. California spotted owl: PAC-by-PAC analysis. PACs in which changes under Alternative 5 would be different than under Alternative 1, except for those PACs in which there would be no additions or conversions from closed to open

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC CA027	FR14617	0.01					0.01	0.65%	0.65%	LOW	ALL ADDITIONS AND CONVERSIONS FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER
Spotted Owl PAC MP085 - COALPIT HILL	17EV183	0.05						2.66%	0.00%	LOW	ALL ADDITIONS AND CONVERSIONS FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER
Spotted Owl PAC TL041 - ROSE CREEK	16EV303	0.03									
Spotted Owl PAC TL041 - ROSE CREEK	22	0.03									

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
TOTAL		0.05					0.05	1.11%	1.11%	LOW	ALL ADDITIONS AND CONVERSIONS FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER
Spotted Owl PAC TL214 - CAMP IDA			03N60	0.09			0.09	2.85%	2.85%	LOW	ALL ADDITIONS AND CONVERSIONS FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER
Spotted Owl PAC - Middle Fork					01S11Y	0.01					
Spotted Owl PAC - Middle Fork					01S15Y	0.17					
Spotted Owl PAC - Middle Fork					01S15Y	0.99					

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC - Middle Fork					01S15YA	0.91					
TOTAL						2.07	-2.07	0.00%	-79.37%	NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED
Spotted Owl PAC TL026 - RUSH CREEK					01S70	0.97					
Spotted Owl PAC TL026 - RUSH CREEK					01S70	0.34					
Spotted Owl PAC TL026 - RUSH CREEK					01S70A	0.22					
TOTAL						1.53	-1.53	0.00%	-51.11%	NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC TL030 - WILSON MEADOW					01N97	1.52	-1.52	0.00%	-99.79%	NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED
Spotted Owl PAC TL031 - REED CREEK					01N15	1.08	-1.08	0.00%	-65.26%	NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED
Spotted Owl PAC TL043 - BRIGHTMAN					06N36Y	0.54	-0.54	0.00%	-69.76%	NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
Spotted Owl PAC TL045					05N02R	0.38	-0.38	0.00%	-38.98%	NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED
Spotted Owl PAC TL208 - UPP. DEER CK					03N58	0.06	-0.06	0.00%	-3.25%	NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED
Spotted Owl PAC TL256 - CLAVEY RIVER					02N58	0.34	-0.34	0.00%	-24.35%	NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED

Following is a discussion of each PAC in which the changes would be different under Alternative 5 from those under Alternative 1.

Spotted Owl PAC MP085 - COALPIT HILL: One addition more than ¼ mile from activity center. Result of alternative is a reduction of 0.16 mile from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL041 - ROSE CREEK: Additions more than ¼ mile from activity center. Result of alternative is a reduction of 2.24 miles from the current situation (Alternative 2—No Action). Because the addition is more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC TL214 - CAMP IDA: Route converted from an open to closed status more than ¼ mile from activity center. Result of alternative is a reduction of 0.10 mile from the current situation (Alternative 2—No Action). Because the addition and the route being converted are more than ¼ mile from activity center, the level of contribution to disturbance of the owls at this PAC's activity center is considered low.

Spotted Owl PAC - MIDDLE FORK: No additions or route conversions from a closed to open status. Route closures, one 120 feet and another 0.02 mile from activity center, total 2.07 miles in PAC. Result of alternative is a reduction of 1.34 miles from the current situation (Alternative 2—No Action). Reproduction in PAC confirmed in 2007. There would be a decrease in disturbance to owls in this PAC because of the route closures.

Spotted Owl PAC TL026 - RUSH CREEK: No additions or route conversions from a closed to open status. Route closures total 1.53 miles in PAC. Result of alternative is a reduction of 1.13 miles from the current situation (Alternative 2—No Action). There would be a decrease in disturbance to owls in this PAC because of the route closures.

Spotted Owl PAC TL030 - WILSON MEADOW: No additions or route conversions from a closed to open status. Route closure, 1.52 miles in PAC, would be 75 feet from activity center. Under this alternative there would be no drivable routes in the PAC. Reproduction in PAC confirmed in 1991 and 2000. There would be a decrease in disturbance to owls in this PAC because of the route closure.

Spotted Owl PAC TL045: No additions or route conversions from a closed to open status. Route closure of 0.38 mile in PAC. Result of alternative is a reduction of 0.38 mile from the current situation (Alternative 2—No Action). There would be a decrease in disturbance to owls in this PAC because of the route closure.

Spotted Owl PAC TL208 - UPPER DEER CREEK: No additions or route conversions from a closed to open status. Route closure of 0.06 mile in PAC. Result of alternative is a reduction of 1.06 miles from the current situation (Alternative 2—No Action). There would be a decrease in disturbance to owls in this PAC because of the route closure.

Spotted Owl PAC MP006 - NED GULCH: No changes to this PAC under this alternative.

Spotted Owl PAC MP082 - DEER LICK CREEK: No changes to this PAC under this alternative.

Spotted Owl PAC TL028 - BEAR MOUNTAIN: No changes to this PAC under this alternative.

Spotted Owl PAC TL049 - EAGLE CK CAMP: No changes to this PAC under this alternative.

Spotted Owl PAC TL052 – CRANDALL: No changes to this PAC under this alternative.

Spotted Owl PAC TL128 - LOWER TROUT CREEK: No changes to this PAC under this alternative.

Spotted Owl PAC TL129 - UPPER 2-MILE CREEK: No changes to this PAC under this alternative.

Spotted Owl PAC TL130 - CAMP CLAVEY: No changes to this PAC under this alternative.

Spotted Owl PAC TL132 - HULL CREEK CAMP: No changes to this PAC under this alternative.

Spotted Owl PAC TL165 - FAHEY CABIN: No changes to this PAC under this alternative.

Spotted Owl PAC TL174: No changes to this PAC under this alternative.

Spotted Owl PAC TL177 - ASCENSION MOUNTAIN WEST: No changes to this PAC under this alternative.

Spotted Owl PAC TL187 - THOMPSON MEADOW: No changes to this PAC under this alternative.

Spotted Owl PAC TL193: No changes to this PAC under this alternative.

Spotted Owl PAC TL203 - RUBY FIRE: No changes to this PAC under this alternative.

Spotted Owl PAC TL217 - WAGNER RIDGE: No changes to this PAC under this alternative.

Spotted Owl PAC TL223: No changes to this PAC under this alternative.

Spotted Owl PAC TL261 - UPPER CAMP 25: No changes to this PAC under this alternative.

Spotted Owl PAC TL055 - LOWER DEER CK: No changes to this PAC under this alternative.

Spotted Owl PAC TL057 - NORTH FORK TUOLUMNE: No changes to this PAC under this alternative.

Spotted Owl PAC TL012 - ACKERSON CREEK: No changes to this PAC under this alternative.

Spotted Owl PAC TL159 - UPPER BOURLAND: No changes to this PAC under this alternative.

Spotted Owl PAC CA024: No changes to this PAC under this alternative.

Spotted Owl PAC MP005 - MARBLE GULCH: No changes to this PAC under this alternative.

Spotted Owl PAC TL011 - BIG CREEK: No changes to this PAC under this alternative.

Spotted Owl PAC TL029 - GRANITE CREEK: No changes to this PAC under this alternative.

Spotted Owl PAC TL039 - ACKERSON MOUNTAIN: No changes to this PAC under this alternative.

Spotted Owl PAC TL040 – MIDDLE FORK TUOLUMNE: No changes to this PAC under this alternative.

Spotted Owl PAC TL051 - SCHOETTGEN PASS: No changes to this PAC under this alternative.

Spotted Owl PAC TL058 - MILE 23: No changes to this PAC under this alternative.

Spotted Owl PAC TL095 - CORRAL CREEK: No changes to this PAC under this alternative.

Spotted Owl PAC TL097: No changes to this PAC under this alternative.

Spotted Owl PAC TL105 - FRENCH CAMP: No changes to this PAC under this alternative.

Spotted Owl PAC TL139 - CEDAR RIDGE: No changes to this PAC under this alternative.

Spotted Owl PAC TL152 - UPPER SOUTH FORK: No changes to this PAC under this alternative.

Spotted Owl PAC TL163 - RUSHING MEADOW: No changes to this PAC under this alternative.

Spotted Owl PAC TL173 - ROCK CREEK SADDLE: No changes to this PAC under this alternative.

Spotted Owl PAC TL205 - NORTH NIAGRA: No changes to this PAC under this alternative.

Spotted Owl PAC TL216 - MILE 16: No changes to this PAC under this alternative.

Spotted Owl PAC TL222 - DRY MEADOW: No changes to this PAC under this alternative.

Spotted Owl PAC TL257 - WESTSIDE EAST: No changes to this PAC under this alternative.

Spotted Owl PAC TL258 - WESTSIDE WEST: No changes to this PAC under this alternative.

Table 39 summarizes the findings from the analysis.

Table 39. California spotted owl: summary of PAC-by-PAC analysis—Alternative 5

Level of contribution to disturbance	Rationale	PAC count	% of total
LOW	All additions and conversions from closed to open >400 meters from activity center	4	2%
NONE--DECREASE	No routes being added or converted from closed to open, but routes are being converted from open to closed	8	4%
	Total PACs in which routes are being added and/or being converted from closed to open	4	2%

Routes would be added and/or routes would be converted from a closed to open status in 4 PACs, 2% of the PACs in the project area. In those 4 PACs, the routes to be added and the routes to be converted from a closed to open status would be more than ¼ mile from the activity center at their closest point. The level of contribution to disturbance is considered low because of the distance of these routes from the PACs' activity centers.

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

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

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

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

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

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

Cumulative Effects

In its Notice of Finding on a petition to list the California spotted owl, the USFWS identified that loss of habitat to stand-replacing fires and habitat modification for fuels reduction were the primary risk factors to California spotted owls occurring on NFS lands (USDI 2006). Appendix B provides a list and description of past, present, and reasonably foreseeable projects on the STF

and private lands within the STF boundary. Some, but not all, of these activities will contribute to effects upon California spotted owls.

Based on GIS analysis, 14 wildfires have burned through 17 or 8% of spotted owl PACs affecting approximately 971 acres or 2% of those PACs since 2000. Forest vegetation/fuels thinning projects (designed to reduce the risk of additional habitat loss to wildfires) have treated within approximately 1,410 acres or 2% of spotted owl PACs between 2000 and 2008. CDF currently lists a total of 2,365 acres of private land within the STF administrative boundary for which timber harvest plans have been submitted. Timber harvest on private lands is generally more intensive and does not typically maintain habitat suitability for spotted owls. These wildfires, fuels treatment, and timber harvest projects have resulted in reduction in the amount and quality of spotted owl habitat within the STF boundary.

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

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

Table 40 shows the total drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. The effect of open motorized routes on spotted owl populations or habitats was not identified as a significant risk factor by either the Forest Service (USDA 2004) or the USFWS (USDI 2006). However, given the proportion of spotted owl nest sites and habitat potentially affected, as indicated in the table, and considering the projections for future increases in recreation uses and OHV activity, Alternative 2 may, over time, contribute to measurable cumulative effects upon spotted owl populations. Because Alternative 2 does not restrict vehicles to designated routes, there is a high degree of uncertainty about where future route proliferation in owl habitat may occur that may have disturbance and habitat effects beyond the effects of routes open to motorized use. Alternative 2 presents the greatest risk of contributing to adverse cumulative effects upon spotted owl habitat and populations because there would not be a prohibition on cross-country travel. Alternative 5 contributes the least to cumulative effects because cross-country travel would be prohibited and open route densities in spotted owl habitat would be lowest. Alternatives 4, 1, and 3 would result in progressively lower risk to spotted owls due to the amount of motorized routes resulting from each alternative. Considering the proportion of spotted owl habitat influenced by motorized routes and projections for future increases in recreation uses and OHV activity, the alternatives may result in minor cumulative impacts when combined with other factors affecting spotted owl habitat. Although adding routes to the NFTS and opening routes currently closed may result in cumulative impacts, they are very minor in comparison to total route densities and other potentially significant impacts (fire, fuels/vegetation treatments).

Table 40. Total drivable routes in California spotted owl habitats

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

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

Determinations

Alternative 1

This alternative would result in disturbance within the project area, but would be limited over the long-term since cross-country travel would be prohibited. Disturbance resulting from this alternative would likely result in adverse impacts to some pairs and individual spotted owls. Since California spotted owls are widespread throughout the project area, since effects would be limited to a small percentage of the activity centers, and since cross-country travel would be prohibited, these effects would not likely result in any impacts to California spotted owl populations within the project area over the short or long-term. This alternative would have the third most impact on the spotted owl.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the California spotted owl.

Alternative 2

Although this alternative would result in increased amounts of disturbance and habitat fragmentation within the project area, continued route proliferation would ultimately be limited by topography and wilderness areas. Disturbance resulting from this alternative would likely result in adverse impacts to individual California spotted owls. Increased habitat fragmentation from route proliferation would likely result in impacts to individuals over the short and long term. California spotted owls are distributed throughout the project area and throughout the central Sierra Nevada Mountains. Therefore, population level impacts would be minor and would not threaten the long-term viability of the species. This alternative would have the most impact on the spotted owl.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the California spotted owl.

Alternative 3

This alternative would result in disturbance within the project area, but would be limited over the long-term since cross-country travel would be prohibited. Disturbance resulting from this alternative would likely result in adverse impacts to some pairs and individual spotted owls. Since California spotted owls are widespread throughout the project area, since effects would be limited to a small percentage of the activity centers, and since cross-country travel would be prohibited, these effects would not likely result in any impacts to California spotted owl populations within the project area over the short or long-term. This alternative would have the second least impact on the spotted owl.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the California spotted owl.

Alternative 4

This alternative would result in disturbance within the project area, but would be limited over the long-term since cross-country travel would be prohibited. Disturbance resulting from this alternative would likely result in adverse impacts to some pairs and individual spotted owls. Since California spotted owls are widespread throughout the project area, since effects would be limited to a small percentage of the activity centers, and since cross-country travel would be prohibited, these effects would not likely result in any impacts to California spotted owl populations within the project area over the short or long-term. This alternative would have the second most impact on the spotted owl.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the California spotted owl.

Alternative 5

This alternative would result in disturbance within the project area, but would be limited over the long-term since cross-country travel would be prohibited. Disturbance resulting from this alternative would likely result in adverse impacts to some pairs and individual spotted owls. Since California spotted owls are widespread throughout the project area, since effects would be limited to a small percentage of the activity centers, and since cross-country travel would be prohibited, these effects would not likely result in any impacts to California spotted owl populations within the project area over the short or long-term. This alternative would have the least impact on the spotted owl.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the California spotted owl.

Great Gray Owl, *Strix nebulosa*

Species and Habitat Account

The great gray owl is a large nocturnal owl that is not easily observed. It is found in the boreal climatic zones of North America from Alaska to central California (Franklin 1988). The population that inhabits California represents the southern extent of its range (van Riper III and Wagtendonk 2006). Yosemite National Park and the STF currently represent the core range of the great gray owl in California. There are currently 21 documented great gray owl PACs on the STF, which are primarily located on the southern portion of the Forest. Great gray owl PACs are defined as "at least 50 acres of the highest quality nesting habitat available in the forested area surrounding nests and the meadow or meadow complex that support a prey base for the nesting owls" (USDA 2004). Although there are 21 designated PACs within the project area, activity centers have only been designated for 12 of them. PACs that do not currently have a designated activity center have not had any documented activity for a significant period of time. Activity centers for the

PACs may not necessarily be nest sites, but may be the location of a roost site or territorial call. This data may vary in its accuracy, but it is currently considered the best available information and provides a means by which to evaluate the relative impacts of each of the project alternatives.

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

Management Direction

The great gray owl was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction does not provide any specific management direction related to this project for the great gray owl.

Direct & Indirect Effects

General – All Alternatives

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

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

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

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

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

Habitat Modification: The use of meadows for nest sites or foraging is likely affected by the quality of the meadow habitat. Meadow habitat quality may be affected in different ways by motorized travel. The most obvious way motorized vehicles may impair meadow quality is

through direct mechanical damage (rutting). Since soil typically has lower bulk density and can be more easily penetrated when it is wet, mechanical damage often occurs in meadows that are naturally wet or in dry meadows after significant rainfall or immediately following the retreat of the snow at higher elevations. When roads or trails are created in meadows they may intercept surface and subsurface flow (Kattelmann 1996). When flows are intercepted and redirected, meadow drying occurs, changing the fauna and flora associated with it.

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

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

Indicators

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

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

Alternative 1

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 41). Alternative 1 would result in the addition of 0.44 miles of motorized routes to 2 great gray owl PACs (Crocker Meadow and Ackerson 3) and 0.24 mile of routes converted from closed to open status in two PACs (Crocker Meadow and Jordan Valley). There would be a total of 0.24 mile of routes added within 400 meters of three Activity Centers and 0.13 mile of routes converted from closed to open status within 400 meters of one Activity Center. The Crocker Meadow PAC has great gray owl activity almost every year. Great grays nested there in 2007. Although the Ackerson 3 PAC has not had any recently documented activity, great gray owls use the entire Ackerson Meadow complex. Great gray owls have been seen at the Jordan Valley PAC in the fall and spring, but, in recent years, not during the breeding season. This alternative would result in disturbance to some individual great gray owls within the project area. Disturbance resulting from this alternative would not likely be substantial enough to reduce any individual owl's fitness. Therefore, it would not result in any population level impacts to the great gray owl.

Table 41. Great Gray Owl: Direct and Indirect Effects Indicators - Alternative 1

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

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

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

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

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

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

Alternative 2

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. All great gray owl

PACs and approximately 12,900 acres of emphasis habitat are currently open to cross-country travel.

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to great gray owls.

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

Alternative 3

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to great gray owl.

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

Alternative 4

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 42). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. There would be an additional 1.76 miles of routes added to the NFTS within great gray owl emphasis habitat. GIS analysis indicated that this route would not cross any streams nor would it impact the hydrology of the meadow.

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

Table 42. Great Gray Owl: Direct and Indirect Effects Indicators - Alternative 4

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

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

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

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

Alternative 5

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

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

Table 43. Great Gray Owl: Direct and Indirect Effects Indicators - Alternative 5

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

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

Season of Use: Although the exact timing may vary, great gray owls start nesting near the month of March. Since seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period and approximately 90% of the great

gray owl PACs would be within these Zones, these closures would reduce disturbance to those individuals returning to their breeding territories and starting to nest.

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

Cumulative Effects

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

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

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

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

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

Table 44 shows the total drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. Although human disturbance has not been recognized as a significant threat to great gray owls, the use of motorized vehicles in meadow habitats can have significant impacts to meadow hydrology and the associated flora and fauna. Disturbance in forested stands (nesting and

roosting habitat) probably does have an effect on individuals. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would cause the most disturbance to individuals. Because this alternative does not restrict vehicles to designated routes, there is a high degree of uncertainty about future route proliferation in great gray owl habitat, foraging as well as nesting and roosting habitats, which may have disturbance and habitat effects beyond the effects of routes open to motorized use. Meadows in particular are often easily accessed by vehicles. Therefore, the direct and indirect effects of Alternative 2 and the effects of continued livestock grazing may have significant impacts to individuals. Although the population of great gray owls within the project area is not precisely known, it is known to be relatively small with a limited distribution. Impacts to meadows that may be associated with unabated cross-country travel would likely impact enough individuals to result in measurable reductions to the population size within the project area.

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

Table 44. Total drivable routes in great gray owl habitats

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

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

Determinations

Alternative 1

The existing NFTS results in disturbance to great gray owls. The addition of routes within two PACs and within 400 meters (approximately 0.25 mile) of one activity center may result in some direct effects through minor amounts of disturbance to some individual owls. Field surveys indicated that indirect effects would be limited since routes within PACs and great gray owl emphasis habitat would not result in adverse impacts to meadow hydrology. Although the distribution of great gray owls is limited in the Sierra Nevada's, effects would only occur within two PACs and near one activity center. Since cross-country travel would be prohibited, since wide-scale seasonal closures would be implemented, and since potential disturbance would be minor, the effects of this alternative would not likely result in any impacts to the viability of great gray owl populations over the short or long term. This alternative would have the third greatest impact to great gray owls.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the great gray owl.

Alternative 2

Although this alternative would not result in the addition of any routes to the NFTS, cross-country travel would not be prohibited and route proliferation would continue to occur. Route proliferation would lead to increased habitat fragmentation. Meadows and near-by forested areas provide critical habitat for great gray owls and are easily accessed by off-road vehicles. Since meadows

are easily accessed and a desirable location for camping and other forest visitors, routes would likely be proliferated in and near many of the meadows within the project area over the long-term. This would result in direct effects through increased disturbance to nesting and foraging owls over the short and long term. Route proliferation in meadows would also likely result in indirect effects to owls through impacts to meadow hydrology over the short term and impacts to their prey base over the long term. These direct and indirect effects would likely result in great gray owl population declines within the project area over the long term. Since great gray owl distribution is limited in the Sierra Nevada and the project area represents a significant portion of their current range, unabated impacts to meadow habitats occurring from continued route proliferation would likely result in impacts to great gray owl populations over the long term. This alternative would have the greatest impact to great gray owls.

Therefore, it is my determination that this alternative "*would impact individuals or habitat with a consequence that the action would contribute to a trend towards federal listing or cause a loss of viability to the population or species*" for the great gray owl.

Alternative 3

The existing NFTS results in disturbance to great gray owls. Although the distribution of great gray owls is limited in the Sierra Nevada, effects would be limited. Since cross-country travel would be prohibited and since potential disturbance would be minor, the effects of this alternative would not likely result in any impacts to the viability of great gray owl populations over the short or long term. This alternative would have the second least impact to great gray owls.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the great gray owl.

Alternative 4

The existing NFTS results in disturbance to great gray owls. The addition of routes within two PACs and within 400 meters (approximately 0.25 mile) of one activity center may result in some direct effects through minor amounts of disturbance to some individual owls. Field surveys indicated that indirect effects would be limited since routes within PACs and great gray owl emphasis habitat would not result in adverse impacts to meadow hydrology. Although the distribution of great gray owls is limited in the Sierra Nevada's, effects would only occur within two PACs and near one activity center. Since cross-country travel would be prohibited, since wide-scale seasonal closures would be implemented, and since potential disturbance would be minor, the effects of this alternative would not likely result in any impacts to the viability of great gray owl populations over the short or long term. This alternative would have the second greatest impact to great gray owls.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the great gray owl.

Alternative 5

The existing NFTS results in disturbance to great gray owls. Since this alternative would not result in the addition of any routes to the NFTS within PACs or near activity centers, there would not be any additional direct or indirect effects to great gray owls over the short term. Since cross-country travel would be prohibited, since wide-scale seasonal closures would be implemented, and since potential disturbance would be minor, the effects of this alternative would not likely result in any impacts to the viability of great gray owl populations over the short or long term. All unauthorized routes within PACs would slowly rehabilitate. There is only one route within emphasis habitat and the remaining unauthorized routes would likely rehabilitate over the long term. This alternative would have the least impact on the great gray owl.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the great gray owl.

Northern Goshawk, *Accipiter gentilis*

Species and Habitat Account

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

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

Management Direction

The northern goshawk was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction contains the following management direction associated with the proposed project for the northern goshawk:

- Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, off-highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes, and recreational and other developments for their potential to disturb nest sites.

Direct & Indirect Effects

General - All Alternatives

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

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

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

Changes in Behavior: Types of changes in behavior that may result from the project alternatives include the following: displacement or avoidance, disturbance at a specific location, or physiological response. Critical times for human disturbance are through the nesting and post fledging period (February 15 through September 15). Because goshawks initiate breeding when the ground is still covered with snow and roads and trails are not in use, nests are sometimes directly located along roads and trails that provide flight access. Following melt-out these sites

can be prime candidates for conflict as humans begin using the roads and trails (USDA 2001). Northern goshawks are aggressive nest defenders that will attack humans that venture into active nest stands. The potential for negative human interactions increases where motorized routes or dispersed campsites are in proximity to goshawk nest stands (USDA 2001).

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

Habitat Modification: Roads and trails modify habitat by directly removing it or indirectly by reducing its quality. While simple habitat loss is the most obvious, roads and trails also reduce habitat quality through fragmentation. Northern goshawks may be affected by edge effects from roads when roads and trails fragment suitable habitat. Several studies indicate that goshawks are sensitive to changes in forest canopy closure and habitat fragmentation that could result from a network of roads (Beier and Drennan 1997, Daw and DeStefano 2001). Roads and trails can result in a reduction in interior forest patch size which decreases the amount of habitat available and increases the distance between suitable interior forest patches for late-successional species such as the goshawk.

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

Indicators

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

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

Alternative 1

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 45). Standards and guidelines in the STF LMP direct that impacts be mitigated where there is documented evidence of disturbance to the nest site from existing road or motorized trail use. The Forest has not monitored goshawk nest sites in proximity to roads or trails and has not documented specific instances of disturbance. Actual nest locations are often difficult to locate and may move around from year to year within a PAC. Therefore, actual nest locations remain unknown for many of the PACs and those nests that have been located may have moved since they were last located. Furthermore, it is not well known why goshawks choose certain nest sites from year to year, but it is likely that the nest sites will continue to move within the PAC over the long term. Activity centers may be defined as a nest site, a pair roost location, or a territorial single located within the PAC. In the absence of recent nest site locations for every PAC, the relative risk of project alternatives resulting in disturbance to nesting goshawks is evaluated by considering the indicators shown in Table 45).

Table 45. Northern Goshawk: Direct and Indirect Effects Indicators - Alternative 1

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

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

[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

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

A detailed PAC-by-PAC analysis was conducted on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. A spreadsheet in the project record (NOGO_CHANGES_BY_PAC) shows the details of that analysis.

The routes proposed to be added to the NFTS and the routes proposed to be converted from closed to open contribute a certain amount of disturbance to the activity center on which each PAC is based. Disturbance could result in flushing from nests, roosts, or perches, in alarm responses, and in increased stress hormone levels in some individual goshawks. Although actual disturbance effects will be largely influenced by site-specific factors, it is assumed that all routes within a PAC may result in disturbance to some goshawks. Therefore, if all the routes proposed to be added to the NFTS or proposed to be converted from closed to open are further than ¼ mile from the activity center on which a given PAC is based, it is assumed that the routes under this alternative in that PAC would contribute a low level of disturbance to the goshawks at that activity center. If any of the routes proposed to be added to the NFTS or proposed to be converted from closed to open are within 400 meters of the activity center, or if the location of the nest stand is unknown, it is assumed that the routes under this alternative in that PAC would contribute a high level of disturbance to the goshawks at that activity center. Within certain PACs meeting that criterion, the contribution to disturbance was rated as moderate for the reasons given below.

The following table summarizes the information from the spreadsheet. In the table, the column labeled “LEVEL OF CONTRIBUTION TO DISTURBANCE” refers to the contribution of the routes under the alternative to the disturbance to the goshawks at each PAC’s activity center.

Table 46. Northern goshawk: PAC-by-PAC analysis—Alternative 1

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
R05F16D51T03 - CLAVEY RIVER	17EV299	0.05									
R05F16D51T03 - CLAVEY RIVER	18EV57	0.13									
TOTAL		0.17					0.17	5.90%	5.90%	HIGH	LOCATION OF NEST STAND NOT KNOWN. ROUTES COULD BE CLOSE TO OR IN NEST STAND.
R05F16D54T07 - BIG CREEK BASIN			02S64C	0.22			0.22	15.07%	15.07%	HIGH	ROUTE BEING CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY
R05F16D54T25 - WOLFIN MEADOW			02N64	0.55			0.55	53.70%	53.70%	HIGH	ROUTE BEING CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
R05F16D51T20 - UPPER HULL CREEK	18EV309	0.08					0.08	3.37%	3.37%	MOD	ROUTE BEING ADDED LESS THAN 400 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY. HOWEVER, CLOSE TO 400 meters (0.22 MILE).
R05F16D54T40 - RUSH CREEK			01S65Y	0.14			0.14	8.30%	8.30%	MOD	ROUTE BEING CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY HOWEVER, CLOSE TO 400 meters (0.23 MILE).
R05F16D52T26 - LONG GULCH	FR98638	0.02					0.02	1.65%	1.65%	LOW	ADDITION >400 meters FROM ACTIVITY CENTER
R05F16D51T09 - TROUT CREEK	18EV67	0.19					0.19	18.47%	18.47%	LOW	ADDITION >400 meters FROM ACTIVITY CENTER

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
R05F16D51T16 - ADAM'S GULCH					01N58A	0.23	-0.23	0.00%	-66.81%	NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED

Following is a discussion of each PAC.

R05F16D51T03 - CLAVEY RIVER: The location of the nest stand is not known. Routes could be close to or in the nest stand. Result of alternative is a reduction of 0.17 mile from the current situation (Alternative 2—No Action). Because of the uncertainty about the nest stand location, the level of contribution to disturbance of the goshawks at this PAC's activity center deemed considered high.

R05F16D54T07 - BIG CREEK BASIN: No additions. Route being converted from closed to open is 0.14 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because the route is less than ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from the route, the level of contribution to disturbance of the goshawks at this PAC's activity center is considered high.

R05F16D54T25 - WOLFIN MEADOW: No additions. Route being converted from closed to open is 0.11 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Young were detected in 1995, 2000, 2001, and 2002 (last year PAC was checked). Because the route is less than ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from the route, the level of contribution to disturbance of the goshawks at this PAC's activity center is considered high.

R05F16D51T20 - UPPER HULL CREEK: Addition 0.22 mile from activity center. Result of alternative is a reduction of 0.10 miles from the current situation (Alternative 2—No Action). Because the route is nearly ¼ mile from the activity center, and because the route is less than 10% of the total drivable routes now in the PAC, the level of contribution to disturbance of the goshawks at this PAC's activity center is considered moderate.

R05F16D54T40 - RUSH CREEK: No additions. Route being converted from closed to open is 0.23 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because the route is nearly ¼ mile from the activity center, and because the route is less than 10% of the total drivable routes now in the PAC, the level of contribution to disturbance of the goshawks at this PAC's activity center is considered moderate.

R05F16D52T26 - LONG GULCH: Addition 0.31 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because the route is more than ¼ mile from the activity center, the level of contribution to disturbance of the goshawks at this PAC's activity center is considered low.

R05F16D51T09 - TROUT CREEK: One addition is 0.41 mile from activity center. Result of alternative is a reduction of 0.41 mile from the current situation (Alternative 2—No Action). Because the route is more than ¼ mile from the activity center, the level of contribution to disturbance of the goshawks at this PAC's activity center is considered low.

R05F16D51T16 - ADAM'S GULCH: No additions or route conversions from a closed to open status. Route closure of 0.23 mile in PAC. Result of alternative is a reduction of 0.23 miles from the current situation (Alternative 2—No Action). There would be a decrease in disturbance to goshawks in this PAC because of the route closure.

Table 47 summarizes the findings from the analysis.

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

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

The routes to be added in two PACs (R05F16D54T07 - BIG CREEK BASIN and R05F16D54T25 - WOLFIN MEADOW) are within ¼ mile of the activity centers, and there is no intervening topography to shield the activity centers from the noise generated those routes. Because of

these reasons, the level of contribution to disturbance to the goshawks at these PACs' activity centers is considered high.

Table 47. Northern goshawk: summary of PAC-by-PAC analysis—Alternative 1

Level of contribution to disturbance	Rationale	PAC count	% of total
HIGH	Nest stand not known, so routes could be close to or cross through nest stand	1	1%
HIGH	Routes being added or converted from closed to open less than 400 meters, and no intervening topography	2	3%
Total of HIGH		3	4%
MOD	Routes being added or being converted from closed to open nearly 400 meters from activity center. Additions less than 10% of total mileage currently drivable in PAC.	2	3%
LOW	Additions >400 meters from activity center	2	3%
NONE--DECREASE	No routes being added or converted from closed to open, but route are being converted from open to closed	1	1%
	Total PACs in which routes are being added and/or being converted from closed to open	7	9%

The level of contribution to disturbance at the activity centers of two PACs (R05F16D51T20 - UPPER HULL CREEK and R05F16D54T40 - RUSH CREEK), while the routes to be added are within ¼ mile of the activity center and the intervening topography would not shield the activity centers from the noise generated those routes, is considered moderate because (1) the additions are less than 10% of the total mileage currently drivable in the PACs, and (2) the routes being added are nearly ¼ mile from the activity center, 0.22 mile from the Upper Hull Creek PAC's activity center and 0.23 mile from the Rush Creek PAC's activity center..

In two of the PACs (R05F16D52T26 - LONG GULCH and R05F16D51T09 - TROUT CREEK), the routes to be added would be more than ¼ mile from the activity center. The level of contribution to disturbance is considered low because of the distance of these routes from the PACs' activity centers.

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

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

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

On the STF, there are 76 known goshawk activity centers. There is available data on 23, or 30%, of those activity centers. The 23 activity centers are located on the Summit and Groveland Ranger Districts, 11 on Summit and 12 on Groveland. Of those 23, the goshawks at 17 (74% of the 23) had young in at least one year recorded in the database consulted. Of those, 13 (76% of the 17) have at least one route that is considered drivable. That is, the route is (1) ML1 (closed), (2) ML2, (3) ML3, (4) administrative use, (5) unauthorized, (6) other public, or (7) private. (Not

included are routes that (1) have been closed by NEPA, (2) have been decommissioned, or (3) are overgrown.) Details on this analysis can be found in the project record.

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

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

Additional assumptions are as follows:

- The activity centers on which data is available is representative of all the activity centers on the Forest. Summit District includes the higher elevation activity centers, and Groveland includes the lower elevation activity centers.
- Routes that are classed as ML1 and routes that are unauthorized are currently being used. Field review for this and other projects has shown that many ML1 routes are not physically closed, and so are often being used. The routes designated as unauthorized exist on the ground, and were created by users.
- The quality of the habitat in the 17 PACs in which reproduction has been noted is similar to that in the 6 PACs in which reproduction has not been noted.

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

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

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

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

outside of the nesting season would not likely reduce any individual goshawk's fitness and would not result in any population level impacts within the project area.

Alternative 2

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

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

Season of Use: The seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to goshawks.

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

Alternative 3

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to goshawks.

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

Alternative 4

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 48). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above.

Table 48. Northern Goshawk: Direct and Indirect Effects Indicators - Alternative 4

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

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

[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

The same detailed PAC-by-PAC analysis was conducted for Alternative 4 as for Alternative 1 on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. The same assumptions were used in ranking the routes within the alternative as contributing a high, moderate, or low level of disturbance to the goshawks at each activity center. A spreadsheet in the project record (NOGO_CHANGES_BY_PAC) shows the details of that analysis.

For information on PACs in which the changes under Alternative 4 would be the same as the changes under Alternative 1, please see the discussion above under Alternative 1.

There are some PACs under Alternative 4 which would have additions and/or conversions from a closed to open status in them but which would not have either of those types of changes under Alternative 1. Some PACs which would have those types of changes under Alternative 1 would have more changes under Alternative 4. Some PACs which would have changes from an open to a closed status under Alternative 1 would have none of or fewer than those types of changes under Alternative 4. The following table summarizes the information for the PACs in which the changes would be different under Alternative 4 from those under Alternative 1.

Table 49. Northern goshawk: PAC-by-PAC analysis. PACs in which changes under Alternative 4 would be different than under Alternative 1

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
R05F16D51T03 - CLAVEY RIVER	17EV51	0.17									
R05F16D51T03 - CLAVEY RIVER	17EV299	0.05									
R05F16D51T03 - CLAVEY RIVER	18EV57	0.13									
TOTAL		0.34					0.51	17.15%	17.15%	HIGH	LOCATION OF NEST STAND NOT KNOWN. ROUTES COULD BE CLOSE TO OR IN NEST STAND.
R05F16D51T09 - TROUT CREEK	18EV101B	0.41									
R05F16D51T09 - TROUT CREEK	18EV67	0.19									
TOTAL		0.60					0.60	37.13%	37.13%	HIGH	ADDITION LESS THAN 400 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
R05F16D54T03 - HELL'S HOLLOW			01S39	0.063462							
R05F16D54T03 - HELL'S HOLLOW			01S42	0.330365							
TOTAL				0.393827			0.39			HIGH	ROUTE BEING CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY
R05F16D54T13 - L. CHERRY CREEK			01N14E	0.122358							
R05F16D54T13 - L. CHERRY CREEK			01N14B	0.165946							
TOTAL				0.337491			0.34	16.07%	16.07%	HIGH	ROUTE BEING CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
R05F16D54T01 - BEAR MOUNTAIN			01S51B	0.228081			0.23	10.32%	10.32%	LOW	ROUTE TO BE CONVERTED FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER
R05F16D54T08 - PILOT RIDGE			01S79	0.337491				20.45%	0.00%	LOW	ROUTE TO BE CONVERTED FROM CLOSED TO OPEN >400 meters FROM ACTIVITY CENTER

Following is a discussion of each PAC in which the changes would be different under Alternative 4 from those under Alternative 1.

R05F16D51T03 - CLAVEY RIVER: The location of the nest stand is not known. Routes could be close to or in the nest stand. The mileage would be the same as under the current situation (Alternative 2—No Action). Because of the uncertainty about the nest stand location, the level of contribution to disturbance of the goshawks at this PAC's activity center is deemed high.

R05F16D51T09 - TROUT CREEK: One addition 0.41 mile from activity center. One addition is 0.13 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Because one route is less than ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from the route, the level of contribution to disturbance of the goshawks at this PAC's activity center is considered high.

R05F16D54T03 - HELL'S HOLLOW: No additions. One route to be converted from a closed to open status is 0.26 mile from activity center, the other 0.19 mile from activity center. Result of alternative is a reduction of 0.04 miles from the current situation (Alternative 2—No Action). Because one route is less than ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from the route, the level of contribution to disturbance of the goshawks at this PAC's activity center is considered high.

R05F16D54T13 - LOWER CHERRY CREEK: No additions. One route to be converted from a closed to open status is 0.34 mile from activity center, the other 140 north from activity center. Result of alternative is a reduction of 0.10 miles from the current situation (Alternative 2—No Action). Because the route is less than ¼ mile of activity center, and the intervening topography is probably not enough to reduce noise at activity center from the route, the level of contribution to disturbance of the goshawks at this PAC's activity center is considered high.

R05F16D54T01 - BEAR MOUNTAIN: No additions. Route to be converted from a closed to open status is 0.36 mile from activity center. Result of alternative is a reduction of 0.34 miles from the current situation (Alternative 2—No Action). Because the route is more than ¼ mile from the activity center, the level of contribution to disturbance of the goshawks at this PAC's activity center is considered low.

R05F16D54T08 - PILOT RIDGE: No additions. Route to be converted from a closed to open status is 0.45 mile from activity center. The mileage would be the same as under the current situation (Alternative 2—No Action). Young were detected in 1996, 1997, and 2001. Because the route is more than ¼ mile from the activity center, the level of contribution to disturbance of the goshawks at this PAC's activity center is considered low.

Table 50 summarizes the findings from the analysis.

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

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

The routes to be added in five PACs are within ¼ mile of the activity centers, and there is no intervening topography to shield the activity centers from the noise generated those routes. Because of these reasons, the level of contribution to disturbance to the goshawks in the PACs is considered high.

The level of contribution to disturbance at the activity centers of two PACs (R05F16D51T20 - UPPER HULL CREEK and R05F16D54T40 - RUSH CREEK), while the routes to be added are within ¼ mile of the activity center and the intervening topography would not shield the activity centers from the noise generated those routes, is considered moderate because (1) the additions are less than 10% of the total mileage currently drivable in the PACs, and (2) the routes being

added are nearly ¼ mile from the activity center, 0.22 mile from the Upper Hull Creek PAC's activity center and 0.23 mile from the Rush Creek PAC's activity center..

Table 50. Northern goshawk: summary of PAC-by-PAC analysis—Alternative 4

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

In three PACs the routes to be added or converted from closed to open would be more than ¼ mile from the activity center at its closest point. The level of contribution to disturbance is considered low because of the distance of this route from the PACs' activity centers.

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

The changes proposed under Alternative 4 would reduce the effects from the existing condition because cross-country travel would be prohibited, not all unauthorized routes would be added to the NFTS, and some routes would be converted from an open to closed status. Since in only 12% of the PACs would routes be added to the NFTS or converted from a closed to open status within ¼ mile of the activity center, and since it is believed that disturbance within ¼ mile of the activity center would be likely to affect goshawk reproduction in a limited number of PACs (see discussion under Alternative 1 above), it is concluded that the alternative would not result in impacts to populations within the project area over the short or long term.

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

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

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

Alternative 5

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 51). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. For further discussion regarding those effects please see discussion above. In the absence of further research, it is assumed that motorized use along all routes within 400 meters (0.25 mile) of activity centers would result in some disturbance to nesting goshawks. Based on that assumption, approximately 1% of activity centers would receive some disturbance from routes added to the NFTS and routes that would be opened. Since the change to the existing NFTS is a decrease in the miles of NFTS within PACs and near activity centers, there would be a decrease from the other alternatives in the direct and indirect effects on goshawks within the project area. Although these effects would impact individuals and some reproducing pairs over the short term, they would not result in impacts to populations within the project area over the short or long term.

Table 51. Northern Goshawk: Direct and Indirect Effects Indicators - Alternative 5

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

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

[2] Percentage of habitat occurring within a 400 meter "zone of influence" of routes added to the NFTS PLUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from closed to open status MINUS percentage of habitat occurring within a 400 meter "zone of influence" of routes converted from open to closed status

The same detailed PAC-by-PAC analysis was conducted for Alternative 5 as for Alternative 1 on the routes proposed to be added to PACs, proposed to be converted from a closed to open status within PACs, and proposed to be converted from open to closed status within PACs. The same assumptions were used in ranking the routes within the alternative as contributing a high, moderate, or low level of disturbance to the goshawks at each activity center. A spreadsheet in the project record (NOGO_CHANGES_BY_PAC) shows the details of that analysis.

For information on PACs in which the changes under Alternative 5 would be the same as the changes under Alternative 1, please see the discussion above under Alternative 1.

There are some PACs under Alternative 1 which would have additions and/or conversions from a closed to open status in them but which would not have either of those types of changes under Alternative 5. Some PACs which would have those types of changes under Alternative 5 would have more changes under Alternative 1. Some PACs which would have changes from an open to a closed status under Alternative 5 would have none of or fewer than those types of changes under Alternative 1. The following table summarizes the information for the PACs in which the changes would be different under Alternative 5 from those under Alternative 1.

Table 52. Northern goshawk: PAC-by-PAC analysis. PACs in which changes under Alternative 5 would be different than under Alternative 1, except for those PACs in which there would be no additions or conversions from closed to open

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
R05F16D54T07 - BIG CREEK BASIN			02S64C	0.22			0.22	15.07%	15.07%	HIGH	ROUTE BEING CONVERTED FROM CLOSED TO OPEN LESS THAN 400 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY
R05F16D51T20 - UPPER HULL CREEK	18EV309	0.08					0.08	3.37%	3.37%	MOD	ROUTE BEING ADDED LESS THAN 400 meters FROM ACTIVITY CENTER, AND NO INTERVENING TOPOGRAPHY. HOWEVER, CLOSE TO 400 meters (0.22 MILE).
R05F16D51T16 - ADAM'S GULCH					01N58A	0.23	-0.23	0.00%	-66.81%	NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED

	ADDITIONS		CLOSED TO OPEN		OPEN TO CLOSED						
PAC NUMBER/NAME	ROUTE	LENGTH	ROUTE	LENGTH	ROUTE	LENGTH	NET CHANGE	% ADDITIONS AND CLOSED TO OPEN CHANGE OF TOTAL	% NET CHANGE OF TOTAL	LEVEL OF CONTRIBUTION TO DISTURBANCE	RATIONALE
R05F16D54T13 - L. CHERRY CREEK					01N97	0.59				NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED
R05F16D52T38 - SOURGRASS					05N02R	0.28				NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED
R05F16D54T40 - RUSH CREEK					01S70	0.72	-0.72	0.00%	-42.45%	NONE--DECREASE	NO ROUTES ARE BEING ADDED OR CONVERTED FROM CLOSED TO OPEN, BUT ROUTES ARE BEING CONVERTED FROM OPEN TO CLOSED

Following is a discussion of each PAC in which the changes would be different under Alternative 5 from those under Alternative 1.

R05F16D51T03 - CLAVEY RIVER: No changes to this PAC under this alternative.

R05F16D51T09 - TROUT CREEK: No changes to this PAC under this alternative.

R05F16D54T25 - WOLFIN MEADOW: No changes to this PAC under this alternative.

R05F16D52T26 - LONG GULCH: No changes to this PAC under this alternative.

R05F16D54T13 - LOWER CHERRY CREEK: No additions or route conversions from a closed to open status. Route closure of 0.59 mile in PAC. Result of alternative is a reduction of 0.97 mile from the current situation (Alternative 2—No Action). There would be a decrease in disturbance to goshawks in this PAC because of the route closure.

R05F16D52T38 – SOURGRASS: No additions or route conversions from a closed to open status. Route closure of 0.28 mile in PAC. Result of alternative is a reduction of 0.28 miles from the current situation (Alternative 2—No Action). There would be a decrease in disturbance to goshawks in this PAC because of the route closure.

R05F16D54T40 - RUSH CREEK: No additions or route conversions from a closed to open status. Route closure of 0.28 mile in PAC. Result of alternative is a reduction of 0.86 miles from the current situation (Alternative 2—No Action). There would be a decrease in disturbance to goshawks in this PAC because of the route closure.

Table 53 summarizes the findings from the analysis.

Table 53. Northern goshawk: summary of PAC-by-PAC analysis—Alternative 5

Level of contribution to disturbance	Rationale	PAC count	% of total
HIGH	Routes being added or converted from closed to open less than 400 meters, and no intervening topography	1	1%
MOD	Route being added nearly 400 meters from activity center. Additions less than 10% of total mileage currently drivable in PAC.	1	1%
NONE--DECREASE	No routes being added or converted from closed to open, but routes are being converted from open to closed	3	4%
	Total PACs in which routes are being added and/or being converted from closed to open	3	3%

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

The route being converted from a closed to open status in one PAC (R05F16D54T07 - BIG CREEK BASIN) is within ¼ mile of the activity centers, and there is no intervening topography to shield the activity center from the disturbance generated on that route. Because of these reasons, the level of contribution to disturbance to the goshawks in the PAC is considered high.

The level of contribution to disturbance at the activity center for one PAC (R05F16D51T20 - UPPER HULL CREEK), while the route to be added is within ¼ mile of the activity center and the intervening topography would not shield the activity center from the disturbance generated by that route, is considered moderate because (1) the addition is less than 4% of the total mileage currently drivable in the PAC, and (2) the route being added is nearly ¼ mile (0.22 mile) from the activity center..

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

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

The changes proposed under Alternative 5 would reduce the effects from the existing condition because cross-country travel would be prohibited, not all unauthorized routes would be added to the NFTS, and some routes would be converted from an open to closed status. Since in only 3% of the PACs would routes be added to the NFTS or converted from a closed to open status within ¼ mile of the activity center, and since it is believed that disturbance within ¼ mile of the activity center would be likely to affect goshawk reproduction in a limited number of PACs (see discussion under Alternative 1 above), it is concluded that the alternative would not result in impacts to populations within the project area over the short or long term.

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

Season of Use: Although the exact timing may vary, goshawks may start nesting in February. Therefore, seasonal closures for Zone 2 and Zone 3 (as identified for each route in Appendix I) would overlap the beginning of the nesting period. Since approximately 96% of the goshawk PACs would be within these Zones, these closures would reduce disturbance to most goshawks during the early nesting period.

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

Cumulative Effects

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

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

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

The effect of open motorized routes on goshawk populations or habitats was not identified as a significant risk factor by the Forest Service, but breeding site disturbance from human recreation

was addressed (USDA 2001 and 2004). Recreation use has increased and is expected to continue to increase on the STF (see 3.04 Recreation Resources, Affected Environment. OHV use has been increasing at an even more rapid pace than other forms of recreation, based upon State figures for OHV sales (see 3.04 Recreation Resources). Approximately 5 miles of new trail construction, as well as numerous short route segments for dispersed camping access, have been proposed for the future (separate from the this project). These trails are proposed to provide "connector routes" between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes would be similar to those described under direct and indirect effects of the alternatives: changes in behavior; and habitat modification through loss of habitat and further fragmentation of habitat.

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

Table 54 shows the total drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. Given the proportion of goshawk nest sites and habitat potentially affected, as indicated in the table, and considering the projections for future increases in recreation uses and OHV activity (see 3.04 Recreation Resource), Alternative 2 may, over time, contribute measurably to cumulative effects upon goshawk populations. Because Alternative 2 does not restrict vehicles to designated routes, there is a high degree of uncertainty about future route proliferation in goshawk habitat which may have disturbance and habitat effects beyond the effects of routes open to motorized use. The action alternatives do not result in a loss of habitat (no route construction), but noise and traffic disturbance would influence habitat use and availability where goshawks may be present. Alternative 5 contributes the least to cumulative effects on this species because cross-country travel would be prohibited and open route densities in goshawk habitat are lowest. Alternatives 4, 1, and 3 would result in progressively lower risk to goshawks due to the amount of motorized routes resulting from each of these alternatives. Although the action alternatives may result in cumulative impacts, they are fairly minor in comparison to potentially significant impacts (fire, fuels/vegetation treatments, timber harvest on private land).

Table 54. Total drivable routes in northern goshawk habitats

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

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

Determinations

Alternative 1

This alternative would result in disturbance to goshawks within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual goshawks and goshawk pairs.

Seasonal closures would reduce disturbance during most of the breeding season. These effects would not likely result in any impacts to goshawk populations within the project area over the short or long term. This alternative would have the third most impact on the goshawk.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the northern goshawk.

Alternative 2

Although this alternative would result in increased amounts of disturbance and habitat fragmentation within the project area, continued route proliferation would ultimately be limited by topography and wilderness areas. Disturbance resulting from this alternative would likely result in adverse impacts to individual goshawks. Increased habitat fragmentation from route proliferation would likely result in impacts to individuals over the short and long term. Goshawks are distributed throughout the project area and throughout the western United States. Therefore, population level impacts would be minor and would not threaten the long-term viability of the species. This alternative would have the most impact on the fisher.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the northern goshawk.

Alternative 3

This alternative would result in disturbance to goshawk within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual goshawks. These effects would not likely result in any impacts to goshawk populations within the project area over the short or long term. This alternative would have the second least impact on the goshawk.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the northern goshawk.

Alternative 4

This alternative would result in disturbance to goshawk within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual goshawks. Seasonal closures would reduce disturbance during most of the breeding season. These effects would not likely result in any impacts to goshawk populations within the project area over the short or long term. This alternative would have the second most impact on the fisher.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the northern goshawk.

Alternative 5

This alternative would result in disturbance to goshawks within the project area, but would be limited over the long term since cross-country travel would be prohibited. Because there would not be route proliferation, habitat fragmentation would not increase. Disturbance resulting from this alternative would likely result in adverse impacts to individual goshawks. Seasonal closures would reduce disturbance during most of the breeding season. These effects would not likely result in any impacts to goshawk populations within the project area over the short or long term. This alternative would have the least impact on the fisher.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the northern goshawk.

Peregrine Falcon, *Falco peregrinus*

Species and Habitat Account

The peregrine falcon is found throughout the western United States and is a year-round resident of California. Peregrines have relatively strict nesting requirements: vertical cliff habitat with large potholes or ledges that are inaccessible to land predators and are preferentially located near habitat that has a high avian prey population. There are currently two peregrine falcons eyries located on the STF at Donnells Reservoir and Pincrest Peak.

Management Direction

The peregrine falcon was listed as a federally endangered species from 1970 through 1999. On August 25, 1999, the final rule was published to de-list the peregrine falcon (USDI 1999) and it was then identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction contains the following management direction associated with the proposed project for the peregrine falcon:

- Implement a limited operating period (LOP), from February 1 through July 31, on all peregrine falcon territories active within the preceding five years, for at least 0.5 miles from the nest.
    - Restrict motor vehicle activities and new road construction during this LOP, according to a management plan for the area.
    - Prohibit motor vehicle activity within 200 feet of lake shorelines that are used by peregrine falcons.

Direct & Indirect Effects

General - All Alternatives

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

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

These activities may have direct and indirect effects on peregrine falcons through changes in behavior.

Changes in Behavior: Allowing cross-country travel or adding routes to the NFTS could improve access to peregrine falcon eyries, thereby increasing disturbance to the eyrie. The response of peregrine falcons to disturbance is variable, but may result in abandonment of the eyrie (Richardson and Miller 1997). Based upon incidental observations of peregrine falcon responses to disturbance, a spatial buffer of 0.5 to 1.0 mile has been recommended to avoid breeding disturbance (Ellis 1982, Hayes and Milner 1999).

Alternative 1

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near peregrine falcon eyries and foraging habitat. This would reduce the risk of direct and indirect effects to peregrine falcons from motorized travel over the long-term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: The direct or indirect effects of these actions would be insignificant and discountable to peregrine falcons for the following reasons:

- This alternative would not add new routes within one mile of any existing eyrie or territory. Therefore, the alternative would not result in an increase in disturbance to eyries over that from the existing NFTS.
- This alternative would not propose any new motorized routes within 200 feet of lake shorelines used by peregrine falcons. Therefore, this alternative would not result in increased disturbance in foraging areas over that from the existing NFTS.

Season of Use: Peregrine falcon eyries within the project area are located at higher elevations and would be within Zone 3 of the seasonal closures (as identified for each route in Appendix I of the STF Travel Management EIS). Motorized use would be seasonally restricted in and near the eyries and foraging areas for a significant portion of the year, providing a further reduction in disturbance. The season of use would not apply to WOS routes (see Table 3), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Mitigation Measures: Mitigation measures would not be implemented within one mile of peregrine falcon eyries or near foraging areas. Therefore, there would not be any direct or indirect effects to peregrine falcons from these actions.

Alternative 2

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed below for adding routes to the NFTS.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes may result in increasing amounts of disturbance to eyries and foraging areas.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Although they would be limited, the seasonal closures implemented within this alternative would reduce disturbance to peregrine falcons to a certain extent.

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

Alternative 3

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near peregrine falcon eyries and foraging areas. This would reduce the risk of direct and indirect effects to peregrine falcons from motorized travel over the short and long-term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Although they would be limited, the seasonal closures implemented within this alternative would reduce disturbance to peregrine falcons to a certain extent.

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

Alternative 4

The direct and indirect effects of this alternative would be similar to those discussed for Alternative 1.

Alternative 5

The direct and indirect effects of this alternative would be similar to those discussed for Alternative 1, with one exception. There would be no wheeled over-snow (WOS) routes under this alternative, so there would be no exceptions to the seasonal closures.

Cumulative Effects

Peregrine falcon numbers have increased substantially across the United States over the past two decades. The following risk factors have been identified for peregrine falcons: (1) collision with stationary structures and objects (particularly transmission lines), (2) illegal shooting or collection, (3) disturbance at eyries, (4) pesticides and contaminants, and (5) degradation of habitat.

Because of the location of the eyries, vegetation management activities have not affected the habitat, nor would reasonably foreseeable activities do so.

Rock climbing near the peregrine falcon eyries likely has the greatest potential threat to nesting success. Alternatives 1, 3, 4, and 5 would not improve access to either of the eyries on the STF, and would not increase disturbance to nesting falcons. Alternative 2 would have the greatest risk to these falcons since it does not limit human access near eyries or foraging areas. Since the majority of suitable nesting habitat is located in areas that are inaccessible to motorized vehicles, the impacts of Alternative 2 would be limited and would not likely have significant impacts to populations within the project area.

Determinations

Alternative 1

Cross-country travel would be prohibited and there would not be any motorized routes added to the NFTS within one mile of eyries or near foraging areas. Prohibiting cross-country travel would prevent disturbance to eyries and near foraging areas over the long term.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the peregrine falcon.

Alternative 2

This alternative would likely result in minor increases in disturbance near foraging areas and eyries within the project area, Increased disturbance may result in impacts to individuals over the long term. Since peregrine falcon habitat is largely inaccessible, disturbance from motorized access would not likely result in impacts to populations within the project area.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the peregrine falcon.

Alternative 3

Cross-country travel would be prohibited and there would not be any motorized routes added to the NFTS in this alternative. Prohibiting cross-country travel would prevent disturbance to eyries and near foraging areas over the long term.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but wuld not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the peregrine falcon.

Alternative 4

Cross-country travel would be prohibited and there would not be any motorized routes added to the NFTS within one mile of eyries or near foraging areas. Prohibiting cross-country travel would prevent disturbance to eyries and near foraging areas over the long term.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the peregrine falcon.

Alternative 5

Cross-country travel would be prohibited and there would not be any motorized routes added to the NFTS within one mile of eyries or near foraging areas. Prohibiting cross-country travel would prevent disturbance to eyries and near foraging areas over the long term.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the peregrine falcon.

Willow Flycatcher, *Epidonax traillii*

Species and Habitat Account

The willow flycatcher is a neotropical migrant that historically occupied much of California.

Preferred habitat for the willow flycatcher in the Sierra Nevada is mainly mountain meadows with clumps of willows and/or alders at 2,000 to 8,000 feet elevation. Suitable meadows are generally 20 acres or greater in size, although they are known to breed in meadows less than one acre in size. Green et al. (1991) determined that more than 95% of the breeding meadows in the Sierra Nevada were greater than 10 acres in size. There are seven willow flycatcher sites currently designated on the STF: one conditional, one historic, and five occupied. For this analysis, emphasis habitat is defined as meadows within 5 miles of occupied willow flycatcher sites that are larger than 15 acres that have standing water on June 1 and a deciduous shrub component.

Management Direction

The willow flycatcher was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction does not provide any specific management direction related to this project for the willow flycatcher.

Direct & Indirect Effects

General - All Alternatives

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

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

These activities may have direct and indirect effects on willow flycatchers through human-caused mortality and habitat modification.

Human-Caused Mortality: Allowing cross-country travel could result in direct effects to willow flycatcher nest sites. Motorized vehicle use near nest sites could result in nests being over-turned or branches that support nests being broken (Kus et al. 1999).

Habitat Modification: Allowing cross-country travel could result in indirect effects to willow flycatchers through habitat modification. Factors responsible for the decline of willow flycatcher populations in the Sierra Nevada are primarily thought to be the result of habitat change. Of particular importance is the alteration of meadow hydrology, specifically caused by roads (Green et al. 2003). Roads and trails within meadows intercept surface and subsurface hydrologic flow, resulting in meadow drying, a reduction of standing water, and changes to flora and fauna communities (Green et al. 2003, Kattlelmann 1996). As the meadow becomes drier and there are fewer willows, suitable nesting sites would be lost. The reduction in floodplain connectivity and standing water would result in a reduction in aquatic insects and available forage for willow flycatchers.

Alternative 1

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near willow flycatcher habitat. This would reduce the risk of direct and indirect effects to willow flycatchers from motorized travel over the long term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: The direct or indirect effects of these actions would be insignificant and discountable willow flycatchers for the following reasons:

- This alternative would not add any new routes within occupied willow flycatcher habitat. Therefore, direct effects to nest sites are not expected to occur.
- A GIS analysis showed that this alternative would result in the addition of only 49 meters (approximately 160 feet) of trail (18EV283) to the NFTS within emphasis habitat. A field survey was conducted and it was determined that this route actually parallels the meadow and stays within the conifer forest surrounding the meadow. Therefore, the addition of this route to the NFTS would not result in indirect effects to the willow flycatcher through habitat modification.

Season of Use: Willow flycatcher habitat is located throughout mid to upper elevations within the project area and falls within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I of the STF Travel Management EIS). Motorized use would be seasonally restricted near willow flycatcher habitat for a significant portion of the year; providing further reduction in disturbance. The season of use would not apply to WOS routes (see Table 3), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Mitigation Measures: Mitigation measures would not be implemented within willow flycatcher habitat. Therefore, there would not be any direct or indirect effects to willow flycatchers from these actions.

Alternative 2

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes may result in increasing amounts of habitat modification/fragmentation and disturbance.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Although they would be limited, the seasonal closures implemented within this alternative would reduce disturbance to willow flycatchers to a certain extent.

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

Alternative 3

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes in and near willow flycatcher habitat. This would reduce the risk of direct and indirect effects to willow flycatchers from motorized travel over the short and long term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Although they would be limited, the seasonal closures implemented within this alternative would reduce disturbance to willow flycatchers to a certain extent.

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

Alternative 4

The direct and indirect effects of this alternative would be similar to those discussed for Alternative 1.

Alternative 5

The direct and indirect effects of this alternative would be similar those discussed for Alternative 1, with one exception. There would be no wheeled over-snow (WOS) routes under this alternative, so there would be no exceptions to the seasonal closures.

Cumulative Effects

Appendix B (STF Travel Management EIS) provides a list and description of past, present, and reasonably foreseeable projects on the STF and on private lands within the forest boundary. Some, but not all, of these activities will likely contribute to effects upon willow flycatchers. The Forest Service has completed a Conservation Assessment of the Willow Flycatcher in the Sierra Nevada (Green et al. 2003), which identified meadow drying, loss of nesting and foraging substrates (riparian shrubs), increased predator access to meadow interiors, and potentially cowbird parasitism as among the key factors likely responsible for the decline of the willow flycatcher. Livestock management, recreation, water developments and roads are described as causative factors.

Historic livestock grazing has severely impacted many meadows and is considered to be a primary factor that has influenced the suitability of willow flycatcher habitat, and meadow habitat for birds in general (Green et al. 2003, Menke et al. 1996). Livestock grazing on montane meadows decreases the height and density of herbaceous growth. Many of the landbird species utilizing these meadows feed upon insects that decline in response to removal of this herbaceous growth (Graber 1996). The willow flycatcher conservation assessment finds that there is strong evidence that densities of birds sensitive to the effects of grazing (such as the willow flycatcher) increase more on ungrazed pastures than on grazed pastures (Stanley and Knopf 2002). For numerous reasons, poorly managed grazing in riparian areas can reduce nesting densities of many bird species, particularly of habitat specialists such as willow flycatcher, Lincoln's sparrow and white-crowned sparrow (RHJV 2004).

All occupied willow flycatcher habitat within the project area is located within active livestock grazing allotments. The condition of these meadows varies, but the condition of this meadow habitat is expected to improve as the process of completing new Allotment Management Plans is completed. The plans are designed to alter livestock use to meet stricter LMP Standards and Guidelines for meadow protection.

Factors responsible for the decline of willow flycatcher populations in the Sierra Nevada are thought to be largely an agent or result of habitat change, particularly the alteration of meadow hydrology (Green et al. 2003). Alternatives 1, 4, and 5 would not increase disturbance within occupied willow flycatcher habitat over that from the existing NFTS (Alternative 3). There would be no further habitat modification under these alternatives. Alternative 2 would have the greatest risk to willow flycatchers over the long-term since it would not limit motorized access within meadows. Although disturbance may increase around the occupied and emphasis habitat, it would not likely result in significant impacts to populations within the project area.

Determinations

Alternative 1

Cross-country travel would be prohibited and the direct and indirect effects of adding routes would be insignificant and discountable. Prohibiting cross-country travel would prevent habitat modification/fragmentation; providing beneficial effects over the long term.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the willow flycatcher.

Alternative 2

This alternative would likely result in increased amounts of disturbance and habitat fragmentation within the project area, Increased disturbance and habitat fragmentation may result in impacts to individuals over the long-term, but recreation has not been identified as a significant threat to willow flycatcher populations.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the willow flycatcher.

Alternative 3

Cross-country travel would be prohibited and there would not be any motorized routes added to the NFTS in this alternative. Prohibiting cross-country travel would prevent modification/fragmentation of willow flycatcher habitat over the long term.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the willow flycatcher.

Alternative 4

Cross-country travel would be prohibited and the direct and indirect effects of adding routes would be insignificant and discountable. Prohibiting cross-country travel would prevent habitat modification/fragmentation; providing beneficial effects over the long term.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the willow flycatcher.

Alternative 5

Cross-country travel would be prohibited and the direct and indirect effects of adding routes would be insignificant and discountable. Prohibiting cross-country travel would prevent habitat modification/fragmentation; providing beneficial effects over the long term.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the willow flycatcher.

Aquatic Wildlife

Effects Common to all Aquatic Wildlife

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

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

Introduction of toxins, non-native organisms, parasites, and disease vectors are also ways in which motorized travel may result in human-caused mortality. When vehicles travel along a route near a stream or cross a stream at a ford, small amounts of toxins may be introduced to the environment. Although there is a low risk that individuals will be exposed to lethal levels of any of these toxins, small exposures may elicit immune responses within individuals. McCallum and Trauth (2007) found that male northern cricket frogs in which immune responses were elicited had reduced fertility rates. Therefore, introduction of toxins at low levels may result in reduced reproductive fitness of some aquatic species.

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

Changes in Behavior: Although it is not well documented in the literature, it is reasonable to assume that aquatic species may be affected by motorized vehicles through changes in behavior.

The presence of routes results in increased access of vehicles and human visitors to aquatic species habitat. As with individuals of terrestrial species, individuals of aquatic species are likely to exhibit a predator avoidance response when they become disturbed by humans. Direct effects of disturbance to an individual's fitness are commonly measured through increases in stress hormone levels. Significant increases in stress hormone levels have been found to reduce reproductive success of individuals of some species.

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

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

The transfer of sediment to streams and other water bodies at route crossings is a consequence of roads and trails (Richardson et al. 1975). The surfaces of unpaved roads can route fine sediments to streams, lakes, and wetlands, increasing turbidity of the water (Reid and Dunne 1984). Various studies have demonstrated that sediment delivery to stream channels in a forested environment is correlated to road surface type, physical characteristics of the adjacent areas (e.g., litter depth, coarse wood), soils (erodibility), the steepness of slope below the road, and vehicle usage (Chin et al. 2004, Clinton and Vose 2003). The knowledge of the impact of increased sediment load on amphibians is limited (Gillespie 2002). However, the negative impacts of increased sediments on other aquatic species, including fish, macroinvertebrates, and periphyton, are well known (Power 1990, Newcombe and MacDonald 1991, Waters 1995). High concentrations of suspended sediment may directly kill aquatic organisms and impair aquatic productivity (Newcombe and Jensen 1996). Egg survival may be impacted by roads and trails through increases in fine sediments. Increased sedimentation may also reduce availability of important food resources for tadpoles such as algae (Power 1990). Fine sediment deposits also tend to fill pools and smooth gravel beds, degrading habitats (Forman and Alexander 1998) and possibly decreasing the availability of oviposition sites or larval refugia (Welsh and Ollivier 1998). In addition, the consequences of past sedimentation are long term and cumulative, and cannot be mitigated effectively (Hagans et al. 1986).

The effects are heightened if the sediments contain toxic materials (Maxell and Hokit 1999). At least five different general classes of chemicals are transferred into the environment from maintenance and use of roads: heavy metals, salt, organic molecules, ozone, and nutrients (Trombulak and Frissell 2000). The changes to water chemistry by road runoff may affect living organisms in several ways. For example, chemicals found in road de-icers may kill (Doughtery and Smith 2006) or displace frog life stages, or they may be accumulated in plants as toxins which, in turn, can depress larval amphibian growth.

Roads can also influence both peak flows (floods) and debris flows (rapid movements of soil, sediment, and large wood in stream channels), two processes which have major influences on riparian vegetation (Jones et al. 2000) as well as aquatic and riparian patch dynamics critical to stream ecosystems (Pringle et al. 1988). Numerous frog species breed in streams which can be adversely affected by fluctuations in the frequency or magnitude of peak flows, thereby adversely affecting recruitment.

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

Threatened and Endangered Species

Lahontan Cutthroat Trout, *Oncorhynchus clarki henshawi*

Species and Habitat Account

The Lahontan cutthroat trout (LCT) is known as the largest subspecies of cutthroat and is widely popular among anglers. It was historically located throughout the Lahontan Basin in Nevada, Oregon, and California. Currently, LCT occupy only a small portion of their historic range. The STF is located on the west side of the Sierra Nevada crest, therefore lying outside of the Lahontan Basin and outside of the native range of the LCT. Although they are not native, LCT currently occupy four 7th field watersheds in the project area: Pacific Valley, Highland Lakes, Headwaters Highland Creek, and Disaster Creek.

Management Direction

The LCT was listed by the FWS as an endangered species in 1970. The listing was reclassified to threatened status in 1975 to facilitate recovery and management efforts and authorize regulated angling (Federal Register 1975). Critical Habitat has not been designated for the LCT (USDI 1995). PDC for route designation were determined through a programmatic consultation with the FWS. If the routes proposed for designation follow the PDC, no further consultation with the FWS is required. PDC for the LCT are:

- Routes and areas do not cross any stream within the occupied range of LCT.
- Route and areas are not located on active landslides and do not re-route surface water onto active landslides within watersheds that provide habitat for LCT.
- Within watersheds that provide habitat for LCT, routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream.
- Areas are located outside of Riparian Conservation Areas (RCAs) that are within watersheds that provide habitat for LCT.
- Within watersheds that provide habitat for LCT, routes avoid RCAs.

Direct & Indirect Effects

General – All Alternatives

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

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

These activities may have direct and indirect effects on LCT through human-caused mortality and habitat modification.

Allowing cross-country travel or travel on motorized routes may result in direct and indirect effects on trout in a variety of ways, including crushing eggs/fry/alevins, disturbance at stream crossings, and impaired water quality and spawning habitat.

Alternative 1

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within watersheds occupied by LCT. This would reduce the risk of direct and indirect effects to LCT from motorized travel over the long-term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: The direct or indirect effects of these actions would be insignificant and discountable LCT for the following reasons:

This alternative would not designate any routes that would result in any crossings on streams that are occupied by LCT.

This alternative would not designate any routes that would contribute sediment to drainages upstream of or currently occupied by LCT.

The action alternatives would not designate any routes within RCA's associated with LCT.

Season of Use: Watersheds occupied by LCT are located at higher elevations within the project area and fall within Zone 3 of the seasonal closures (as identified for each route in Appendix I of the STF Travel Management EIS). Wheeled motorized use would be seasonally restricted within these for a significant portion of the year; providing further beneficial impacts. The season of use would not apply to wheeled over-snow use (WOS) routes (see Table 3 in the EIS), so disturbance to individuals would not be reduced along these routes except when conditions prohibit WOS use. Ten WOS routes would be open to this use.

Mitigation Measures: Mitigation measures would not be implemented within watersheds occupied by LCT. Therefore, there would not be any direct or indirect effects to LCT from these actions.

Alternative 2

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long-term and the effects would be similar to those discussed below for adding routes to the NFTS.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized routes because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles would continue to use all of the documented unauthorized routes previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes may result in increasing amounts of disturbance and habitat modification.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Although they would be limited, the seasonal closures implemented within this alternative would reduce disturbance to LCT to a certain extent.

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

Alternative 3

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes within watersheds

occupied by LCT. This would reduce the risk of direct and indirect effects to LCT from wheeled motorized travel over the short and long-term.

Adding Routes to the NFTS or Changing the Type of Use on Current NFTS Routes: This alternative would not result in the addition of any motorized routes to the NFTS, nor would it change the type of use on any current NFTS routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist. Although they would be limited, the seasonal closures implemented within this alternative would reduce disturbance to LCT to a certain extent.

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

Alternative 4

The direct and indirect effects of this alternative would be similar to those discussed for Alternative 1.

Alternative 5

The direct and indirect effects of this alternative would be similar to those discussed for Alternative 1, with one exception. There would be no wheeled over-snow (WOS) routes under this alternative, so there would be no exceptions to the seasonal closures.

Cumulative Effects

Appendix B (STF Travel Management EIS) provides a list and description of past, present, and reasonably foreseeable projects on the STF and private lands within the STF boundary. Some, but not all, of these activities will contribute to effects upon LCT. The USDI (1995) identified the following principle threats to the LCT: (1) habitat alternation from livestock grazing; (2) urban and mining development; (3) water diversions; (4) water quality; (5) hybridization with non-native fish species; and (6) competition with introduced fish species. Within the analysis area, livestock grazing, competition with introduced fish species, and vegetation management activities have impacted or have the potential to result in impacts to individuals or modification of habitat.

Livestock grazing has the potential to affect individuals and habitat through numerous ways. When cattle approach and/or enter streams to drink they may directly affect LCT by disturbing juveniles and adults. When disturbed, normal behavior may be interrupted, potentially resulting in increased rates of predation. Indirect effects that may occur to LCT from grazing include: reducing near-stream vegetation and de-stabilizing stream banks, which can lead to increased stream temperature, fine sediment input, and filling of pools. All occupied streams on the STF fall within active grazing allotments. Historically, livestock had unrestricted access to public land. Recently, land management agencies have recognized the widespread impacts of unrestricted grazing and have began implementing monitoring and guidelines to ensure sustainable practices. The Sierra Nevada Forest Plan Amendment (2004) provides management direction and standards and guidelines for livestock utilization and streambank disturbance. Implementation and monitoring of these standards and guidelines will likely reduce the potential habitat impacts of livestock grazing. In summary, livestock grazing has historically and could cumulatively affect LCT habitat in the future and should be appropriately monitored to reduce the potential impacts.

Ongoing and planned vegetation and fuels management projects within the project area should not add cumulative impacts to effects due to the location of planned projects in respect to occupied LCT habitat and the implementation of Best Management Practices and Riparian Conservation Objectives for Riparian Conservation Areas.

Alternatives 1, 3, 4, and 5 would prohibit cross-country travel. Therefore, these alternatives would decrease the risk of disturbance and habitat modification over the long term. They would reduce the cumulative adverse effects for this species. Alternative 2 would have the greatest risk to LCT over the long term since it would not prohibit motorized access near occupied LCT habitat.

Determinations

Alternative 1

Cross-country travel would be prohibited and the direct and indirect effects of adding routes would be insignificant and discountable. Prohibiting cross-country travel would prevent increases in disturbance and habitat modification/fragmentation.

Therefore, this alternative would result in a determination of "*May Affect, But Not Likely to Adversely Affect*" the Lahontan cutthroat trout.

Alternative 2

This alternative would likely result in increased amounts of disturbance and habitat modification within the project area, Increased disturbance and habitat fragmentation may result in impacts to individuals over the long-term, but a large portion of occupied an and suitable LCT habitat within the project area is located within roadless and wilderness areas and would not be adversely impacted by route proliferation.

Therefore, this alternative would result in a determination of "*May Affect, But Not Likely to Adversely Affect*" the Lahontan cutthroat trout.

Alternative 3

Cross-country travel would be prohibited, preventing increases in disturbance and habitat modification/fragmentation. No routes would be added in habitat.

Therefore, this alternative would result in a determination of "*May Affect, But Not Likely to Adversely Affect*" the Lahontan cutthroat trout.

Alternative 4

Cross-country travel would be prohibited and the direct and indirect effects of adding routes would be insignificant and discountable. Prohibiting cross-country travel would prevent increases in disturbance and habitat modification/fragmentation.

Therefore, this alternative would result in a determination of "*May Affect, But Not Likely to Adversely Affect*" the Lahontan cutthroat trout.

Alternative 5

Cross-country travel would be prohibited and the direct and indirect effects of adding routes would be insignificant and discountable. Prohibiting cross-country travel would prevent increases in disturbance and habitat modification/fragmentation.

Therefore, this alternative would result in a determination of "*May Affect, But Not Likely to Adversely Affect*" the Lahontan cutthroat trout.

California Red-legged Frog, *Rana aurora draytonii*

Species and Habitat Account

The California red-legged frog (CRLF) historically occurred from the California coast, throughout the Central Valley, and into the Sierra Nevada foothills. Currently, the CRLF occupies approximately 70% of their historic range and are primarily located in streams and wetlands in coastal drainages (71 FR 19244). There are no recent (<40 years) occurrences on the STF (USDI 2002). However, historic records for this species exist in the California Natural Diversity Data Base (CNDDB) at Jordan Pond (1967) and Woods Creek (1950). Herpetofauna surveys have occurred extensively throughout the STF, but surveys have used a generalized visual encounter method (Fellers and Freel 1995) and the majority has not been conducted according to the most recent CRLF protocol (USDI 2005), nor have they covered all aquatic habitat within the project area. Between 1995 and 2005, USFWS protocol-level surveys were conducted for CRLF

within the project area in the following areas: Bull Creek (in Anderson Valley), Rush Creek, Jordan Pond, Bean Creek, and Smith Creek. Despite significant survey efforts, there have been no recent observations of the CRLF within the project area. Although there have not been any observations of the CRLF in the project area, all suitable habitat has not been surveyed within the last two years to the most recent protocol (USDI 2005). The FWS, in the recovery plan for the CRLF (USDI 2002), stated that, for the South Fork of the Calaveras River and the Tuolumne River, in both of which drainages the STF partially lays, "Extirpated [the CRLF] but represents historic range." In the Federal Register addressing proposed designation of critical habitat for this species (Federal Register 2004), the FWS stated, ". . . this unit [the Yosemite Unit, which consists of drainages found in the tributaries of the Tuolumne River and Jordan Creek, a tributary to the Merced River, in Tuolumne and Mariposa Counties, and includes National Forest System lands on the STF] is currently considered unoccupied." This analysis takes a conservative approach in assuming that there is a low possibility that suitable habitat is occupied.

The CRLF is a highly aquatic species typically found in cold water ponds and stream pools with depths exceeding 0.7 meters (approximately 2.3 feet) and with overhanging vegetation such as willows, as well as emergent and submergent vegetation (Hayes and Jennings 1988). Suitable habitat on the forest is defined as areas on the landscape that meet the definition of a primary constituent element (PCE) as defined in Federal Register and is comprised of aquatic breeding habitat, non-breeding aquatic habitat, upland habitat, and dispersal habitat. Aquatic habitat consists of low-gradient fresh water bodies, including natural and manmade ponds, and backwaters within streams and creeks. Non-breeding aquatic habitat consists of the aquatic habitat elements identified above, and also includes, but is not limited to, other wetland habitats such as intermittent creeks, seeps, and springs. Upland habitat consists of natural areas within 200 feet of the edge of the riparian vegetation or dripline, or the edge of the watershed boundary, whichever is closer. Dispersal habitat consists of upland and riparian habitat contiguous with breeding and nonbreeding aquatic habitat, that is free of barriers, and, that connects two or more patches of aquatic breeding habitat within 0.7 mi of one another. (71 FR 19244).

Management Direction

On May 23, 1996, the CRLF was listed as a threatened species (Federal Register 1996). On April 13, 2006 critical habitat was designated, but does not exist on the STF (Federal Register 2006). PDC for route designation were determined through a programmatic consultation with the FWS. If the routes proposed for designation follow the PDC, no further consultation with the FWS is required. PDC for the CRLF are the following:

- Routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream associated with the CRLF.
- In suitable CRLF habitat, routes avoid Riparian Reserve (RR) and Riparian Conservation Areas (RCAs) except where necessary to cross streams. Crossing approaches get the riders in and out of the stream channel and riparian area in the shortest distance possible while meeting the gradient and approach length standards.
- Routes or areas do not cross any stream or waterbody within 500 feet of known occupied sites of CRLF; and route or area is not within a distance of 500 feet from wetland (i.e. springs, wet meadows, ponds, marshes).
- In habitat occupied by CRLF, routes or areas do not have the potential to capture or divert stream flow. The approaches to stream crossings are down-sloped toward the stream on both sides.
- Areas are located outside of RR and RCAs, meadows, and wetlands, within CRLF habitat.
- No route or areas are within Critical Aquatic Refuges for CRLF.

The action alternatives are not currently proposing any "unauthorized areas." Therefore, this analysis specifically addresses "unauthorized routes" that were identified in the site-specific analysis.

The Forest Plan Direction contains the following management direction associated with the proposed project for the CRLF:

- Within 300 feet of streams or ponds that have potential suitable habitat:
  - Construct new roads or trails or use off-road routes for motorized vehicles only after conducting amphibian surveys to the most recent protocol for the frog.
  - Allow stream crossings only where the route, through the water, and the adjacent streamside areas are naturally resistant to tires or are hardened with rock or other materials.

Direct & Indirect Effects

General – All Alternatives

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

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

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

Indicators

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

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

Alternative 1

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 55). This alternative would result in the addition to the NFTS of several routes with 20 stream crossings within suitable CRLF habitat. These stream crossings would likely result in direct and indirect effects to some individuals of all CRLF life history stages. The addition of routes to the NFTS and conversion of roads to trails within 300 feet of suitable aquatic habitat may result in direct effects to some juvenile and adult frogs and indirect effects to all life history stages. The addition of routes to the NFTS and conversion of roads to trails within dispersal areas may also result in direct effects to some adults dispersing between breeding sites.

Table 55. California Red-legged Frog: Direct and Indirect Effects Indicators - Alternative 1

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

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

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

There are 12 routes proposed as additions under this alternative that don't follow the PDC for the red-legged frog. Table 56 shows those routes, and indicates which of the PDC they don't meet.

Table 56. Route compliance with FWS PDC for the California red-legged frog

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

[1] The letter "Y" indicates that the route complies with the specified Project Design Criterion. The letter "N" indicates that the route does not comply with the specified Project Design Criterion.

[2] PDC 1: Unauthorized routes or areas proposed for designation do not have the potential to capture surface run-off and then deliver sediment into a stream associated with the CRLF..

[3] PDC 2: In suitable CRLF habitat, unauthorized routes proposed for designation avoid Riparian Reserve (RR) and Riparian Conservation Areas (RCAs) except where necessary to cross streams. Crossing approaches get the riders in and out of the stream channel and riparian area in the shortest distance possible while meeting the gradient and approach length standards.

As can be seen from the table, none of the routes listed comply with PDC 2. They do not avoid RCAs, and they aren't necessary to cross streams. (Riparian Reserves is not a land designation category used on the STF.) The total miles of routes proposed to be added to the system in RCAs are 2.86 miles. This would be a minor addition to the total mileage within RCAs if this alternative were implemented (318.87 miles—this mileage includes the routes that are necessary to cross streams).

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

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

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

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

Alternative 2

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to individual frogs.

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

Alternative 3

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8`). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the CRLF.

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

Alternative 4

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 57). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within 300 feet of suitable aquatic habitat, there would be a slight increase in the direct and indirect effects to these frogs' habitat within the project area.

Table 57. California Red-legged Frog: Direct and Indirect Effects Indicators - Alternative 4

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

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

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

The same 12 routes proposed as additions under Alternative 1 that don't follow the PDC for the red-legged frog are proposed under Alternative 4 (see Table 56). As can be seen from that table,

none of the listed routes comply with PDC 2. They do not avoid RCAs, and they aren't necessary to cross streams. (Riparian Reserves is not a land designation category used on the STF.) The total miles of routes proposed to be added to the system in RCAs are 2.86 miles. This would be a minor addition to the total mileage within RCAs if this alternative were implemented (326.69 miles—this mileage includes the routes that are necessary to cross streams).

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

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

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

Alternative 5

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 57). Routes added to the NFTS within this alternative would not likely result in disturbance or crushing of any individuals or contribute sediment to streams associated with the CRLF. Therefore, this alternative would not result in the addition of any routes to the NFTS that would have direct or indirect effects to the CRLF.

Table 58. California Red-legged Frog: Direct and Indirect Effects Indicators - Alternative 5

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

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

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

Season of Use: The CRLF primarily inhabits lower elevations throughout its range and are not known to overwinter or enter into torpor. Suitable habitat within the project area is located within Zone 1 and Zone 2 of the seasonal closures (as identified for each route in Appendix I). Since Zone 1 is open to year-round use, there would not be any beneficial impacts to the CRLF or its habitat within this zone. Since breeding typically occurs in late winter and early spring, restrictions

on the season of use within Zone 2 would likely reduce direct effects to breeding adults and those that may be migrating between breeding sites. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and subsequent sedimentation routing into streams associated with all life history stages of the CRLF.

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

Cumulative Effects

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

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

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

Timber harvest and other vegetation management projects are occurring on private lands and on lands administered by the STF. A majority of the commercial timber lands are outside of the elevation range of the frog. Harvest on these lands has the potential to impact habitat indirectly primarily through erosion and sedimentation of aquatic habitats. Other vegetation management projects (fuel reduction projects) do occur within the elevation range of the frog and could affect aquatic and terrestrial habitats through sedimentation and modification of dispersal and upland habitats. On NFS land, activities in or near RCAs are mitigated by applying best management practices (BMPs) where equipment and activities are prohibited or minimal. Stream protection measures are also required on private land. Both public and private timber lands use herbicides for site preparation and to alleviate competition from non-desirable vegetation. The STF has developed a five-year plan for managing vegetation on its lands. There are 10 to 15 projects that are planned or in planning that overlap with areas of suitable habitat. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. At present, vegetation management activities on private and public lands are having minor impacts to individuals and habitats.

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

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

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

Table 59 shows the total drivable routes under each alternative.

Table 59. Total drivable routes in California red-legged frog habitats

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

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

[2] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 are less than the miles of open routes under Alternative 3.

[3] This indicator relates directly to the PDC for the red-legged frog. Since the PDC apply only to unauthorized routes proposed for designation to the NFTS, the indicator is used only for additions to the system.

The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. The direct and indirect effects of the project alternatives would likely contribute to cumulative effects for this species. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would have the most impact on individuals. Because this alternative does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon the red-legged frog. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS. Alternatives 1, 3,

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

Determinations

Alternative 1

This alternative would prohibit cross-country travel, thus preventing further increases in disturbance and habitat modification. While there are several routes proposed within this alternative that have the potential to capture surface run-off and deliver sediment to streams with suitable CRLF habitat, mitigation measures would be implemented to reduce the amount of sediment from all but one of those routes. Field surveys found that mitigation measures were not needed on that route to reduce sediment. This alternative would have the third most impact on the red-legged frog. .

Therefore, this alternative would result in a determination of "*May Affect, But Not Likely to Adversely Affect*" the California red-legged frog.

Alternative 2

Although this alternative would not result in the addition of any routes to the NFTS, cross-country travel would not be prohibited and route proliferation would continue to occur. The result would be modification and degradation of habitat and increased disturbance. No mitigation measures would be taken to reduce sediment from routes currently unauthorized. This alternative would have the most impact on the red-legged frog.

Therefore, this alternative would result in a determination of "*May Affect, Likely to Adversely Affect*" for the California red-legged frog.

Alternative 3

This alternative would prohibit cross-country travel, thus preventing further increases in disturbance and habitat modification. All unauthorized routes within suitable habitat would slowly rehabilitate. The rehabilitation of these routes would result in minor improvements to CRLF habitat over the long-term. This alternative would have the least impact on the red-legged frog. .

Therefore, this alternative would result in a determination of "*May Affect, But Not Likely to Adversely Affect*" the California red-legged frog.

Alternative 4

This alternative would prohibit cross-country travel travel, thus preventing further increases in disturbance and habitat modification. While there are several routes proposed within this alternative that have the potential to capture surface run-off and deliver sediment to streams with suitable CRLF habitat, mitigation measures would be implemented to reduce the amount of sediment from all but one of those routes. Field surveys found that mitigation measures were not needed on that route to reduce sediment. This alternative would have the second most impact on the CRLF. .

Therefore, this alternative would result in a determination of "*May Affect, But Not Likely to Adversely Affect*" the California red-legged frog.

Alternative 5

This alternative would prohibit cross-country travel travel, thus preventing further increases in disturbance and habitat modification. This alternative would have the second least impact on the CRLF. .

Therefore, this alternative would result in a determination of "*May Affect, But Not Likely to Adversely Affect*" the California red-legged frog.

Sensitive Species

Foothill Yellow-legged Frog, *Rana boylii*

Species and Habitat Account

The foothill yellow-legged frog (FYLF) was historically found throughout much of California and southwestern Oregon, but currently occupies only a small portion of its historical range (Amphibiaweb 2009, Jennings and Hayes 1994). Lind (2005) estimated FYLF populations (prior to 1980) have disappeared from approximately 51% of their historic range. These frogs have been extirpated from at least two thirds of their historic localities over their entire Sierran range (Jennings 1996, Lind 2005). Herpetofauna surveys have occurred extensively throughout the STF, but have not covered aquatic habitat within the project area in its entirety. Approximately 20% of all perennial streams and 6% of all seasonal streams have been surveyed. Through these surveys these frogs have been detected in approximately 18 separate streams throughout the STF. There are many "subpopulations" associated with multiple breeding/occupancy locales in several of these streams.

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

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

Management Direction

The FYLF was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction does not provide any specific management direction related to this project for the FYLF.

Direct & Indirect Effects

General – All Alternatives

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

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

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

Indicators

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

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

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

Alternative 1

<u>Cross-Country Travel</u>: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near known occupied and suitable FYLF habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

<u>Additions to the NFTS or Changes to the Existing NFTS</u>: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 60). This alternative would result in the addition to the NFTS of one route with one stream crossing within known occupied FYLF habitat and several routes with 61 stream crossings within suitable habitat. These stream crossings would likely result in direct and indirect effects to some individuals of all FYLF life history stages. The addition of routes to the NFTS and conversion of roads to trails

within 100 meters (approximately 325 feet) of known occupied and suitable aquatic habitat would likely result in direct effects to a few juvenile and adult FYLF and would result in indirect effects to both aquatic and terrestrial habitat over the short and long term. Since these impacts would affect a very small percentage of suitable and known occupied habitat (Table 60), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Table 60. Foothill Yellow-legged Frog: Direct and Indirect Effects Indicators - Alternative 1

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	+ 1
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat[2]	+ 0.27
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes[3]	+ <1%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 44
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat[2]	6.89
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes[3]	+ <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

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

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

Alternative 2

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

Additions to the NFTS or Changes to the Existing NFTS: Although this alternative would not result in the addition of any miles of unauthorized routes to the NFTS, vehicles would be allowed to use all existing motorized trails because cross-country travel would be allowed. Therefore, it is assumed that wheeled motorized vehicles will continue to use all of the unauthorized routes

previously identified and continue to create new routes. The use of these routes and the continued proliferation of new routes would result in increasing amounts of direct and indirect effects to these frogs. These effects would be similar to those discussed within Alternative 1 for the short term, but would be exacerbated over the long term by the continued proliferation of routes.

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to individual frogs.

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

Alternative 3

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the FYLF.

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

Alternative 4

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 61). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of routes added to the system or converted to a trail within suitable FYLF habitat, there would be a slight increase over Alternative 1 in the direct and indirect effects to these frogs within the project area. Although these increases would result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to FYLF populations within the project area.

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

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

Table 61. Foothill Yellow-legged Frog: Direct and Indirect Effects Indicators - Alternative 4

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	+ 1
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat[2]	+ 0.27
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 73
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat[2]	+ 8.69
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

Alternative 5

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 62). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a decrease from Alternative 1 in the number of routes added to the system or converted to a trail within suitable and known occupied FYLF habitat, there would be a decrease in the direct and indirect effects to these frogs within the project area. The impacts from this alternative would affect a very small percentage of suitable and known occupied habitat (Table 62). Thus, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

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

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

Table 62. Foothill Yellow-legged Frog: Direct and Indirect Effects Indicators - Alternative 5

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	0
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat[2]	0
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	0%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 7
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat[2]	-- 1.03
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	-- <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

Cumulative Effects

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

Historic livestock grazing likely had a significant cumulative impact to FYLF and their habitat. Historic livestock grazing evidence indicates that heavy livestock use in the Sierra Nevada led to riparian habitat degradation across much of the Sierra Nevada. Livestock trampling has the potential to directly kill most life stages of FYLF. The mortality risk from livestock trampling is greatest for tadpoles and recently metamorphosed frogs. Tadpoles have limited mobility and have a tendency to seek cover in the spaces between streambed substrates. By seeking cover in this manner, tadpoles may be unaware of the potential peril from trampling. The risk is particularly high in intermittent streams where water resources may be limited and livestock have few options for accessing water. Risk is also higher following metamorphosis when metamorphs are concentrated along aquatic margins. Sedimentation arising from concentrated livestock use areas is considered to be the biggest impact to FYLF habitat. Ten active livestock allotments overlap known localities of the FYLF, and suitable FYLF habitat (no known detections) overlaps with an additional 4 allotments. On the STF, the impacts of livestock grazing on meadows is variable between years, but has been steadily decreasing as forage utilization levels are being reduced by stricter standards established by the SNFPA. Livestock grazing is considered to currently have a very minor impact on individuals and habitat on the STF.

As with the CRLF, recreational gold mining activities overlap with known occupied FYLF sites and the activity has the potential to impact individuals and habitat. Tadpoles are potentially vulnerable to being sucked into the dredge and mortality or injury could result. Suction dredging also presents a physical disturbance to frogs and prolonged dredging could affect the distribution of individuals in a stream. Some of the actions involved with suction dredging include moving streambed substrates, digging into streambanks, and loss of riparian vegetation. At some

locations, there has been a modification of rearing habitat resulting in the loss of shallow, warm-water foraging habitat for tadpoles. Also, the rearrangement of streambed substrates has the potential to change the streamflow patterns thereby affecting the suitability of habitat for deposition of egg masses. Suction dredging occurs at six to ten of the known occupied streams. Suction dredging is considered to currently have a minor impact on individuals and a moderate impact on habitat.

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

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

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

decline of the FYLF. Pesticide exposure is currently having a very minor impact on individuals, but historic applications likely had a minor to moderate impact on individuals.

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

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

Table 63 shows the total drivable routes under each alternative.

Table 63. Total drivable routes in foothill yellow-legged frog habitats

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

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

[2] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 are less than the miles of open routes under Alternative 3.

The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. The direct and indirect effects of the project alternatives would likely contribute to cumulative effects for this species. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would have the most impact on individuals. Because Alternative 2 does not prohibit cross-country travel, there is a high degree of uncertainty about

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

Determinations

Alternative 1

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to FYLF populations within the project area over the short or long-term. It would have the third most impacts on FYLF.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the foothill yellow-legged frog.

Alternative 2

Although this alternative would result in increased amounts of human-caused mortality, disturbance, and habitat modification/degradation within the project area, continued route proliferation within occupied and suitable habitat would ultimately be limited by topography and vegetation. These direct and indirect effects would likely result in adverse impacts to some individuals over the short and long term. The effects would be relatively minor but may have minor impacts on some populations within the project area. These impacts are not likely to result in the loss of any populations within the project area.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the foothill yellow-legged frog.

Alternative 3

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to FYLF populations within the project area over the short or long-term. It would have the least impact on FYLF.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the foothill yellow-legged frog.

Alternative 4

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely

result in any measurable impacts to FYLF populations within the project area over the short or long-term. It would have the second most impacts on FYLF.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the foothill yellow-legged frog.

Alternative 5

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to FYLF populations within the project area over the short or long-term. It would have the second least impact on FYLF.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the foothill yellow-legged frog.

Mountain Yellow-legged Frog, *Rana muscosa*

Species and Habitat Account

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

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

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

MYLFs are seldom far from water, although they have been observed moving overland to disperse to other pond habitats. In some areas, there is a seasonal movement from lakes that are more favorable for overwintering (e.g., deeper water) to nearby areas that are more favorable for breeding. As the temperatures drop to freezing or below (generally October to November), frogs enter torpor for the winter. Adults emerge from torpor as soon as the ponds and lakes begin to thaw and ice is clear from at least part of the water surface (Amphibiaweb 2009). They have been found to move 200 to 900 meters (0.12 to 0.56 mile) along streams or across dry land

(Knapp et al. 2007). Out of 500 frogs tagged in one study, one moved 1 kilometer () in the fall to over-wintering habitat (Pope and Matthews 2001).

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

Management Direction

The MYLF was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction does not provide any specific management direction related to this project for the MYLF.

Direct & Indirect Effects

General – All Alternatives

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

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

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

Indicators

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

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

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

roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within 30 meters (approximately 100 feet) of known occupied habitat.

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

Alternative 1

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 64). This alternative would not result in the addition to the NFTS of any stream crossings within known occupied MYLF habitat, but would result in the addition to the NFTS of 8 stream crossings within suitable habitat. These stream crossings may result in direct and indirect effects to some individuals of all MYLF life history stages. The addition to the NFTS of routes and conversion of roads to trails within 30 meters (approximately 100 feet) of known occupied and suitable aquatic habitat would likely result in direct effects to a few juvenile and adult MYLF and would result in indirect effects to both aquatic and terrestrial habitat over the short and long term. Impacts from this alternative would affect a very small percentage of suitable and known occupied habitat. Thus, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

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

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

Table 64. Mountain Yellow-legged Frog: Direct and Indirect Effects Indicators - Alternative 1

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	0
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat[2]	0
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	0
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 7
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat[2]	+ 1.66
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

Alternative 2

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to these frogs.

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

Alternative 3

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the MYLF.

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

Alternative 4

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 65). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight increase from Alternative 1 in the number of ML1 roads converted to a trail within suitable MYLF habitat, there would be a slight increase over Alternative 1 in the direct and indirect effects to these frogs within the project area. Although these increases may result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to MYLF populations within the project area.

Table 65. Mountain Yellow-legged Frog: Direct and Indirect Effects Indicators - Alternative 4

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	0
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat[2]	0
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	0
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 7
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat[2]	+ 1.66
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

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

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

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

Alternative 5

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 66). This alternative would not result in the addition to the NFTS of any stream crossings within known occupied or suitable MYLF habitat. The conversion of approximately 0.26 miles of roads to trails within 30 meters (approximately 100 feet) of suitable aquatic habitat may result in direct effects to very few juvenile and adult MYLF. The conversion of this route to trail may result in minor indirect effects to both aquatic and terrestrial habitat over the short and long term. Impacts under this alternative would affect a very small percentage of suitable and known occupied habitat. Thus, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Table 66. Mountain Yellow-legged Frog: Direct and Indirect Effects Indicators - Alternative 5

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	0
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of known occupied habitat[2]	0
Net change from existing NFTS in percentage of upland habitat (within 30 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	0
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	-- 1
Net change from existing NFTS in miles of routes within 30 meters (approximately 100 feet) of suitable aquatic habitat[2]	+ 0.17
Net change from existing NFTS in percentage of upland habitat (within 30 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

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

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

Cumulative Effects

Many past and current cumulative impacts have contributed to the decline in MYLF numbers and distribution. One factor attributed to wide-scale population declines of the MYLF has been the introduction of salmonid fishes during the last century (Bradford et al. 1993, Knapp 1996). Recently, it has been determined that a chytridomycete fungus has been associated with numerous MYLF die-offs in the Sierra Nevada of California (Rachowicz 2006). Other factors that

may contribute to cumulative impacts to the species and its habitat include the following: pesticides; ultraviolet radiation; bacterial, fungal, and viral pathogens; acidification from atmospheric deposition; nitrate deposition; livestock grazing; recreational activities; and drought (USDA 2001).

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

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

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

Historic vegetation management and fuels reduction projects have likely contributed to past and present cumulative effects, especially if projects occurred adjacent to MYLF aquatic habitats. Ground-disturbing activities including timber harvest and fuels treatment projects (burning and mastication projects) potentially caused direct mortality to this species which may have affected the abundance of the species on the STF. Projects in the planning stage on the STF will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. CDF currently lists approximately 2,365 acres of private land within the STF administrative boundary for which timber harvest plans have been submitted. The portion of these projects occurring within this frog's range has not been determined. Timber harvest on private lands is generally more intensive. In general, current vegetation and fuels projects on public land are designed to reduce potential impacts on MYLF habitats, and, therefore, minimize disturbance to the species. However, as MYLF migrate between breeding sites, and between breeding sites and overwintering sites (usually in or very near water), there is some potential for direct impacts from being crushed or burned from vegetation and fuels projects. The magnitude of this happening across the range of the MYLF frog habitats on the STF should be limited given the timing of MYLF migration (in the spring), with the exception of spring prescribed burning projects. The adverse impacts of spring burning is expected to be low given the relatively low amount that occurs on the Forest within an average year, particularly within the range of this frog.

Recreation use has increased and is expected to continue to increase on the STF (see 3.04 Recreation Resources), resulting in greater likelihood and magnitude of human disturbance to aquatic wildlife. OHV use has been increasing at an even more rapid pace than other forms of

recreation, based upon State figures for OHV sales (see 3.04 Recreation Resources). Approximately 5 miles of new trail construction, as well as numerous short route segments for dispersed camping access, have been proposed for the future (separate from this project). These trails are proposed to provide “connector routes” between existing NFTS routes and motorized access to historical dispersed camping opportunities. The effects of these routes could be similar to those described under direct and indirect effects of the alternatives: changes in behavior and loss of habitat.

Although motorized vehicle use has not been identified as one of the major contributing factors to MYLF declines, the direct and indirect effects of the project alternatives would likely contribute to cumulative effects for this species with added displacement due to noise and human activity, and indirect effects to aquatic habitat. Table 67 shows the total drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would have the most impact on individuals. Because Alternative 2 does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon MYLF. Alternatives 1, 3, 4, and 5 contribute cumulatively to the disturbance and habitat alteration from activities described above. Alternatives 4, 1, 5, and 3 would result in progressively lower risk to these frogs due to the amount of motorized routes resulting from each alternative. These alternatives do not result in a loss of habitat (no route construction), but would likely influence habitat suitability. Although the action alternatives may result in additional cumulative impacts, they are very minor in comparison to other factors affecting this species.

Table 67. Total drivable routes in mountain yellow-legged frog habitats

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

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

[2] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 are less than the miles of open routes under Alternative 3.

Determinations

Alternative 1

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to MYLF populations within the project area over the short or long-term. It would have the third most impacts on MYLF.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the mountain yellow-legged frog.

Alternative 2

Although this alternative would result in increased amounts of human-caused mortality, disturbance, and habitat modification/degradation within the project area, continued route proliferation within occupied and suitable habitat would ultimately be limited by topography and vegetation. These direct and indirect effects would likely result in adverse impacts to some individuals over the short and long term. The effects would be relatively minor but may have minor impacts on some populations within the project area. These impacts are not likely to result in the loss of any populations within the project area.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the mountain yellow-legged frog.

Alternative 3

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to MYLF populations within the project area over the short or long-term. It would have the least impact on MYLF.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the mountain yellow-legged frog.

Alternative 4

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to MYLF populations within the project area over the short or long-term. It would have the second most impact on MYLF.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the mountain yellow-legged frog.

Alternative 5

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to MYLF populations within the project area over the short or long-term. It would have the second least impact on MYLF.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the mountain yellow-legged frog.

Western Pond Turtle, *Clemmys marmorata*

Species and Habitat Account

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

WPTs are habitat generalists, occurring in a wide variety of permanent and intermittent aquatic habitats and using terrestrial habitats extensively. Although they may occur up to 6,000 feet in elevation, they have rarely been observed above 5,000 feet within the project area (Stebbins 1985; Aquasurv, STF database updated as of 2008). Individual WPTs (usually males) may have large home ranges and may wander within a given watercourse for several kilometers on a regular basis (Holland 1994, Reese and Welsh 1997). In streams, Reese (1996) found that all turtles in the study used terrestrial habitats during the course of the year. Terrestrial habitats are needed for nesting, overwintering, and for seasonal uses. WPT nests have been found as far as 435 yards from a stream (Reese and Welsh 1997) in open sunny areas on hillslopes, generally with a south to southwest facing aspect. Nest sites typically occur in open areas dominated by grasses or herbaceous annuals on dry, well-drained soils with high clay/silt content and low (less than 15-degree) slope (Holland 1994). There is some indication that most nesting excursions occur at night (Rathbun et al. 2002). WPTs also move into upland slopes while overwintering or during periods when aquatic habitats become unsuitable (i.e., dry). The timing of overwintering movements is poorly understood, but generally occurs within the project area from the fall (October) to early spring (April).

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

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

Management Direction

The WPT was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction contains the following management direction associated with the proposed project for the WPT:

- In areas adjacent to waters with known populations of WPT:
  - Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist.

Direct & Indirect Effects

General – All Alternatives

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

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

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

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

Indicators

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

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

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

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

Alternative 1

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 68). This alternative would result in the addition to the NFTS of several routes and 22 stream crossings within known occupied WPT habitat and several routes with 38 stream crossings within suitable habitat. These routes and stream crossings would likely result in direct and indirect effects to some juvenile and adult individual WPTs. The addition to the NFTS of routes and conversion of roads to trails within 400 meters (0.25 mile) of known occupied and suitable aquatic habitat may result in direct effects to adults (females) moving overland to find suitable nesting locations. Since nests are prepared in terrestrial habitat with vegetation providing some cover, it is unlikely that nests would be built directly in routes. Therefore, motorized use on routes would not likely result in the destruction of pond turtle nests. In areas where routes intersect suitable nesting habitat, hatchlings may be disturbed or crushed as they leave the nest to find suitable aquatic habitat.

Table 68. Western Pond Turtle: Direct and Indirect Effects Indicators - Alternative 1

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	+ 26
Net change from existing NFTS in miles of routes within 400 meters (0.25 mile) of known occupied habitat[2]	+ 14.00
Net change from existing NFTS in percentage of upland habitat (within 400 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 54
Net change from existing NFTS in miles of routes 400 meters (0.25 mile) of suitable aquatic habitat[2]	+ 77.86
Net change from existing NFTS in percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

Alternative 1 would add routes to the NFTS within ¼ mile of occupied WPT habitat that were not approved by a Wildlife Biologist. Therefore, these routes would not comply with the S&G which states, "Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist." These routes would be exempted from this S&G through a minor Forest Plan amendment. The following table shows these routes, their mileage, and the drainage in which they lie.

Table 69. Routes inconsistent with the Forest Plan for the western pond turtle under Alternative 1

ROUTE	DRAINAGE	MILEAGE	MILEAGE WITHIN 400 METERS OF OCCUPIED WPT HABITAT IN DRAINAGE
FR98575	Big Creek	0.132	0.132
1S1902	Birch Lake	0.238	0.711
FR8601		0.473	
FR8516	Bull Creek	0.048	1.375
FR98482		0.06	
FR98486		0.209	
FR98511		0.146	
FR98513		0.027	
FR98514		0.035	
FR98515		0.094	
FR98520		0.028	
FR98554		0.04	
FR98566		0.05	
FR10178		0.638	
FR98599	Hull Creek	0.043	0.043
FR98537	Middle Fk. Tuolumne	0.089	0.356
FR98539		0.099	
FR98541		0.068	
FR98548		0.042	
FR98560		0.058	
17EV192	Moore Creek	0.625	5.257
17EV192A		0.062	
17EV192B		0.151	
17EV194		0.385	
17EV195		0.501	

ROUTE	DRAINAGE	MILEAGE	MILEAGE WITHIN 400 METERS OF OCCUPIED WPT HABITAT IN DRAINAGE
17EV196		0.19	
17EV197		0.449	
17EV197A		0.046	
17EV901		0.372	
1S1727		0.874	
1S17E35B		0.341	
1S17M		1.128	
FR98508		0.061	
FR98509		0.032	
FR98510		0.04	
1S1929	S. Fk. Tuolumne	0.151	0.413
1S1929C		0.187	
FR98504		0.075	
TOTAL		**8.287**	**8.287**

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

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

above, the risk is relatively greater (rated as moderate) due to the discrete nature of the habitat and the propensity of the turtle to remain in close proximity to the suitable habitat.

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

The area of greatest concern for the western pond turtle is in the Moore Creek area on the Groveland District. Of the 8.7 miles of routes proposed within one-quarter mile of known occupied habitat, 5.3 miles cross or are adjacent to approximately seven miles of Moore Creek. At the site-specific scale, there could be significant impacts to the turtle population in this creek. Past survey efforts have shown a small population (<20 individuals) dominated by adults with no apparent recruitment (Aquasurv, STF database updated as of 2008). This adult-skewed population may be an artifact of the lack of nesting habitat adjacent to the creek, particularly nesting habitat in close proximity to suitable hatchling habitat (Steve Holdeman, Forest Aquatic Biologist, pers. comm.). Aerial photograph interpretation and field visits indicated extensive brush fields adjacent to Moore Creek and very little open, herbaceous-dominated areas that are preferred for nesting. There is a higher mortality and injury risk from direct encounters with off-highway vehicles in the vicinity of Moore Creek due to the number and total length of routes being proposed within one-quarter mile of the aquatic habitat. In combination, the increased mortality risk and an apparently older population of turtles may lead to a reduced viability of the local population. If there is limited or no recruitment in this population and mortality occurs on an occasional or regular basis, there is the risk the population will become unsustainable. However, at the larger scale of the 6th Level Hydrologic Unit Code (Upper North Fork Merced River watershed) which includes Moore Creek, turtle populations are known from the North Fork Merced River, Jordan Creek, Smith Creek, and Bean Creek. All of these streams have connectivity with Moore Creek and this potential meta-population may serve as a source of recruitment of adult and subadult turtles to Moore Creek.

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

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

Mitigation Measures: Types of mitigation measures proposed on routes associated with known occupied pond turtle habitat include the following: barriers, tread hardening, and drain dips. Types of mitigation measures proposed on routes associated with suitable pond turtle habitat

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

Alternative 2

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to pond turtles.

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

Alternative 3

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

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the WPT.

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

Alternative 4

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near known occupied and suitable WPT habitat. This would reduce the risk of direct and indirect effects to pond turtles from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 70). Direct

and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1.

Table 70. Western Pond Turtle: Direct and Indirect Effects Indicators - Alternative 4

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	+ 31
Net change from existing NFTS in miles of routes within 400 meters (0.25 mile) of known occupied habitat[2]	+ 22.43
Net change from existing NFTS in percentage of upland habitat (within 400 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 74
Net change from existing NFTS in miles of routes 400 meters (0.25 mile) of suitable aquatic habitat[2]	+ 78.80
Net change from existing NFTS in percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

Alternative 4 would add the same routes to the NFTS within ¼ mile of occupied WPT habitat that were not approved by a Wildlife Biologist as under Alternative 1, plus one additional route (see Table 71). These routes would not comply with the S&G pertaining to routes within ¼ mile of occupied habitat and would be exempted from this S&G through a minor Forest Plan amendment. The additional route is 1S1907A, in the Middle Fork Tuolumne River watershed. There are 6 routes proposed to be added within ¼ mile of occupied habitat in this watershed under Alternative 1. Four (FR98533, FR98537, FR98560, and FR5540) present low risk of direct or indirect impact to turtles because they are high up on a steep slope or are at the edge of the buffer. Two routes (FR98541 and FR98548) are located within 0.5 miles of each other and access dispersed recreation sites at the river's edge. 1S1907A connects to FR98541, and is within 170 feet of the river at its closest point. While there would be 3 routes in this drainage close to the aquatic habitat, the impact would still be considered localized because of the amount of suitable habitat (over 14 miles) in the Middle Fork. The risk would still be rated as moderate due to the discrete nature of the habitat and the propensity of the turtle to remain in close proximity to the suitable habitat.

Table 71. Routes inconsistent with the Forest Plan for the western pond turtle under Alternative 4

ROUTE	DRAINAGE	MILEAGE	MILEAGE WITHIN 400 METERS OF OCCUPIED WPT HABITAT IN DRAINAGE
FR98575	Big Creek	0.132	0.132

ROUTE	DRAINAGE	MILEAGE	MILEAGE WITHIN 400 METERS OF OCCUPIED WPT HABITAT IN DRAINAGE
1S1902	Birch Lake	0.238	0.711
FR8601		0.473	
FR8516	Bull Creek	0.048	1.375
FR98482		0.06	
FR98486		0.209	
FR98511		0.146	
FR98513		0.027	
FR98514		0.035	
FR98515		0.094	
FR98520		0.028	
FR98554		0.04	
FR98566		0.05	
FR10178		0.638	
FR98599	Hull Creek	0.043	0.043
1S1907A	Middle Fk. Tuolumne	0.388	0.744
FR98537		0.089	
FR98539		0.099	
FR98541		0.068	
FR98548		0.042	
FR98560		0.058	
17EV192	Moore Creek	0.625	5.257
17EV192A		0.062	
17EV192B		0.151	
17EV194		0.385	
17EV195		0.501	
17EV196		0.19	
17EV197		0.449	
17EV197A		0.046	
17EV901		0.372	
1S1727		0.874	
1S17E35B		0.341	
1S17M		1.128	

ROUTE	DRAINAGE	MILEAGE	MILEAGE WITHIN 400 METERS OF OCCUPIED WPT HABITAT IN DRAINAGE
FR98508		0.061	
FR98509		0.032	
FR98510		0.04	
1S1929	S. Fk. Tuolumne	0.151	0.413
1S1929C		0.187	
FR98504		0.075	
TOTAL		**8.675**	**8.675**

Since there is an increase from Alternative 1 in the number of routes added to the system or converted to a trail within known occupied and suitable pond turtle habitat, there would be an increase in the direct and indirect effects to individuals within the project area. Although these increases would result in more individuals being impacted, these increases would not likely be significant enough to result in impacts to WPT populations within the project area.

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

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

Alternative 5

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

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 72). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a substantial decrease from Alternative 1 in the number of routes added to the system or converted to a trail within suitable and known occupied pond turtle habitat, there would be a substantial decrease from Alternative 1 in the direct and indirect effects to individuals within the project area. All of the routes to be added are in compliance with the Forest Plan, so no amendment would be necessary. Since these impacts would affect a very small percentage of pond turtle habitat (Table 72), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Season of Use: WPTs generally move into upland terrestrial habitat to overwinter. Most of the known occupied and suitable pond turtle habitat in the project area is within Zone 2 or Zone 3 of the seasonal closures (as identified for each route in Appendix I). Limiting the season of use would likely reduce disturbance to some individual overwintering pond turtles. Furthermore, the

closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the WPT.

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

Table 72. Western Pond Turtle: Direct and Indirect Effects Indicators - Alternative 5

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	0
Net change from existing NFTS in miles of routes within 400 meters (0.25 mile) of known occupied habitat[2]	+ 0.36
Net change from existing NFTS in percentage of upland habitat (within 400 meters of known occupied aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 2
Net change from existing NFTS in miles of routes 400 meters (0.25 mile) of suitable aquatic habitat[2]	+ 4.19
Net change from existing NFTS in percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

Cumulative Effects

Like the amphibians discussed above, the WPT has experienced dramatic declines within its range. The Federal Register (57 FR 45761) listed habitat destruction as the primary cause for the decline of the species. Within the analysis area, livestock grazing, suction dredge mining, water developments, vegetation management activities, and recreation activities have impacted or have the potential to impact individuals or modify habitat.

Grazing has the potential to affect the WPT. Livestock may injure or kill individuals through trampling, particularly on hatchlings in the nest or in shallow water habitats. Sediment arising from areas of high use by livestock may impact pool habitat (reduction in volume). Grazing likely does not have a major influence on upland habitat attributes, such as vegetation composition or availability of overwintering sites. When livestock access water, there is the potential that their presence will result in a physical disturbance to individual turtles and cause them to seek refuge in aquatic habitat. The consequence of this disturbance is likely very minor in that it may interrupt an activity like basking that is necessary for basic metabolism. Basking is tied to metabolism which is linked with food intake and growth. If the interruptions are occasional, then the effect on metabolism is likely to be negligible. Extended disturbance may result in dispersal from the affected area or in loss of body mass (Cadi and Joly 2003). Nine active allotments overlap known populations of WPT and six other allotments overlap suitable habitat. Current standards and guidelines in the SNFPA were implemented to reduce the risk of habitat degradation by livestock (USDA 2004). Historic grazing likely had a minor impact on individuals and habitats, and current livestock grazing also has a minor impact on individuals and habitats.

Suction dredge mining can result in disturbance to individuals and modification of habitat. The presence of people operating dredges in known occupied habitat can cause physical disturbance to individuals, thereby interrupting their normal activity pattern. As with livestock disturbance, if

the disturbance is occasional then the effect on metabolism is assumed to be negligible. However, if the disturbance is excessive then physiological effects on growth are expected. Dredging can also alter habitats, possibly favoring the turtle. On the STF, observations have indicated that pool habitats are frequently deepened by dredging and WPT take advantage of this "improved" pool habitat. It is unlikely that dredgers unintentionally suck turtles into the dredge because the turtles are relatively conspicuous and typically attempt to avoid capture. The impact of past and current suction dredging is minor to individuals and negligible to the aquatic habitats needed by the species.

Water developments have the potential to impact the WPT through loss and/or modification of habitat. As noted above, several impoundments have been constructed on rivers across the STF, resulting in a direct loss of habitat. Holland (1994) found that large impoundments are largely unsuitable for the WPT. Indirect impacts to habitat include loss of habitat complexity and alterations in water temperatures. Reese and Welsh (1998) investigated the impacts of regulated streamflow downstream of an impoundment and found that habitat suitability was reduced in a dammed stream because there were fewer slow-velocity and warm water habitats than in an undammed stream. The implication of reduced habitat suitability was more time spent basking for thermoregulation which increased predation risk (Reese and Welsh 1998). Dams also physically interrupt the continuity of aquatic habitats which can effectively separate populations of turtles and limit genetic dispersal. The impact of past and current water developments on the STF have had, and continue to have, moderate to major impacts on the WPT and its habitats.

Vegetation management activities have the potential to impact individuals and the habitats required by the WPT. Since the turtle uses upland habitats extensively, there is the potential that timber harvest, fuel reduction activities, and prescribed fire can impact individuals directly. Mechanical operations (harvest, shredding) and prescribed fire frequently occur within 100 meters (approximately 325 feet) of known occupied streams. These activities can injure or kill individual females attempting to nest or both sexes overwintering, or by impacting nests (eggs and hatchlings). Fuel reduction and prescribed fire have the potential to modify upland and riparian habitats directly by changing the composition and density of vegetation in upland habitats. The loss of leaf duff from these activities may have detrimental effects on overwintering habitat. At the same time, the loss of leaf duff may have beneficial effects by increasing nesting habitat. Typically, the amount of sediment arising from vegetation management projects is minor and only has small and localized impacts to aquatic habitat (reduced pool volume). There are 10 to 15 projects that are planned or in the planning phase on the STF that could affect WPT habitats. These projects will likely occur on an estimated 3,500 acres per year, based upon the acreage treated in 2006. CDF currently lists approximately 2,365 acres of private land within the STF administrative boundary for which timber harvest plans have been submitted. The portion of these projects occurring within the turtle's range has not been determined. Timber harvest on private lands is generally more intensive. Past activities likely had a greater impact (moderate) on the WPT because protections have only occurred in the last 10 years and management activities occurred close to streams. At present, mitigation measures are incorporated on public land to minimize effects at known occupied sites, and measures are incorporated on both public and private land to protect aquatic ecosystems. The current level of impact from vegetation management is minor on the turtle.

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

The direct and indirect effects of the project alternatives would likely contribute to cumulative effects for this species. Table 73 shows the total drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would have the most impact on individuals. Because Alternative 2 does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts upon the WPT. Alternatives 1, 3, 4, and 5 contribute cumulatively to the disturbance and habitat alteration from activities described above. Alternatives 4, 1, 3, and 5 would result in progressively lower risk to these frogs due to the amount of motorized routes under each alternative. These alternatives do not result in a loss of habitat (no route construction), but would likely influence habitat suitability. Although the action alternatives may result in additional cumulative impacts, they are very minor in comparison to other factors affecting this species.

Table 73. Total drivable routes in western pond turtle habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Number of stream crossings (perennial) on all routes within known occupied aquatic habitat [1,2]	92	101	67	98	66
Total miles of routes within 400 meters of known occupied aquatic habitat [1,2]	679.98	794.34	627.13	728.48	622.46
Percentage of upland habitat (within 400 meters of known occupied aquatic habitat) directly impacted by all routes [1,2]	<1%	<1%	<1%	<1%	<1%
Number of stream crossings (perennial) on all routes within suitable aquatic habitat [1,2]	478	611	430	503	420
Total miles of routes within 400 meters of suitable aquatic habitat [1,2]	699.53	889.97	649.97	735.67	633.74
Percentage of upland habitat (within 400 meters of suitable aquatic habitat) directly impacted by all routes [1,2]	<1%	<1%	<1%	<1%	<1%

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

[2] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 are less than the miles of open routes under Alternative 3.

Determinations

Alternative 1

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to WPT populations within the project area over the short or long-term. This alternative would have the third greatest impact on the WPT.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the western pond turtle.

Alternative 2

Although this alternative would result in increased amounts of human-caused mortality, disturbance, and habitat modification/degradation within the project area, continued route proliferation within occupied and suitable habitat would ultimately be limited by topography and vegetation. These direct and indirect effects would likely result in adverse impacts to some individuals over the short and long term. The effects would be relatively minor but may have

minor impacts on some populations within the project area. These impacts are not likely to result in the loss of any populations within the project area. This alternative would have the greatest impact on the WPT.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the western pond turtle.

Alternative 3

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to WPT populations within the project area over the short or long-term. This alternative would have the second least impact on the WPT.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the western pond turtle.

Alternative 4

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to WPT populations within the project area over the short or long-term. This alternative would have the second greatest impact on the WPT.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the western pond turtle.

Alternative 5

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to WPT populations within the project area over the short or long-term. This alternative would have the least impact on the WPT.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the western pond turtle.

Yosemite Toad, *Bufo canorus*

Species and Habitat Account

The Yosemite toad is an endemic species to the state of California and is found at high elevations in the Sierra Nevada Mountains. Although they occur in habitats that are less impacted by humans, they currently only occupy approximately 50% of their historic range (Lannoo 2005). Herpetofauna surveys have occurred throughout the STF, but surveys have not been conducted systematically for this project nor have they covered Yosemite toad habitat within the project area in its entirety. Approximately 55% of all wet meadows within the range of the toad have been

surveyed. Through these surveys and various other efforts these toads have been detected at approximately 65 to 70 locations throughout the STF.

The Yosemite toad inhabits high elevation meadows that are typically associated with a water source and a willow component. Upon snowmelt, the toad moves from a hibernaculum to a breeding site typically located in a meadow. Shallow water sheeting across/through vegetation appears to be favored for breeding because water temperatures are very warm and allow for rapid development of the eggs and tadpoles. However, tadpoles have also been observed in small streams in wet meadows. Females may breed once every two to three years. Following breeding, the adults move into the rest of the meadow, into willow thickets, and into the uplands surrounding the meadow to forage (Martin 2008). Dispersal distance from the breeding site to foraging habitat is variable, but Martin (2008) reports movements exceeding 600 meters (approximately 1,960 feet, or 0.4 mile) are possible. At the end of the season, toads seek underground refugia (e.g., rodent burrows) to overwinter. Morton (1981) reported toads may overwinter up to 750 meters (approximately 2,460 feet, or nearly ½ mile) from the nearest breeding site. Many researchers have found the toad to be diurnal (Kagarise Sherman and Morton 1993, Mullallay and Cunningham 1956). However, Martin (2008) reported most longer-distance movements occurred at night. Although the elevation range of the species begins at approximately 6,400 feet, they have only been found within the project area above 7,200 feet. For the purposes of this analysis, potentially suitable Yosemite toad habitat has been defined and mapped as the Wet Willow and Wet Other CWHR types above 7,000 feet in elevation.

Management Direction

The Yosemite toad was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction does not provide any specific management direction related to this project for the Yosemite toad.

Direct & Indirect Effects

General – All Alternatives

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

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

These actions may have direct and indirect effects on toads through the following: human-caused mortality, changes in behavior, and habitat modification (see Effects Common to all Aquatic Wildlife). Furthermore, Yosemite toads may be less prone to motorized travel because breeding movements typically occur when roads near breeding sites are impassable due to snow, because few trails or roads are located within meadows within the toad's elevational range, and because most post-breeding movements occur in the breeding meadow or upland habitats adjacent to the breeding meadow. However, the dispersal and overwintering movements are large (exceeding 600 meters [approximately 0.4 mile]), making it possible that toads may have to cross roads to reach preferred foraging or overwintering sites.

Indicators

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

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

- Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat.
- Net change from existing NFTS in miles of routes (miles of routes added to the NFTS PLUS miles of routes converted from closed to open status [ML1 roads or administrative roads {closed} converted to all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open}] MINUS miles of routes converted from open to closed status [all-vehicle roads, HLO roads, all-vehicle trails, ATV trails, MC trails, or 4WD trails {open} converted to ML1 roads or administrative roads {closed}]) within known occupied habitat.
- Net change from existing NFTS in percentage of known occupied habitat directly impacted by routes added to the NFTS or routes converted from closed to open status
- Net change from existing NFTS in miles of routes within 100 meters (approximately 325 feet) of suitable aquatic habitat.
- Net change from existing NFTS in miles of routes within 400 meters (approximately 325 feet) of suitable aquatic habitat.
- Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat.
- Net change from existing NFTS in miles of routes within suitable habitat.
- Net change from existing NFTS in percentage of suitable habitat directly impacted by routes added to the NFTS or routes converted from closed to open status

Alternative 1

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near known occupied and suitable Yosemite toad habitat. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 1, several analyses were completed (Table 74). This alternative would result in the addition to the NFTS of zero stream crossings in known occupied habitat and three stream crossings within suitable habitat. These stream crossings may result in direct and indirect effects to some individuals of all Yosemite toad life history stages. Routes being added to the system within or near known occupied and suitable Yosemite toad habitat may result in direct effects to some juveniles and adults and indirect effects to all life history stages of this toad. Since these impacts would affect a very small percentage of suitable and known occupied habitat, these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

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

Season of Use: The Yosemite toad inhabits higher elevations and spends the cold winter months in torpor. All known occupied and suitable Yosemite toad habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these toads entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the Yosemite toad. Since these frogs typically overwinter in earthen cavities (rodent burrows, rock crevices) the use of wheeled over-snow

motor vehicles on designated routes (11 in number—see Table 3) during the winter months would have very little impact on them.

Mitigation Measures: The only type of mitigation measure proposed on routes that are associated with known occupied Yosemite toad habitat is a drain dip. Types of mitigation measures proposed on routes associated with suitable Yosemite toad habitat include barriers and drain dips. The installation of all mitigation measures may result in short-term disturbance to some individual toads, but will limit trail widening, reduce soil perturbation, and reduce sedimentation, providing beneficial effects over the long term.

Table 74. Yosemite Toad: Direct and Indirect Effects Indicators - Alternative 1

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	0
Net change from existing NFTS in miles of routes within known occupied habitat[2]	+ 0.19
Net change from existing NFTS in percentage of known occupied habitat directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%
Net change from existing NFTS in miles of routes within 100 meters (approximately 325 feet) of suitable aquatic habitat[2]	+ 0.30
Net change from existing NFTS in miles of routes within 400 meters (approximately 325 feet) of suitable aquatic habitat[2]	+ 0.30
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	0
Net change from existing NFTS in miles of routes within suitable habitat[2]	+ 0.22
Net change from existing NFTS in percentage of suitable habitat directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

Alternative 2

Cross-Country Travel: Cross-country travel would not be prohibited under this alternative. Therefore it is assumed that route proliferation would continue over the short and long term and the effects would be similar to those discussed for adding routes to the NFTS. Of the 9,000 acres of suitable Yosemite toad habitat on the STF, 3,500 acres are open to cross-country travel.

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential disturbance to these toads.

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

Alternative 3

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near known occupied and suitable Yosemite toad. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

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

Season of Use: Seasonal closures that would be implemented under this alternative are only those that currently exist (Table 8). Although they would be limited, the seasonal closures implemented within this alternative would reduce potential direct and indirect effects to the Yosemite toad.

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

Alternative 4

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near known occupied and suitable Yosemite toad. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 4, several analyses were completed (Table 75). Direct and indirect effects of the actions proposed in this alternative would be the same as those discussed in Alternative 1.

Season of Use: The Yosemite toad inhabits higher elevations and spends the cold winter months in torpor. All known occupied and suitable Yosemite toad habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I). Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these toads entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the Yosemite toad. Since these frogs typically overwinter in earthen cavities (rodent burrows, rock crevices) the use of wheeled over-snow motor vehicles on designated routes (11 in number—see Table 3) during the winter months would have very little impact on them.

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

Table 75. Yosemite Toad: Direct and Indirect Effects Indicators - Alternative 4

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	0
Net change from existing NFTS in miles of routes within known occupied habitat[2]	+ 0.19
Net change from existing NFTS in percentage of known occupied habitat directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%
Net change from existing NFTS in miles of routes within 100 meters (approximately 325 feet) of suitable aquatic habitat[2]	+ 0.30

Indicators	
Net change from existing NFTS in miles of routes within 400 meters (approximately 325 feet) of suitable aquatic habitat[2]	+ 0.30
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 1
Net change from existing NFTS in miles of routes within suitable habitat[2]	+ 0.56
Net change from existing NFTS in percentage of suitable habitat directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

Alternative 5

Cross-Country Travel: Cross-country travel would be prohibited in this alternative. Prohibiting cross-country travel would limit the proliferation of illegally created routes near known occupied and suitable Yosemite toad. This would reduce the risk of direct and indirect effects to these frogs from motorized travel over the short and long term.

Additions to the NFTS or Changes to the Existing NFTS: To determine the relative risk of the direct and indirect effects of Alternative 5, several analyses were completed (Table 76). Direct and indirect effects of the actions proposed in this alternative would be similar to those discussed in Alternative 1. Since there is a slight decrease from Alternative 1 in the amount of routes added to the system or converted to a trail within suitable habitat, there would likely be a slight decrease in the direct and indirect effects to individuals within the project area. Since these impacts would affect a very small percentage of suitable and known occupied habitat (Table 76), these actions would likely impact some individuals but would not likely result in impacts to populations within the project area over the short or long term.

Season of Use: The Yosemite toad inhabits higher elevations and spends the cold winter months in torpor. All known occupied and suitable Yosemite toad habitat would be within Zone 2 and Zone 3 of the seasonal closures (as identified for each route in Appendix I of the EIS). Although impacts are expected to be minimal during the winter, these closures may provide some additional protection prior to these toads entering torpor in fall and after emergence in the spring. Furthermore, the closure of routes during the wet weather season reduces soil perturbation and sedimentation into streams associated with all life history stages of the Yosemite toad. Since these frogs typically overwinter in earthen cavities (rodent burrows, rock crevices) the use of wheeled over-snow motor vehicles on designated routes (11 in number—see Table 3) during the winter months would have very little impact on them.

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

Table 76. Yosemite Toad: Direct and Indirect Effects Indicators - Alternative 5

Indicators	
Net change from existing NFTS in number of stream crossings affected by NFTS routes within known occupied habitat[1]	0
Net change from existing NFTS in miles of routes within known occupied habitat	+ 0.19
Net change from existing NFTS in percentage of known occupied habitat directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	+ <1%
Net change from existing NFTS in miles of routes within 100 meters (approximately 325 feet) of suitable aquatic habitat[2]	+ 0.30

Indicators	
Net change from existing NFTS in miles of routes within 400 meters (approximately 325 feet) of suitable aquatic habitat[2]	+ 0.30
Net change from existing NFTS in number of stream crossings affected by NFTS routes within suitable aquatic habitat[1]	+ 0
Net change from existing NFTS in miles of routes within suitable habitat[2]	-- 0.34
Net change from existing NFTS in percentage of suitable habitat directly impacted by routes added to the NFTS or routes converted from closed to open status[3]	-- <1%

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

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

[3] Percentage of habitat impacted by routes added to the NFTS PLUS percentage of habitat impacted by routes converted from closed to open status MINUS percentage of habitat impacted by routes converted from open to closed status

Cumulative Effects

While the causes of decline for Yosemite toad are unclear, several past and current stressors have contributed to the decline in Yosemite toad numbers and distribution. The decline of the Yosemite toad has largely been hypothesized to include factors such as livestock grazing, disease, and pesticide drift. Recreational activities also affect the toad.

Martin (2008) associated declines in Yosemite toad populations primarily with livestock grazing. Beginning in the 1860s, high elevation meadows were heavily impacted by unrestricted, large numbers of sheep. Cattle were introduced in the early 1900s and large numbers were allowed unrestricted access to the high-elevation meadows that provide suitable habitat for the toad. Primary impacts to individuals include the trampling of tadpoles in breeding habitat, of adults and subadults in upland habitats, and of recent metamorphs who have limited mobility. Impacts to habitat may have been more severe, with many meadows losing hydrologic function when streams incised and widened, thereby preventing annual flood waters from inundating the meadow and lowering the water table. Lowered water tables may be important in the persistence of breeding habitat (by causing early desiccation), which is naturally vulnerable in a Mediterranean climate. Livestock have the tendency to linger in the wet habitats in late summer because these habitats frequently support palatable forage. As such, breeding habitats tend to be heavily trampled and pocked by hooves. Livestock also graze the vegetation that may be important to toads for cover, foraging, and creating a cool, moist microclimate at the ground surface. There is also some speculation that the metabolic waste products degrade breeding habitats occupied by tadpoles through exposure to nitrogen (nitrates, nitrites, and ammonium) and phosphorus compounds. On the STF, livestock allotments overlap a majority of the known occupied Yosemite toad habitat. Approximately 45% of the known occupied sites occur outside of livestock allotments, primarily in the Emigrant Wilderness area. Historic livestock grazing likely had major impacts to individuals and habitat. Current impacts are considered to be moderate, since livestock numbers have steadily declined over the last 80 years and because restrictions on utilization and the timing of grazing have been recently tightened.

Kagarise Sherman and Morton (1993) documented declines of Yosemite toad populations in and near Yosemite National Park. Using pathological examinations of toads collected during this die-off, Green and Kagarise Sherman (2001) found disease may have been critical in the declines of Yosemite toad populations within protected areas. Several diseases and parasites were detected in preserved specimens, including the chytrid fungus (Batrachochytrium dendrobatidis) suspected in many amphibian die offs (Berger et al. 1998, Lips 1998, Fellers et al. 2001, Daszak et al. 2003). This fungus is apparently widespread and has the potential to affect every population of Yosemite toad on the STF. While the past and present impact of disease on Yosemite toad populations is unknown, it is assumed that diseases (in general) and chytridiomycosis (in specific) have a major potential to impact the remaining populations on the STF.

Davidson et al. (2002) used spatial tests to determine that windborne contaminants were consistent with Yosemite toad declines because historic sites where Yosemite toads are absent had twice as much agricultural land upwind compared to historic sites that still have toads. Fellers et al. (2004) found elevated levels of DDE and other organochlorines in frog tissues in an area upwind of extensive agriculture. Fellers et al. (2007) and Davidson and Knapp (2007) both suggested airborne agrochemical deposition in the Sierra Nevada are contributing to declines of amphibians in relatively undisturbed environments. It is not known how pesticide contamination has affected the Yosemite toad on the STF in the past or currently. It is assumed that airborne contaminants are having a minor to moderate effect on Yosemite toad populations and habitat on the Forest.

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

The project contributes cumulatively to the disturbance and habitat alteration from activities described above. Table 77 shows the total drivable routes under each alternative. The numbers shown for Alternative 2 are the conditions existing at the time the route data base was last updated. As can be seen from the table, Alternative 2 would have the most miles of routes, and therefore would have the most impact on individuals. Because Alternative 2 does not prohibit cross-country travel, there is a high degree of uncertainty about future route proliferation and associated cumulative impacts on the toad. Alternatives 4, 1, 5, and 3 would result in progressively lower risk to these frogs due to the amount of motorized routes under each alternative. These alternatives do not result in a loss of habitat (no route construction), but would likely influence habitat suitability. Although the action alternatives may result in additional cumulative impacts, they are very minor in comparison to other factors affecting this species.

Table 77. Total drivable routes in Yosemite toad habitats

Indicators	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Number of stream crossings on all routes within known occupied habitat[1,2]	2	2	2	2	2
Total miles of routes within known occupied habitat[1,2]	4.38	4.38	3.45	4.38	4.38
Percentage of known occupied habitat directly impacted by all routes[1,2]	<1%	<1%	<1%	<1%	<1%
Total miles of routes within 100 meters of known occupied habitat[1,2]	25.09	25.19	23.53	25.09	25.09
Total miles of routes within 400 meters of known occupied habitat[1,2]	62.72	65.70	60.46	62.72	62.72
Number of stream crossings on all routes within suitable habitat[1,2]	2	2	1	2	1
Total miles of routes within suitable habitat[1,2]	5.92	6.83	5.70	5.92	5.70
Percentage of suitable habitat directly impacted by all routes[1,2]	<1%	<1%	<1%	<1%	<1%

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

[2] Because some routes are being changed from open to closed, in some habitats the miles of open routes under Alternative 5 are less than the miles of open routes under Alternative 3.

Determinations

Alternative 1

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but

these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to toad populations within the project area over the short or long-term. This alternative would have the third greatest impact on the Yosemite toad.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the Yosemite toad.

Alternative 2

Although this alternative would result in increased amounts of human-caused mortality, disturbance, and habitat modification/degradation within the project area, continued route proliferation within occupied and suitable habitat would ultimately be limited by topography and vegetation. These direct and indirect effects would likely result in adverse impacts to some individuals over the short and long term. The effects would be relatively minor but may have minor impacts on some populations within the project area. These impacts are not likely to result in the loss of any populations within the project area. This alternative would have the greatest impact on the toad.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the Yosemite toad.

Alternative 3

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to toad populations within the project area over the short or long-term. This alternative would have the least impact on the Yosemite toad.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the Yosemite toad.

Alternative 4

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely result in any measurable impacts to toad populations within the project area over the short or long-term. This alternative would have the second greatest impact on the Yosemite toad.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the Yosemite toad.

Alternative 5

This alternative may result in minor amounts of human-caused mortality and disturbance to some individuals, and could result in minor amounts of habitat modification within the project area, but these effects would be limited over the long term since cross-country travel would be prohibited. Since the direct effects would be limited to only some individuals and the indirect effects would impact only a small percentage of occupied and suitable habitat, this alternative would not likely

result in any measurable impacts to toad populations within the project area over the short or long-term. This alternative would have the second least impact on the Yosemite toad.

Therefore, it is my determination that this alternative "*may impact individuals or habitat, but will not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the Yosemite toad.

Hell Hollow Slender Salamander, *Batrachoseps diabolicus*

Species and Habitat Account

The Hell Hollow slender salamander is an endemic species to California formerly assigned to the relictual slender salamander complex (Jockusch et al. 1998). Jockusch et al. (Ibid.) report the distribution of the Hell Hollow slender salamander extends from the lower Merced River canyon (Mariposa County) to the American River canyon (Placer County) at elevations below 2,000 feet. Herpetofauna surveys have occurred throughout the STF, but surveys specific to this species have not been conducted systematically for this project nor have they covered Hell Hollow slender salamander habitat within the project area in entirety. Other occurrence records from near the STF boundary include the Stanislaus River canyon (Tuolumne County, now impounded by New Melones Reservoir), Table Mountain near Jamestown, and the Merced River canyon (Mariposa County).

Individual salamanders can be found under surface objects (rocks, logs, bark) during periods of high soil moisture (November to April). The primary vegetative communities in suitable habitat include mixed oak woodlands and areas of chaparral. The one occurrence record of the Hell Hollow slender salamander on the STF is from the North Fork Tuolumne River at the Riverside Day Use Area (Jockusch, personal communication). There are roughly 25,000 acres of land on the STF below 2,000 feet.

Management Direction

The Hell Hollow slender salamander was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The Forest Plan Direction does not provide any specific management direction related to this project for this salamander.

Direct & Indirect Effects

General – All Alternatives

Under Alternative 1, a total of 0.11 mile of route would be added to the NFTS system within Hell Hollow slender salamander habitat (below 2,000 feet). There wouldn't be any routes converted from a closed to an open status within that habitat under Alternative 1. Under Alternative 4, an additional 0.77 mile would be converted from a closed to open status, for a total of 0.88 mile more of open route in the salamander's habitat. There would be no additions and no changes in vehicle class in Hell Hollow salamander habitat under Alternative 5.

The Hell Hollow slender salamander is a terrestrial species that has a strong association with surface cover objects. Most movement occurs at night (NatureServ 2009). There is the risk to individual salamanders of being crushed by vehicles. However, the lack of surface cover objects within the trail tread of any existing unauthorized routes would significantly reduce the risk of crushing of any individuals. Secondly, traffic volume on routes being added to the system and on routes being converted from a closed to open status is very low at night. Thirdly, under the action alternatives, the mileage of routes being added to the system or being converted from a closed to open status is very low compared to the acreage of habitat (under Alternative 4, 0.88 miles in 25,000 acres of habitat). The increase in risk to individuals from these routes is correspondingly low. The loss of habitat from creation of the 0.11 mile of route to be added to the system is also very low. Thus, the direct and indirect effects on the salamander would be very minor.

Cumulative Effects

Within the analysis area, livestock grazing, vegetation management activities, and recreation activities have impacted or have the potential to impact individuals or modify habitat.

Grazing has the potential to affect this salamander. Livestock may injure or kill individuals through trampling. Grazing likely does not have a major influence for this species on habitat attributes such as vegetation. When livestock move through habitat, there is the potential that their presence will result in a disturbance to individual salamanders and cause them to seek refuge. The increased movement may affect the individual's metabolism. If the interruptions are occasional, then the effect on metabolism is likely to be negligible. Extended disturbance may result in dispersal from the affected area. Most grazing within suitable habitat occurs on private land. Four active allotments on NFS land overlap suitable habitat. However, most of the suitable habitat occurs within steep river canyons where grazing is very light.. Historic grazing likely had a minor impact on individuals and habitats, and current livestock grazing also has a minor impact on individuals and habitats.

Vegetation management activities have the potential to impact individuals and the habitats required by the salamander. There is the potential that timber harvest, fuel reduction activities, and prescribed fire can impact individuals directly. Mechanical operations (harvest, shredding) and prescribed fire can injure or kill individual salamanders. Fuel reduction and prescribed fire have the potential to indirectly affect the species by changing the composition and density of vegetation. Most vegetation management projects on the STF occur above the suitable habitat for this species, although there may be some projects that do include land below 2,000 feet. The California Department of Forestry and Fire Protection currently lists approximately 2,365 acres of private land within the STF administrative boundary for which timber harvest plans have been submitted. The portion of these projects occurring within the salamander's range has not been determined. However, because the land below 2,000 feet within the STF administrative boundary is extremely limited in amount, and because that land lies for the most part in steep river canyons, timber harvest would be extremely limited because of the steep slopes. Timber harvest on private lands is generally more intensive than that on NFS lands. The current level of impact from vegetation management is minor on this salamander.

Recreation use has increased and is expected to continue to increase on the STF (see 3.04 Recreation Resources), resulting in greater likelihood and magnitude of human disturbance to aquatic wildlife. OHV use has been increasing at an even more rapid pace than other forms of recreation, based upon State figures for OHV sales (see 3.04 Recreation Resources). The project alternatives could contribute to these past and current conditions with added displacement due to noise and human activity, and indirect effects to habitat.

The direct and indirect effects of the project alternatives would likely contribute to cumulative effects for this species. However, because of the very minor amounts of direct and indirect effects on the salamander, the addition to the other effects on the species within the analysis area would also be very minor.

Determinations

The routes proposed for addition to the NFTS removed very little habitat when they were created. The salamanders are primarily active at night when vehicle use of the routes being considered is low. Very few miles would be added to the system or converted from closed to open status in Hell Hollow salamander habitat under any of the alternatives.

Therefore, it is my determination that the project alternatives "*may impact individuals or habitat, but would not likely contribute towards federal listing or cause a loss of viability to the population or species*" for the Hell Hollow slender salamander.

7. COMPLIANCE WITH THE FOREST PLAN AND FWS MANAGEMENT GUIDELINES AND PROJECT DESIGN CRITERIA

American Marten

The American marten was identified by the Regional Forester as a Sensitive Species and Management Indicator Species (MIS) on the STF (USDA 2007a, USDA 2007b). The FSEIS amended the STF Forest Plan with updated guidelines for managing furbearers, including the marten (USDA 2004).

Forest Plan Direction

1. Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (particularly fisher and marten) in biological evaluations.
2. Mitigate impacts where there is documented evidence of disturbance to the den site from existing recreation, OHV route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, OHV routes, and recreational and other developments for their potential to disturb den sites.
3. Within Fisher/Marten reproductive areas in Forest Plan Near Natural and Wildlife management areas (see Forest Plan Wildlife Maps).
    1. Construct new roads or trails or use existing off-road routes for motorized vehicles only where compatible with road/trail density standards, and where approved in the fisher/marten area management plan.

Forest Plan Compliance

1. Alternative 2 would not prohibit cross-country travel; therefore, this alternative would not minimize old forest habitat fragmentation and would not comply with the above mentioned S&G. Alternatives 1, 3, 4, and 5 would prohibit cross-country travel. Therefore, they would minimize old forest habitat fragmentation and would comply with the above mentioned S&G.
2. There are no known marten den sites within the project area. Therefore, none of the project alternatives would have the potential to disturb known den sites, and all would comply with the above mentioned S&G.
3. Road/trail density standards are not given in the Forest Plan. Only unauthorized routes, created through cross-country travel, are being considered for inclusion into the system. Disturbance from these routes is on-going. No new trails are being constructed. Every alternative except Alternative 2 reduces the density of routes in marten habitat. Under Alternative 2, there is a likelihood of route density being increased because cross-country travel would be allowed to continue. Therefore, all alternatives except Alternative 2 comply with the above mentioned S&G.

Pacific Fisher

The Pacific fisher was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). The FSEIS amended the STF Forest Plan with updated guidelines for managing furbearers, including the fisher (USDA 2004).

Forest Plan Direction

1. Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species (particularly fisher and marten) in biological evaluations.
2. Mitigate impacts where there is documented evidence of disturbance to the den site from existing recreation, OHV route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, OHV routes, and recreational and other developments for their potential to disturb den sites.
3. Within Fisher/Marten reproductive areas in Forest Plan Near Natural and Wildlife management areas (see Forest Plan Wildlife Maps).

1. Construct new roads or trails or use existing off-road routes for motorized vehicles only where compatible with road/trail density standards, and where approved in the fisher/marten area management plan.

Forest Plan Compliance

1. Alternative 2 would not prohibit cross-country travel. Therefore, this alternative would not minimize old forest habitat fragmentation and would not comply with the above mentioned S&G. Alternatives 1, 3, 4, and 5 would prohibit cross-country travel. Therefore, they would minimize old forest habitat fragmentation and would comply with the above mentioned S&G.
2. There are no known fisher den sites within the project area. Therefore, none of the project alternatives would have the potential to disturb known den sites, and all would comply with the above mentioned S&G.
3. Road/trail density standards are not given in the Forest Plan. Only unauthorized routes, created through cross-country travel, are being considered for inclusion into the system. Disturbance from these routes is on-going. No new trails are being constructed. Every alternative except Alternative 2 reduces the density of routes in marten habitat. Under Alternative 2, there is a likelihood of route density being increased because cross-country travel would be allowed to continue. Therefore, all alternatives except Alternative 2 comply with the above mentioned S&G.

California Spotted Owl

The California spotted owl was identified by the Regional Forester as a Sensitive Species and Management Indicator Species (MIS) on the STF (USDA 2007a, USDA 2007b).

Forest Plan Direction

Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, OHV route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, OHV routes, and recreational and other developments for their potential to disturb nest sites.

Forest Plan Compliance

The STF does not monitor spotted owl nest sites for disturbance from motorized recreation; therefore, there is not any documented disturbance to spotted owl nest sites from existing recreation. All routes that have been proposed as additions to the NFTS have been evaluated as part of this planning process.

Northern Goshawk

The northern goshawk was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a).

Forest Plan Direction

Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, OHV route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, OHV routes, and recreational and other developments for their potential to disturb nest sites.

Forest Plan Compliance

The STF does not monitor goshawk nest sites for disturbance from motorized recreation; therefore, there is not any documented disturbance to goshawk nest sites from existing recreation. All routes that have been proposed as additions to the NFTS have been evaluated as part of this planning process.

Bald Eagle

The bald eagle was listed by the FWS as a federally endangered species in 1978 and was removed from the federal list of Threatened and Endangered Species on June 28, 2007. The bald eagle was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a). Since 1978 populations have increased nationwide as well as in the Sierra Nevada (USDA 2001). Management direction for the bald eagle is now provided by the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) of 1990 and the Migratory Bird Treaty Act (16 USC 703-712) of 1972. Under these acts, disturbance that is likely to cause injury, substantial interference with normal breeding, feeding or sheltering behavior, or nest abandonment is prohibited (USDI 2007).

FWS Management Guidelines

1. Off-road vehicle use (including snowmobiles). No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within 330 feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet.
2. Minimize potentially disruptive activities and development in the eagles' direct flight path between their nest and roost sites and important foraging areas.

FWS Compliance

1. Alternative 2 would not prohibit cross-country travel. Therefore, this alternative would not prevent disturbance to nest sites during the breeding season and would not comply with the above mentioned management guideline. Alternatives 1, 3, 4, and 5 would prohibit cross-country travel and would not add any routes within 660 feet of nest sites. Therefore, these alternatives would prevent disturbance from motorized vehicles to nest sites during the breeding season and would comply with the above mentioned management guideline.
2. Alternative 2 would not prohibit cross-country travel. Therefore, this alternative would not "minimize potentially disruptive activities… between the eagles' nest and roost sites and important foraging areas" and would not comply with the above mentioned management guideline. Alternatives 1, 3, 4, and 5 would prohibit cross-country travel and would not add any routes between the eagles' nest and roost sites and important foraging areas. Therefore, these alternatives would comply with the above mentioned management guideline.

Forest Plan Direction

1. Within Designated Territories (delineated bald eagle management areas, or additional territories, based on nesting occupancy):
    - Implement a Limited Operating Period (LOP) from January 1 through August 31.
        - Apply LOP restriction to motor vehicle activities on Level 1 roads and OHV routes open to the general public.
        - Prohibit motor vehicle activity in wetlands, streamside management zones, and within 200 feet of lake shorelines that are used by bald eagles.
2. Outside Designated Territories (new active bald eagle nests outside of designated management territories):
    - From January 1 through August 31, implement the following restriction around the nest for a distance determined by the Wildlife Biologist on a site-specific basis.
        - Re-route existing OHV use to routes at a safe distance from the nest.
        - Close or detour existing roads in the proximity of the nest site.
        - Prohibit motor vehicle activities in the roost area.

Forest Plan Compliance

1. Since Alternative 2 would not prohibit cross-country travel, this alternative would not prevent disturbance within Designated Territories. Therefore, this alternative would not comply with the above mentioned S&G. Alternatives 1, 3, 4, and 5 would prohibit cross-country travel and would not add any routes within Designated Territories. Therefore, these alternatives would comply with the above mentioned S&G.

3. Since Alternative 2 would not prohibit cross-country travel, this alternative would not prevent disturbance outside Designated Territories. Therefore, this alternative would not comply with the above mentioned S&G. Alternatives 1, 3, 4, and 5 would prohibit cross-country travel and would not add any routes near nest sites outside of Designated Territories. Therefore, these alternatives would comply with the above mentioned S&G.

Peregrine Falcon

The peregrine falcon was listed as a federally endangered species from 1970 through 1999. On August 25, 1999 the final rule was published to de-list the peregrine falcon and it was then identified by the Regional Forester as a Sensitive Species on the STF (64 FR 46542, USDA Forest Service 2007a).

Forest Plan Direction

Implement a limited operating period (LOP), from February 1 through July 31, on all peregrine falcon territories active within the preceding five years, for at least 0.5 miles from the nest.

- Restrict motor vehicle activities and new road construction; during this LOP, according to a management plan for the area.
- Prohibit motor vehicle activity within 200 feet of lake shorelines that are used by peregrine falcons.

Forest Plan Compliance

Alternative 2 would not prohibit cross-country travel; thus this alternative would not prevent disturbance within peregrine falcon territories. Therefore, this alternative would not comply with the above mentioned S&G. Alternatives 1, 3, 4, and 5 would prohibit cross-country travel and would not add any routes within peregrine falcon territories. Therefore, these alternatives would comply with the above mentioned S&G.

Valley Elderberry Longhorn Beetle

On August 8, 1980, VELB was listed as a threatened species (45 FR 52803). Critical habitat was also designated at this time, but does not occur on the STF. PDC for route designation were determined through a programmatic consultation with the FWS. If the routes proposed for designation follow the PDC, no further consultation with the FWS is required. PDC for VELB are the following:

FWS Project Design Criteria

1. Unauthorized staging areas proposed for designation are not within 100 feet of occupied VELB sites or suitable habitat of elderberry plants containing stems measuring 1.0 inches or greater in diameter at ground level.
2. Unauthorized routes or areas proposed for designation are not within 20 feet of occupied VELB sites or suitable habitat of elderberry plants containing stems measuring 1.0 inches or greater in diameter at ground level.

Project Design Criteria Compliance

1. The project alternatives do not propose to add any staging areas. Therefore, all project alternatives would be in compliance with the above mentioned PDC.
2. The project alternatives do not propose to add any staging areas. Alternative 2 would not prohibit cross-country travel; thus this alternative would not prevent the creation of routes within 20 feet of occupied VELB sites or suitable habitat. Therefore, this alternative would not comply with the above mentioned PDC. Field surveys were completed on all routes below 3000 feet in elevation that were proposed to be added within Alternatives 1, 4, and 5. Alternatives 1, 3, 4, and 5 would prohibit cross-country travel and would not add any routes within 20 feet of occupied VELB sites or suitable habitat. Therefore, these alternatives would comply with the above mentioned PDC.

If either Alternatives 1, 3, 4, or 5 is selected, no further consultation with FWS is required for this species.

Lahontan Cutthroat Trout

The LCT was listed by the FWS as an endangered species in 1970. The listing was reclassified to threatened status in 1975 to facilitate recovery and management efforts and authorize regulated angling (Federal Register 1975). Critical Habitat has not been designated for the LCT (USDI 1995). PDC for route designation were determined through a programmatic consultation with the FWS. If the routes proposed for designation follow the PDC, no further consultation with the FWS is required. PDC for VELB are the following:

FWS Project Design Criteria

1. Unauthorized routes and areas proposed for designation do not cross any stream within the occupied range of LCT.
2. Unauthorized routes and areas proposed for designation are not located on active landslides and do not re-route surface water onto active landslides within watersheds that provide habitat for LCT.
3. Within watersheds that provide habitat for LCT, unauthorized routes or areas proposed for designation do not have the potential to capture surface run-off and then deliver sediment into a stream.
4. Unauthorized areas proposed for designation are located outside of Riparian Conservation Areas (RCAs) that are within watersheds that provide habitat for LCT.
5. Within watersheds that provide habitat for LCT, unauthorized routes proposed for designation avoid RCAs.

Project Design Criteria Compliance

1. The project alternatives do not propose to add any staging areas. Alternative 2 would not prohibit cross-country travel; thus this alternative would not prevent the creation of routes and stream crossings within the occupied range of LCT. Therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, and 5 would prohibit cross-country travel and would not add any routes or stream crossings within the occupied range of LCT. Therefore, these alternatives would comply with the above mentioned PDC.
2. The project alternatives do not propose to add any staging areas. Alternative 2 would not prohibit cross-country travel; thus this alternative would not prevent the creation of routes on active landslides nor would it prevent the creation of routes that could potentially divert surface water onto active landslides within watersheds that provide habitat for LCT. Therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, and 5 would prohibit cross-country travel and would not add any routes on active landslides nor would they add any routes that could potentially divert surface water onto active landslides within watersheds that provide habitat for LCT; therefore, these alternatives would comply with the above mentioned PDC.
3. The project alternatives do not propose to add any staging areas. Alternative 2 would not prohibit cross-country travel; thus, this alternative would not prevent the creation of routes that may have the potential to capture surface run-off and then deliver sediment into a stream that provides habitat for LCT. Therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1, 3, 4, and 5 would prohibit cross-country travel and would not add any routes that may have the potential to capture surface run-off and then deliver sediment into a stream that provides habitat for LCT. Therefore, these alternatives would comply with the above mentioned PDC.
4. The project alternatives do not propose to add any staging areas. Therefore, all project alternatives would be in compliance with the above mentioned PDC.
5. Alternative 2 would not prohibit cross-country travel; thus, this alternative may result in the creation of routes that do not avoid RCAs within watersheds that provide habitat for LCT. Therefore, this alternative would not comply with the above mentioned PDC. Alternatives 1,

3, 4, and 5 would prohibit cross-country travel and would not add any routes within RCAs that are within watersheds that provide habitat for LCT. Therefore, these alternatives would comply with the above mentioned PDC.

If either Alternatives 1, 3, 4, or 5 is selected, no further consultation is required for this species.

California Red-legged Frog

On May 23, 1996, CRLF was listed as a threatened species (Federal Register 1996). On April 13, 2006 critical habitat was designated, but does not exist on the STF (Federal Register 2006). PDC for route designation were determined through a programmatic consultation with the FWS. If the routes proposed for designation follow the PDC, no further consultation with the FWS is required. PDC for VELB are the following:

FWS Project Design Criteria

1. Unauthorized routes or areas proposed for designation do not have the potential to capture surface run-off and then deliver sediment into a stream associated with CRLF.
2. In suitable CRLF, unauthorized routes proposed for designation avoid RRs and RCAs except where necessary to cross streams. Crossing approaches get the riders in and out of the stream channel and riparian area in the shortest distance possible while meeting the gradient and approach length standards.
3. Unauthorized routes or areas proposed for designation do not cross any stream or waterbody within 500 feet of known occupied sites of CRLF; and no route or area is within a distance of 500 feet from wetland (i.e. springs, wet meadows, ponds, marshes).
4. In habitat occupied by CRLF, unauthorized routes or areas proposed for designation do not have the potential to capture or divert stream flow. The approaches to stream crossings are down-sloped toward the stream on both sides.
5. Unauthorized areas proposed for designation are located outside of RR and RCAs, meadows, and wetlands, within CRLF.
6. No unauthorized route or areas proposed for designation are within Critical Aquatic Refuges for CRLF.

Project Design Criteria Compliance

1. The project alternatives do not propose to add any staging areas. Alternative 2 would not prohibit cross-country travel; thus, this alternative would not prevent the creation of routes that may have the potential to capture surface run-off and then deliver sediment into a stream associated with CRLF. Therefore, this alternative would not comply with the above mentioned PDC. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS. Therefore, this alternative would comply with the above mentioned PDC. Alternatives 1 and 4 would prohibit cross-country travel but would add routes that may have the potential to capture surface run-off and then deliver sediment into a stream associated with CRLF. Therefore, these alternatives would not comply with the above mentioned PDC (Table 78). Alternative 5 would prohibit cross-country travel and would not add routes that may have the potential to capture surface run-off and then deliver sediment into a stream associated with CRLF. Therefore, this alternative would comply with the above mentioned PDC (Table 78).
2. Alternative 2 would not prohibit cross-country travel; thus, this alternative would not prevent the creation of routes that avoid RCAs except where necessary to cross streams in suitable CRLF habitat. Therefore, this alternative would not comply with the above mentioned PDC. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS. Therefore, this alternative would comply with the above mentioned PDC. Alternatives 1 and 4 would prohibit cross-country travel but would add routes that do not avoid RCAs except where necessary to cross streams in suitable CRLF habitat. Therefore, these alternatives would not comply with the above mentioned PDC (Table 78). Alternative 5 would prohibit cross-country travel and would not add routes that do not avoid RCAs except where necessary to cross streams in suitable CRLF habitat. Therefore, this alternative would comply with the above mentioned PDC (Table 78).

3. As discussed in the Affected Environment section on CRLF, all suitable habitat has not been surveyed within the last two years to the most recent protocol. The FWS stated in 2002 that the CRLF has been extirpated from the part of its historic range which is on or adjacent to the STF (USDI 2002). In 2004 the FWS stated that drainages in the tributaries of the Tuolumne River and Jordan Creek are considered unoccupied (Federal Register 2004). This analysis takes a conservative approach in assuming that there is a low possibility that suitable habitat is occupied. This PDC addresses **known**, not assumed, occupied habitat. There are not any known occupied sites of CRLF within the project area. Therefore, all the project alternatives would comply with the above mentioned PDC.
4. See discussion under #3 above. There are not any known occupied sites of CRLF within the project area. Therefore, all the project alternatives would comply with the above mentioned PDC.
5. The project alternatives do not propose to add any staging areas. Therefore, all the project alternatives would comply with the above mentioned PDC.
6. There are not any Critical Aquatic Refuges for CRLF within the project area. Therefore, all the project alternatives would comply with the above mentioned PDC.

Table 78. Routes inconsistent with FWS PDC for the California red-legged frog

Route Number	PDC Consistency	Addition to the NFTS		
		Alt. 1	Alt. 4	Alt. 5
17EV192	Inconsistent	Yes	Yes	No
17EV192A	Inconsistent	Yes	Yes	No
17EV192B	Inconsistent	Yes	Yes	No
17EV194	Inconsistent	Yes	Yes	No
1S17M	Inconsistent	Yes	Yes	No
FR98508	Inconsistent	Yes	Yes	No
FR98509	Inconsistent	Yes	Yes	No
FR98510	Inconsistent	Yes	Yes	No
FR98511	Inconsistent	Yes	Yes	No
FR98514	Inconsistent	Yes	Yes	No
FR98566	Inconsistent	Yes	Yes	No
FR98575	Inconsistent	Yes	Yes	No

If Alternatives 1, 2, or 4 is selected, further consultation with the FWS is required.

Forest Plan Direction

Within 300 feet of streams or ponds that have potential suitable habitat:

- Construct new roads or trails or use off-road routes for motorized vehicles only after conducting amphibian surveys to the most recent protocol for CRLF.
- Allow stream crossings only where the route, through the water, and the adjacent streamside areas are naturally resistant to tires or are hardened with rock or other materials.

Forest Plan Compliance

Alternative 2 would not prohibit cross-country travel; thus, this alternative would not prevent the creation of routes or unhardened stream crossings within 300 feet of potential suitable habitat for CRLF. Therefore, this alternative would not comply with the above mentioned S&G. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS. Therefore, this alternative would comply with the above mentioned S&G. Alternative 5 would prohibit cross-country travel and would not add any routes within 300 feet of potential suitable CRLF. Therefore, this alternative would comply with the above mentioned S&G. Alternatives 1 and 4 would prohibit cross-country travel but would add routes and unhardened stream crossings within 300 feet of potential suitable habitat for CRLF (Table 79). Management requirements (surveys completed to protocol) and mitigation measures (hardened stream crossings) are proposed on

these routes to ensure that Alternatives 1 and 4 would comply with the above mentioned S&G (see EIS, 2.03 Mitigation and Other Requirements Common to All Action Alternatives).

Table 79. Routes inconsistent with the Forest Plan for the California red-legged frog

Route Number	Forest Plan Consistency	Additions to the NFTS		
		Alt. 1	Alt. 4	Alt. 5
17EV192	Inconsistent	Yes	Yes	No
17EV192A	Inconsistent	Yes	Yes	No
17EV192B	Inconsistent	Yes	Yes	No
17EV194	Inconsistent	Yes	Yes	No
17EV195	Inconsistent	Yes	Yes	No
17EV196	Inconsistent	Yes	Yes	No
17EV197	Inconsistent	Yes	Yes	No
1S1734A	Inconsistent	No	Yes	No
1S17E35B	Inconsistent	Yes	Yes	No
1S17M	Inconsistent	Yes	Yes	No
FR10178	Inconsistent	Yes	Yes	No
FR8516	Inconsistent	Yes	Yes	No
FR98481	Inconsistent	Yes	Yes	No
FR98508	Inconsistent	Yes	Yes	No
FR98509	Inconsistent	Yes	Yes	No
FR98510	Inconsistent	Yes	Yes	No
FR98511	Inconsistent	Yes	Yes	No
FR98513	Inconsistent	Yes	Yes	No
FR98514	Inconsistent	Yes	Yes	No
FR98566	Inconsistent	Yes	Yes	No
FR98575	Inconsistent	Yes	Yes	No

Western Pond Turtle

The WPT was identified by the Regional Forester as a Sensitive Species on the STF (USDA 2007a).

Forest Plan Direction

In areas adjacent to waters with known populations of WPT:

- Construct new roads or trails or use existing off-road routes for motorized vehicles only if at least ¼ mile from occupied habitat or where approved by a Wildlife Biologist.

Forest Plan Compliance

Alternative 2 would not prohibit cross-country travel. Therefore, this alternative would not prevent the creation of routes within ¼ mile of occupied WPT habitat and would not comply with the above mentioned S&G. Alternative 3 would prohibit cross-country travel and would not add any routes to the NFTS. Therefore, this alternative would comply with the above mentioned S&G. Alternative 5 would prohibit cross-country travel and would not add any routes to the NFTS within ¼ mile of occupied WPT habitat. Therefore, this alternative would comply with the above mentioned S&G. Alternatives 1 and 4 would prohibit cross-country travel but would add routes within ¼ mile of occupied WPT habitat that were not approved by a Wildlife Biologist. Therefore, these routes would not comply with the above mentioned S&G (Table 80). These routes will be excepted from this S&G through a minor Forest Plan amendment. The effects of excepting these routes under this amendment are disclosed above under the WPT section.

Table 80. Routes inconsistent with the Forest Plan for the western pond turtle

Route Number	Forest Plan Consistency	Additions to the NFTS		
		Alt. 1	Alt. 4	Alt. 5
17EV192	Inconsistent	Yes	Yes	No
17EV192A	Inconsistent	Yes	Yes	No
17EV192B	Inconsistent	Yes	Yes	No
17EV194	Inconsistent	Yes	Yes	No
17EV195	Inconsistent	Yes	Yes	No
17EV196	Inconsistent	Yes	Yes	No
17EV197	Inconsistent	Yes	Yes	No
17EV197A	Inconsistent	Yes	Yes	No
17EV901	Inconsistent	Yes	Yes	No
1S1727	Inconsistent	Yes	Yes	No
1S17E35B	Inconsistent	Yes	Yes	No
1S17M	Inconsistent	Yes	Yes	No
1S1902	Inconsistent	Yes	Yes	No
1S1907A	Inconsistent	No	Yes	No
1S1929	Inconsistent	Yes	Yes	No
1S1929C	Inconsistent	Yes	Yes	No
FR10178	Inconsistent	Yes	Yes	No
FR8516	Inconsistent	Yes	Yes	No
FR8601	Inconsistent	Yes	Yes	No
FR98482	Inconsistent	Yes	Yes	No
FR98486	Inconsistent	Yes	Yes	No
FR98504	Inconsistent	Yes	Yes	No
FR98508	Inconsistent	Yes	Yes	No
FR98509	Inconsistent	Yes	Yes	No
FR98510	Inconsistent	Yes	Yes	No
FR98511	Inconsistent	Yes	Yes	No
FR98513	Inconsistent	Yes	Yes	No
FR98514	Inconsistent	Yes	Yes	No
FR98515	Inconsistent	Yes	Yes	No
FR98520	Inconsistent	Yes	Yes	No
FR98537	Inconsistent	Yes	Yes	No
FR98539	Inconsistent	Yes	Yes	No
FR98541	Inconsistent	Yes	Yes	No
FR98548	Inconsistent	Yes	Yes	No
FR98554	Inconsistent	Yes	Yes	No
FR98560	Inconsistent	Yes	Yes	No
FR98566	Inconsistent	Yes	Yes	No
FR98575	Inconsistent	Yes	Yes	No
FR98599	Inconsistent	Yes	Yes	No

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