Salt Timber Harvest and Fuels Hazard Reduction Project

Wildlife Biological Evaluation

Prepared by:

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Marynell Oechsner
Wildlife Biologist
TEAMS Enterprise Unit

Reviewed by:

_____**Date:**_____

Thomas A. Quinn
Wildlife Biologist
Trinity River Management Unit
Shasta-Trinity National Forest

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Summary

Compliance with the Forest Plan and Other Regulatory Direction

The Salt Timber harvest and Fuels Hazard Reduction Project is consistent with the Standards and Guidelines in the Shasta – Trinity National Forest Land and Resource Management Plan, USDA Forest Service Manual Direction, and the National Forest Management Act.

Table 1: Summary of the Determinations for the Salt Timber Harvest and Fuels Hazard Reduction Project to Sensitive Species

Species	No Impact	May Impact Individuals but would not likely result in a trend toward listing or loss of viability. Alternative 2	Alternative 3
Mammals			
American Marten (*Martes americana)*		X	X
California wolverine *(Gulo gulo luteus*	X		
Pacific fisher (*Martes pennanti pacifica*)		X	X
Pallid bat (*Antrozous pallidus)*		X	X
Townsend's big-eared bat (*Corynorhinus townsendii*		X	X
Western red bat (*Lasiurus blossevillii*		X	X
Birds			
Bald eagle (*Haliaeetus leucocephalus)*	X		
Northern goshawk (*Accipiter gentilis*)		X	X
Willow flycatcher (*Empidonax traillii)*	X		
Reptiles			
Northwestern pond turtle (*Clemmys marmorata marmor*ata	X		
Amphibians			
Cascades frog (*Rana cascadae)*	X		
Foothill yellow-legged frog (*Rana boylii)*	X		
Shasta salamander (*Hydromantes shastae*	X		
Southern Torrent salamander (*Rhyacotriton variegatus*	X		

Species	No Impact	May Impact Individuals but would not likely result in a trend toward listing or loss of viability. Alternative 2	Alternative 3
Terrestrial Invertebrates			
Big Bar (Pressley) hesperian snail (*Vespericola pressleyi*)*	X		
Shasta chaparral snail (*Trilobopsis roperi*)	X		
Shasta hesperian snail (*Vespericola Shasta)*	X		
Shasta sideband snail (*Monadenia troglodytes troglodytes)*	X		
Tehama chaparral snail (*Trilobopsis tehamana*	X		
Wintu sideband snail (*Monadenia troglodytes wintu*	X		
Aquatic Invertebrates			
California floater (*Anodonta californiensis*)	X		
Montane peaclam (*Pisidium [Cyclocalyx] ultramontanum)*	X		
Nugget pebble snail (*Fluminicola seminalis)*	X		
Topaz [scalloped] juga (*Juga [Calibasis] occata*	X		

*Survey and manage species

Introduction

The purpose of this biological evaluation (BE) is to determine potential effects of actions proposed in alternatives of the Salt Project to sensitive species and their habitats known or suspected to occur in or near the project area.

Regulatory Framework

Sensitive species are those that are vulnerable to decline and loss of viable populations and have the potential for being listed as threatened or endangered. Sensitive species are managed under the authority of the National Forest Management Act (PL 94-588) and the USDA Forest Service Manual Direction (FSM 2600). Sensitive species are administratively designated by the Regional Forester (FSM 2670.5). This document is prepared in accordance with current policy and follows the standards established in Forest Service Manual direction (FSM 2670.32).

Sensitive Species Management Direction

Management goals for sensitive species in the Shasta-Trinity National Forests Land and Resource Management Plan (S-T LRMP) (pgs.3-27 and 28) will be directed toward maintaining or, if possible, increasing existing viable populations of sensitive species.

Pg. 4-5 Threatened, Endangered and Sensitive Species (Plants and Animals): Manage habitat for sensitive plants and animals in a manner that will prevent any species from becoming a candidate for Threatened and Endangered status. Monitor and protect habitat for Federally listed, threatened and endangered (T&E) and candidate species.

Pg. 4-30 Survey and evaluate habitat for TE & S species at the project level in coordination with the U.S. Fish and Wildlife Service.

Additional management direction related to each sensitive species is presented in the species analysis portion of this report.

Sensitive Species Considered

The Regional Forester's Sensitive Species list (last appended October 15, 2007 to include the delisted bald eagle) identifies twenty-nine sensitive animal species that may occur on the Shasta-Trinity National Forest. Four of the sensitive species identified for the Shasta-Trinity National Forest are fish. Fish are evaluated under separate cover.

In order to determine the scope of analysis, a preliminary evaluation was conducted for each potentially affected sensitive species. This document considers the twenty-four animal species listed below.

Mammals

- Pacific fisher (*Martes pennanti pacifica*)
- American marten (*Martes americana*)
- California wolverine (*Gulo gulo luteus*)
- pallid bat (*Antrozous pallidus*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)
- western red bat (*Lasiurus blossevillii*)

Birds
- bald eagle (*Haliaeetus leucocephalus*)
- northern goshawk (*Accipiter gentilis*)
- willow flycatcher (*Empidonax traillii*)

Reptiles
- Northwestern pond turtle (*Clemmys marmorata marmorata*)

Amphibians
- Cascades frog (*Rana cascadae*)
- foothill yellow-legged frog (*Rana boylii*)
- southern torrent salamander (*Rhyacotriton variegatus*)
- Shasta salamander (*Hydromantes shastae*)

Terrestrial Invertebrates
- Shasta sideband snail (*Monadenia troglodytes troglodytes*)
- Wintu sideband snail (*Monadenia troglodytes wintu*)
- Shasta chaparral snail (*Trilobopsis roperi*)
- Tehama chaparral snail (*Trilobopsis tehamana*)
- Big Bar (Pressley) hesperian snail (*Vespericola pressleyi*)*****
- Shasta hesperian snail (*Vespericola Shasta*)

Aquatic Invertebrates
- California floater (*Anodonta californiensis*)
- montane peaclam (*Pisidium [Cyclocalyx] ultramontanum*)
- topaz [scalloped] juga (*Juga [Calibasis] occata*)
- nugget pebble snail (*Fluminicola seminalis*)

*****This species is also classified as survey and manage.

Species Dropped from Further Analysis

Table 2 displays the species that were considered but were dismissed from further project analysis in this document. The rationale for their elimination from detailed study and the effects determination for each species are also provided in Table 2.

Table 2: Species Preliminarily Considered and Dismissed

Species	Habitat Requirements	Potential Habitat in Project Area?	Likelihood of Occurrence in Project Area?	Potential Effects from Project?	Determination of Effects
CA Wolverine	Wide ranging species that occupies a wide variety of remote habitat away from people	Habitat lacks suitability due to high human use	Very unlikely; no recent (~30 years) verified reports on the Shasta-Trinity National Forest (Quinn, personal communication)	No	No Impact
Bald eagle	Large trees adjacent to lakes and rivers with abundant fish	Lack of adequate aquatic habitat	Not likely to occur	No	No Impact

Species	Habitat Requirements	Potential Habitat in Project Area?	Likelihood of Occurrence in Project Area?	Potential Effects from Project?	Determination of Effects
Willow flycatcher	Requires large shrubby willows that line slow-moving streams in open meadow situations or that are scattered about seeps in moist meadows (NatureServe, 2008)	No	Not likely to occur	No	No Impact
Northwestern pond turtle	Permanent or nearly permanent waters of low flow rivers, creeks, small lakes, ponds, and marshes with nesting and hibernating habitat in uplands ~1320 feet adjacent to water (NatureServe, 2008)	Unlikely; Field reviews revealed streams are shaded and do not provide pond turtle aquatic habitat	Possible; Reported in Trinity County (NatureServe, 2008);	No Field reviews revealed no potential nesting habitat near areas proposed for treatment.	No Impact
Cascades frog	Permanent open shallow ponds and streams, wet mountain meadows, sphagnum bogs in open coniferous forests up to timberline (NatureServe, 2008)	Lack of oligotrophic ponds and streams	Not likely to occur. Reported in Trinity County (NatureServe 2008) but not known to occur in or near project area (Quinn, personal communication)	No	No Impact
Foothill yellow-legged frog	Partially shaded, rocky low flow, shallow streams at low to moderate elevations in areas of chaparral, open woodland and forest (NatureServe, 2008)	Possibly	Reported in Trinity County; Incidental sightings have been recorded in association with Salt Creek (URS Greiner Woodward Clyde, 2000) but not known to occur in or near project area (Quinn, personal communication)	No	No Impact
Southern torrent salamander	Small, cold, clear, high-gradient mountain streams and spring seepages in gravel-dominated riffles (NatureServe, 2008)	Unlikely	Unlikely; Reported in Trinity County (NatureServe, 2008) but not known to occur in this portion of Trinity County (Jennings and Hayes, 1994) or near project area (Quinn, personal communication)	No; Proposed treatments would maintain existing canopy closure adjacent to all perennial streams.	No Impact

Species	Habitat Requirements	Potential Habitat in Project Area?	Likelihood of Occurrence in Project Area?	Potential Effects from Project?	Determination of Effects
Shasta salamander	Limestone and volcanic rock outcrops, steep, shady slopes in montane hardwood-conifer communities (NatureServe, 2008)	None	No; Not known to occur on the Trinity portion of the Shasta-Trinity National Forest (Quinn, personal communication)	No	No Impact
Shasta sideband snail		None	No; Only known to occur in Shasta County CA (NatureServe, 2008); Not near Shasta lake nor expected area of this species (Quinn, personal communication)	No	No Impact
Wintu sideband snail		None	No; Outside of the known location or expected area of this species (Quinn, personal communication)	No	No Impact
Shasta chaparral snail	Chaparral habitat within 100 m of shaded limestone rockslides, draws with oak or shrub cover; caves (URS Greiner Woodward Clyde, 2000)	48 acres of chaparral occurs within the project area	only known to occur in Shasta County CA; Known location is outside of and not near the project area (Quinn, personal communication)	No	No Impact
Tehama chaparral snail	Talus, leaf litter and woody debris within 100 m of limestone outcrops (URS Greiner Woodward Clyde, 2000)	48 acres of chaparral occurs within the project area	No; Isolated population located in Tehama County and is not known or expected to occur near project area (Quinn, personal communication)	No	No Impact–
Big Bar (Pressley) Hesperian snail	Conifer/hardwood forests in permanently damp stream channels with late successional habitat elements (e.g. woody debris and leaf mold); limestone (URS Greiner Woodward Clyde, 2000)	None	No; Reported in Trinity County (NatureServe, 2008) but this isolated population is not known or expected to occur near project area (Quinn, personal communication)	No	No Impact

Species	Habitat Requirements	Potential Habitat in Project Area?	Likelihood of Occurrence in Project Area?	Potential Effects from Project?	Determination of Effects
Shasta Hesperian snail	Mixed woodlands under bark and debris near bank edges (NatureServe, 2008)	None	No; Occurrences limited to Shasta County along Flume, Slate and Little Slate Creeks (NatureServe, 2008) and not known or expected to occur near project area (Quinn, personal communication)	No	No Impact
CA floater	Low elevation lakes and lake-like environments	None	No; Occurrences limited to the Fall and Pit rivers in Shasta County (NatureServe, 2008) and not known or expected to occur near project area (Quinn, personal communication)	No	No Impact
Montane peaclam	Herbaceous freshwater wetlands and marshes (NatureServe, 2008)	No	No; Known occurrence in the Upper Klamath Lake and Lost Watersheds (NatureServe, 2008) and not known or expected to occur in or near the project area (Quinn, personal communication)	No	No Impact
Topaz (scalloped) juga	Freshwater	No	No; Known populations are scattered in un-impounded portions of the Pit River in Shasta County (NatureServe, 2008) and not known or expected to occur in or near the project area (Quinn, personal communication)	No	No Impact
Nugget pebble snail	Freshwater	No	No; Known populations occur in Shasta and Tehama Counties (NatureServe, 2008) and are not known or expected to occur in or near the project area (Quinn, personal communication)	No	No Impact

Sensitive Species Related Issues Addressed

The following key issues, related to sensitive species, were identified during scoping. The Issue Indicator's used to analyze and compare the effects of each alternative on these key issues are also presented.

Key Issue #2: Retaining less then 60 percent canopy closure after thinning could affect wildlife habitat.

Issue Indicator: Narrative assessment of effects to wildlife habitat

Key Issue #3: Thinning in riparian reserves may have unintended effects on …wildlife.

Issue Indicator: Narrative assessment of effects to riparian associated wildlife species analyzed

Key Issue #5: Construction of new temporary roads … could impact wildlife.

Issue Indicator: Acres of wildlife habitat affected.

Additionally, potential sensitive species related analysis issues identified during scoping included:

- Treatments may destroy, alter or fragment forest habitat suitable for fishers.
- Treatments, when considered cumulatively with past projects in the watershed may fragment habitat.
- Vegetation treatments may impact … sensitive species habitat and ability to survive.
- Removing old legacy trees may impact wildlife habitat including future snag habitat.

The resource protection measures, related to snags, downed woody material and hardwood retention were developed to help address these issues. These issues are analyzed in the environmental effects section of this report. Other wildlife related issues raised through public scoping will be addressed in the supplement to the Biological Assessment, the management indicator habitat report and/or the migratory bird report.

Project Area Location

The project area is located within the upper reach of the Salt Creek fifth field watershed. State Highway 36 defines the northern boundary of the project area. The proposed project includes treatment areas in: T29N, R11W sections 4-9; T29N, R12W sections 1, 2 and 12; T30N, R11W sections 31 and 32; and T30N, R12W sections 25, 26, 35, and 36 of the Mt. Diablo Meridian. This project area is an estimated 10 air miles south of Hayfork, California, and 3 air miles east of Post Mountain, California. The Post Mountain community is listed as an Urban Wildland Interface community at high risk from wildfire.

Land Allocation and Management Direction

The project area is located within the upper reach of the Salt Creek fifth field watershed. The project area is within the Hayfork Adaptive Management Area (AMA), and Management Area 19 (Indian Valley/Rattlesnake) of the Shasta-Trinity Land and Resource Management Plan (LRMP 1995). The LRMP land management allocation further identifies the proposal as being within Matrix lands of the Hayfork Adaptive Management Area identified in the Northwest Forest Plan (USDA Forest Service and USDOI Bureau of Land Management, 1994), primarily within Management Prescriptions III that emphasizes Roaded Recreation and VIII area that emphasizes

Commercial Wood Products. There are areas of Prescription IX emphasizing Riparian Reserves which are located throughout the project area, but riparian reserves only encompass only a small percentage of the land base. Table 3 displays the acres by land allocations and land management prescriptions within the Salt project area.

Table 3: Acres of Land Allocations and Management Prescriptions within the Project Area

Management Prescription	Acres	% of Project Area
Adaptive Management/ Matrix Lands		
Prescription III – Roaded Recreation	2,161	51%
Prescription VII – Commercial Wood Products Emphasis	1,361	32%
Other	5	0
Riparian Reserves/Key Watersheds		
Prescription IX – Riparian Management	751	18%
Total Project Area	**4,278**	**100%**

The 1995 Shasta-Trinity LRMP includes a standard and guideline designed to provide for retention of old-growth fragments in watersheds where little remains. The proposed harvest units were located to specifically avoid areas that were identified as currently providing the highest quality late-successional and old-growth conifer habitat in the Salt Creek 5th Field Watershed. The proposed harvest units lie in early- to mid-mature conifer habitat that is common throughout the watershed and were also not identified as high priority areas to meet the standard and guideline. Additionally, the thinning prescriptions purposefully include recommendations (e.g., retaining the largest available trees, snags and logs as well as all viable hardwoods) to encourage the development of late-successional and old-growth attributes and increase future options for meeting the standard and guideline.

Project Area Description

The Salt Project is located in the Rattlesnake Creek drainage in the Klamath Mountains of northern California. Elevations range from about 2,500 to 5,800 feet.

Overstory vegetation types within the assessment area generally include an open Grey pine/live oak type, a well stocked mixed conifer type, and a Jeffery pine type on serpentine soils. The Grey pine/live oak type is typically found on low-elevation sites with shallow, rocky soils. As elevation increases, conifer species become more prevalent, primarily a function of more favorable environmental conditions. The deeper, more developed soils support mixed conifer stands of Douglas-fir, ponderosa pine, incense cedar, and sugar pine.

Hardwood species, predominately black oak, madrone, white oak live oak and white alder comprise a substantial stand component throughout the assessment area. Black oak and madrone tend to occupy more productive sites while white oak and live oak are found on less productive sites. White alder is generally a substantial stand component along perennial stream-courses and adjacent to year-round wet areas. Table 4 displays the acres of major forest types within the project area.

Table 4: Major Overstory Vegetation Types occurring in the Salt Project Area

Major Overstory Vegetation	Acres	% of Area
Mixed Conifer	253	6
Douglas Fir	648	15
Jeffery Pine-Ponderosa Pine	2363	55
Montane	48	1
Clearcuts/type conversions	491	11
White Fir	446	10
Other	29	<1

Late-Successional Forest – Related to 15% Forest Plan Standard and Guideline

The 36,881-acre Salt Creek Watershed includes about 5,748 acres of private property and 31,133 acres of National Forest System Lands of which about 26,491 acres are vegetation types that are considered 'federal forest land' (Figure 1). Federal forest land is the denominator in calculating the standard and guideline of total existing late-successional forest. Tables 5 and 6 display the tree size classes and canopy closures used to characterize and describe vegetation.

Late-successional forests, as defined in the Northwest Forest Plan (USDA Forest Service and USDOI Bureau of Land Management 1994) and Shasta-Trinity Land and Resource Management Plan (1995), include small, mature and medium to large old growth trees (size class 3 and 4), regardless of the crown density of those stands (canopy closure codes S, P, N & G). Approximately 78 percent of the Salt Creek Watershed is in late-successional forest. Only 2 percent of this habitat is high quality old-growth habitat (4N/G), the rest is small, mature forest. (See Table 7 on page 12 and page 18 for an explanation of changed habitat conditions in the Salt Creek Watershed as a result of wild fire in 2008). The Salt project does not propose any activities in high quality old-growth habitat.

Table 5: Description of the tree size class codes used in vegetation descriptions

Size Class Code	LRMP Size Class – Crown Diameter
2	Pole-size timber (6-12 feet)
3	Small sawtimber (13-24 feet)
4	Medium/large sawtimber ((25+ feet)

Table 6: Description of the canopy closure codes used in vegetation descriptions

Canopy Closure Code	Density Group	Percent Canopy Closure
S	Sparse	10-19 Percent
P	Light	20-39 Percent
N	Medium	40-69 Percent
G	Heavy	70-100 Percent

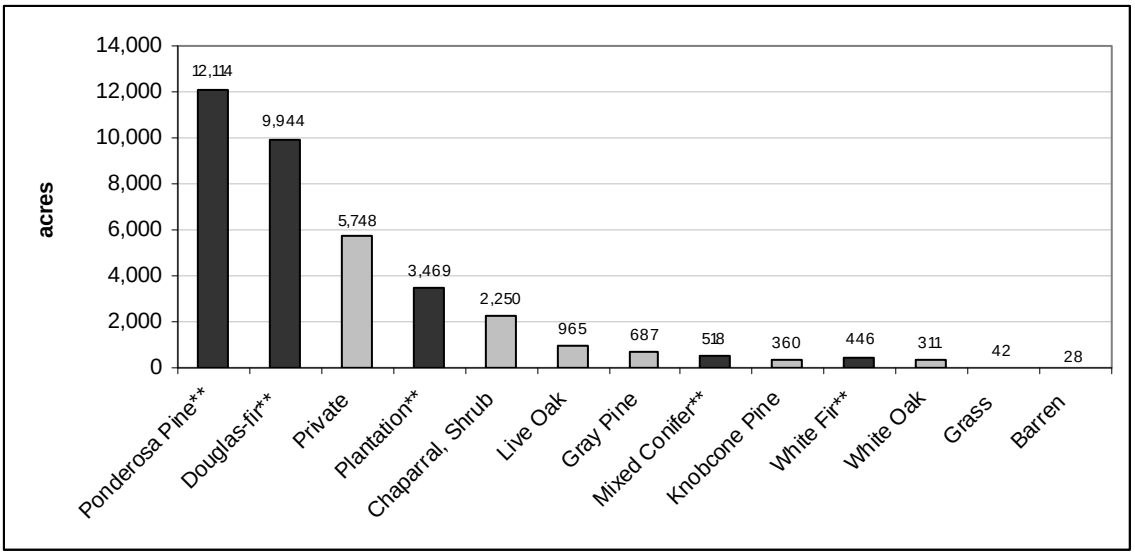

Figure 1: Major Vegetation Types in the Salt Creek Watershed. **Vegetation types that qualify as Federal Forest Land and supply the denominator in calculating the 15% S&G.

Table 7 displays the acres of mature and old growth habitat in the Salt Creek 5th Field Watershed by level of severity that was burned by a wildfire in the summer of 2008. (See page 18 for further information on the Telephone wildfire.)

Table 7. Acres Mature and Old Growth Habitat Burned by Level of Severity in the Salt Creek 5th Field Watershed

Habitat	Level of Fire Severity			Total Acres
	Low	Moderate	High	
Mature Forest (3G and 3N)	2438	763	49	3250
Old Growth (4G and 4N)	159	42	6	206
Total	2597	805	55	3456

Snags and Downed Woody Debris

Stand exam data from 2008 shows that currently there is an average of 13 dead trees per acres across the project area. Six of the 13 dead trees per acre are 12.1 inches dbh or greater. (Petersen and Amell 2009).

Large woody debris ranges from 5 to 10 trees/ac for mixed conifer stands, from 3 to 8 trees/ac for tree/brush stands and 1 to 5 logs/ac for brush areas (Foss, 2009). Downed woody material ranges from less than 7 tons per acre to over 68 tons per acre, with an overall average of approximately 37 tons per acre on most of the project area (Lewis, 2009).

The existing habitat condition in the project area, as it relates specifically to the habitat needs of each sensitive species, is described later in this report.

Purpose and Need

The purpose and need for the proposed project is to maintain and improve the health and vigor of forested areas; reduce hazardous fuels conditions; provide timber products; and, decommission roads not needed for future management.

The restoration strategy of the South Fork Management Unit is designed to implement a series of management projects. The Salt project continues this strategy in the north central area by addressing the need to reduce high fuel hazard, restore timber stands to a healthier condition and connecting to previously treated watersheds. The proposed action also includes activities that will improve watershed conditions through decommissioning of un-needed roads and restoration of anadromous fish habitat.

The high fuel hazard occurring in the project area needs to be lowered by removing the number of trees growing in young dense stands. Thinning stands would provide more space between trees increasing tree growth and vigor, reduce the future rate of tree mortality, and reduce the potential effects of wildfire.

Cut-over older stands need to be “restarted” with regeneration treatments using “green tree retention” guidelines. These stands are under stocked and not growing well. Mortality and increasing decadence is occurring throughout these stands, increasing hazardous fuels. Young stands would be created by removing areas of unhealthy trees and planting new, healthy seedlings in their place.

In Riparian Reserves there is a need to reduce the number of trees in young dense stands to improve connecting travel corridors for wildlife species, particularly late-successional dependent species; reduce the hazard of crown fires by removing some of the understory trees density; and maintain stand growth toward late-successional conditions by giving individual trees more site resources such as additional water and more space to grow..

There are more roads within the Salt project area then are necessary for forest management. Roads can be costly to maintain and can be the major source of sedimentation to streams. There is a need to decommission roads no longer needed for management and assure they are hydrologically stable.

The purpose and need is described more fully in Chapter 1 of the Environmental Impact Statement (USDA Forest Service, 2009).

Description of Alternatives

Alternative 1 (No Action)

The No Action alternative provides a point of reference from which to evaluate the action alternatives. This alternative would implement no activity at this time, allowing the existing conditions, which are inconsistent with the desired conditions for this area, to remain unchanged.

Alternative 2 (Proposed Action)

For more detail on the proposed action refer to Chapter 2 of the EIS ((USDA Forest Service, 2009). The actions listed below are proposed by the Shasta-Trinity National Forest to meet the purpose and need.

Approximately 1,619 acres of proposed vegetation treatments include:

- 963 acres of Intermediate Thinning from below, 31 units
- 31 acres of Shelterwood Harvest with Green Tree Retention., 2 units
- 14 acres of Hand Fuel Treatment, 1 unit
- 481 acres of Pre-commercial Thinning (plantations), 59 units
- 103 acres of Intermediate Thinning (shaded fuel break), 1 unit
- 27 acres of Regeneration Harvest with Green Tree Retention, 2 units

Sub-merchantable fuels will be managed in all treatment units. The vegetation treatments are expected to produce approximately 9.4 million board feet of merchantable saw timber and 15,073 tons (bone dry) of biomass. Forest Service crews, service contracts, and /or commercial timber sales may be used to implement these actions.

Three tenths of a mile of temporary road would be constructed to access units and would be obliterated when the project is completed. Approximately 17.1 miles of road will be reconstructed, 5 miles would be maintained, and 13.8 miles would be decommissioned after this project's vegetation treatments are completed.

Alternative 3

This alternative was designed specifically to address and consider key issues raised during scoping. The differences between Alternative 3 and the proposed action follow.

- No regeneration harvest – green tree retention treatment
- Retain 60% canopy closure rather than 50%
- No thinning in ephemeral or intermittent riparian reserves
- No removal or downgrading of spotted owl habitat
- No construction of new temporary roads

Comparison of Alternatives 2 and 3

Table 8 summarizes and compares vegetative treatments, logging systems and connected road proposed in Alternatives 2 and 3.

Table 8: Comparison of Acres, Types of Treatments, Logging Systems and Road Action Proposed in Alternatives 2 and 3

Timber Stand Activity	Alt. 2	Alt. 3
Proposed Vegetation Treatments (acres)		
Intermediate Thinning	963	850
Shelterwood Harvest – Green Tree Retention	31	30
Shaded Fuel Break Thin	103	100
Regeneration Harvest - Green Tree Retention	27	0
Hand Fuel Treatment	14	14
Pre-commercial Thin	481	421
Total Proposed Treatments (acres)	**1,619**	**1,415**

Timber Stand Activity	Alt. 2	Alt. 3
Yarding Systems (commercial saw-timber acres)		
Tractor Yarding	986	877
Helicopter Yarding	138	134
Sub-merchantable Fuel Treatment		
Treat on Site	1,306	1,168
Tractor Site Prep and Burn Piles	58	30
Handpile, Burn Piles	152	148
Tractor Jackpot Pile and Burn Piles	103	100
Tree Planting	27	0
Landings constructed (and existing)	38 (19)	9 (11)
Temporary Road Constructed (miles)	0.3	0
Estimated Biomass (dry tons)	15,073	4,680
Estimated Timber Harvest Volume (thousands of board feet, MBF)	9,365	3,305
Road Activities		
Roads constructed (miles)	0	0
Roads maintained (miles)	5.0	5.0
Roads reconstructed (miles)	17.1	17.1
Temporary roads constructed (miles)	0.3	0.3
Miles of road closed	0.4	0.4
Miles of roads decommissioned		
Unclassified roads decommissioned	9.5	9.5
Classified roads decommissioned	4.3	4.3
Total Miles of Roads Decommissioned	**13.8**	**13.8**
Borrow pit expanded for road surfacing	1	1

Resource Protection Measures

All anticipated effects are based on implementation of the following wildlife resource protection measures, as well as other resource protection measures identified in Chapter 2 of the EIS (USDA Forest Service, 2009). Table 9 identifies project specific protection measures related to terrestrial sensitive wildlife species.

Table 9: Display of Resource Protection Measures Related to Terrestrial Sensitive Wildlife Species

Resource Protection Measure	Sensitive Species Benefited by the measure
Wildlife	
Should a new goshawk territory be discovered prior to or during implementation, conferencing with a biologist will occur and a buffer zone and limited operating period will be established.	Goshawks
Snags and Downed Woody Debris	
Existing snags and down logs greater than 19” in diameter will be retained (unless there are safety concerns or the snag is within a skid trail, temporary road location, or landing site). An average of 1.5 snags per acre greater than 15 inches in diameter and 20 feet in height will be retained. Snags felled for safety reasons would be left on site.	Fisher, Marten, Northern Goshawk, Towndsend’s big-eared bat.
Maintain 5 logs per acres in contact with the soil surface. Desired logs are about 20 inches in diameter	Fisher, Marten, Northern Goshawk
Maintain an average of 10 tons of downed material per acre on slopes less than 40% with a preference to have 4 to 6 logs per acre at the largest available diameter. Where feasible maintain the same amount on slopes over 40%.	Fisher, Marten, Northern Goshawk
Maintain an average of 5 tons of downed material per acre on slopes less than 40% with a preference to have 4 to 6 logs per acre at the largest available diameter. Where feasible maintain the same amount on slopes over 40%.	Fisher, Marten, Northern Goshawk

Resource Protection Measure	Sensitive Species Benefited by the measure
Retain hardwoods that have a reasonable chance of surviving and thriving after stand treatments.	Fisher, Marten, Goshawk
Riparian Reserves*	
Perennial and Non-perennial: No treatment or equipment within any of the riparian reserves.	Fisher, Marten, Goshawk ,Western Red Bat
Perennial: No thinning and no equipment in perennial stream riparian reserves. Riparian reserves for perennial streams for this project are 300 feet for fish bearing streams and 225 feet for non-fish bearing streams.	Fisher, Marten, Goshawk, Western Red Bat
Non-Perennial Streams: The non-perennial riparian reserve is defined for this project as a protection zone 150 feet wide measured along the slope from the high watermark up the hillslope. ▪ No new landings would be located inside of RRs ▪ At least 60% of overstory canopy remains after thinning. ▪ Designate/approve Riparian Reserve crossings in coordination with the fisheries biologist and/or hydrologist. ▪ Equipment will be excluded from operating on active or potentially active landslides and thinning will be prescribed by a geoscientist. ▪ Selective commercial thinning within RRs, adjacent to EEZs, would be accomplished through a combination of mechanical operations and hand thinning. ▪ Hazard trees within RRs must be dropped and retained on site if > 16” dbh. Handpiles of thinned fuels would be placed outside of EEZs and burned in the riparian reserve in a manner that leaves at least 50% of the localized area unburned at any given time. In addition, hand piles would be placed in a checkerboard pattern whenever possible (not one pile directly above another). ▪ When fuels treatments involve area ignition, use backing fire in RRs. There would be no ignition within RRs associated with understory burning; however, fire would be allowed to creep into riparian areas.	Fisher, Marten, Goshawk, Western Red Bat
Equipment Exclusion Zone: No equipment and no thinning allowed within the equipment exclusion zone (EEZ). The EEZ is a portion of the riparian reserve defined for this project as the area that extends 50 feet (slope distance) from the high watermark on slopes >30% and extends 25 feet (slope distance) on slopes <30% OR extends to the inner gorge, which ever is greater.	Fisher, Marten, Goshawk, Western Red Bat

* See Figure 7 (page 28) of the Salt Timber Harvest and Fuel Hazard Reduction Project Draft Environmental Impact Statement (March 2009)

Sensitive Species Evaluated

Methodology for Analysis

Field reviews and habitat assessments were conducted in 2007 and 2008. Within the project area, vegetation components were sampled in May, 2008 using standard R-5 Stand Exam protocol. A total of 160 field plots (representing 98 percent of the vegetation found in the project area) were completed in the major vegetation types in the project area. Vegetation types sampled included the M2G, M2P, M3G, M3P, XX1 and XX2 (Petersen and Amell, 2009). See Tables 5 and 6 for a description of these vegetation types.

To assess existing habitat conditions, the 2008 stand exam data was extrapolated to similar vegetation types across the analysis areas for each sensitive wildlife species. The existing Shasta-Trinity GIS database Veg1980 layer was used for those vegetation types that did not have 2008 stand exam data. In addition to the stand exams, habitat was assessed through field observations in 2008.

The Shasta-Trinity GIS database and the California Natural Diversity Database were consulted and used to determine habitat occupancy and sighting information.

Assumptions and limitations of the data used in this analysis were considered. Extrapolations of site specific stand exam data to like vegetation types is an accepted method of characterizing vegetation, however it is not a 100% accurate representation of each acre on the ground. For wildlife habitat characterization this methodology is appropriate. All habitat determinations were reviewed and validated by a wildlife biologist who is familiar with the habitat within the project area.

Habitat Conditions Modified by Wildfire

During preparation of this document in the summer of 2008, a wildfire occurred directly adjacent to the Salt project area. The Telephone wildfire was part of the Lime Complex of fires that occurred on the front country of Trinity County in the Lower Hayfork Creek 6th field watershed.

The wildfire started on a ridgeline and slowly backed down the ridges over time, causing a mosaic burn. Generally forested areas that were north or east facing slopes were underburned. Forested areas that were south or west facing slopes burned hotter and had tree mortality of 20-40% with ridges burning hot (USDA Forest Service, 2008).

Within the fire effects literature, the term “fire severity” is used to describe ecological impacts of fires (Parsons, 2003). Fire severity determines, in large part, the mortality of dominant vegetation and changes in the aboveground structure of the plant community (Smith, 2000).

In an understory fire regime, fires are generally not lethal to the dominant vegetation and do not substantially change the structure of the dominant vegetation. Approximately 80 percent or more of the aboveground dominant vegetation survives fire. In a mixed-severity fire, the severity of fire either causes selective mortality in dominant vegetation depending on different species’ susceptibility to fire, or varies between understory and stand replacement (Smith, 2000).

Effects of the Telephone wildfire to each species evaluated are incorporated and discussed under the existing habitat condition.

Pacific Fisher

Natural History

Pacific fishers occur in the northern Coast Ranges and Klamath province at elevations near sea level to about 5,600 feet (Golightly et al. 2006).

The largest California fisher home ranges, using the minimum convex polygon method, occur in northern California, mainly on the Shasta-Trinity National Forest (Green et al, 2008). Male home ranges average between 13.8 and 22.7 square miles. Female home range averages between 5 and 10.2 square miles. On the Shasta-Trinity National Forest, Yeager (2005) calculated female fisher home range size of about 5,800 acres on average.

Fishers use a mosaic of many forest types which are often conifer dominated with a hardwood component. The combination of sighting reports, monitoring results, and study findings demonstrate fisher are widely distributed across a variety of habitat types throughout the Shasta-Trinity National Forest (Quinn, 2008).

Forests with complex structural elements are preferred. Fishers occupy habitat with moderate to high canopy closure often with multiple canopy layers, large trees, large woody debris, and large snags that are generally found in late successional stands in western forests. These elements provide protective cover from weather and predation, prey and substrates in the form of down wood and tree cavities for resting and denning (Green et al, 2008). Raptor nests, mistletoe clumps and branch platforms under dense canopies are also used for resting.

Fishers appear to have an important commensal relationship with pileated woodpeckers (Green et al, 2008). Natal den sites are typically found in large (36-54 inch dbh) live tree and snag cavities, are often excavated by pileated woodpeckers, and are located well above the ground. By using abandoned pileated woodpecker nests for natal denning, these woodpeckers contribute to fisher survival. The entrances of pileated woodpecker cavities are large enough for entry by female fishers, but too small for males, which may prevent males from entering these den cavities and killing kits (Aubry and Raley, 2006). As the kits grow, females move them to maternal dens in larger live trees and snags with larger cavities. Maternal dens are also found in large hollow logs at ground level.

Riparian areas are used by fishers as travel and dispersal corridors. Riparian areas are also important foraging areas. Fishers forage in all types of habitats. Fishers are generalist predators, utilizing a wide variety of prey, including squirrels, mice, chipmunks, voles, deer and elk carrion, lizards, soft and hard mast, and false truffles (*Rhizopogan* spp) (*in* Green et al, 2008).

Recent surveys indicate that fishers appear to occupy less than half of the range they did in the early 1900s in California and this population is divided into two remnant populations (DOI USFWS, 2004). The Pacific fisher population of the Klamath province, which includes the Salt project area and vicinity, is indigenous to the area. Accurate information on fisher densities and abundance is very limited and there are no good population estimates for fisher populations in California, Oregon and Washington (DOI USFWS 2004). Zielinski et al (2004) provided a rough estimate of approximately 5 female fishers per 38.6 sq. mi. for their 154 sq mi north coast study area (in the Six Rivers and Shasta-Trinity National Forests of southeastern Humboldt and southwestern Trinity Counties). On the Shasta-Trinity National Forest, over 550 fishers have been observed since 1941 to 2005 through monitoring (track plates or camera stations), trapping, incidental sightings, and fisher research results from Buck, Marcot, Raphael, Garrison, Yaeger, and Zielinski (Quinn, 2008).

Threats to fisher and their habitat include wildfires, removal of key structural elements needed by fisher as a result of mechanical vegetation treatments designed to reduce fuels loading; rural or recreational development that fragments habitat, creates dispersal barriers or creates ecological sinks that causes mortality to exceed reproductive output; climate change and disease (Green et al, 2008).

Management Direction

In 2004, U.S. Fish and Wildlife Service (USFWS) published a 12 month finding that the petition to list the West Coast Distinct Population Segment of the Fisher (*Martes pennanti*) under the Endangered Species Act is warranted but precluded by higher priority actions. Fishers were added to the USFWS's candidate species list.

The Shasta-Trinity National Forest (STNF) is currently operating in full compliance with the Record of Decision (ROD) for Amendments to Forest Service and Bureau of Land Management Planning Documents within the range of the northern spotted owl (ROD; USDA Forest Service

and USDI Bureau of Land Management, 1994). The Regional Forester approved the Shasta-Trinity Land and Resource Management Plan (LRMP) on April 28, 1995 and it became effective as of June 5, 1995. The Northwest Forest Plan ROD (1994) was incorporated into the Forest Plan.

The Shasta-Trinity Land and Resource Management Plan adopts the ROD as the Federal contribution to the management and/or recovery of species associated with late-successional forest ecosystems such as the northern spotted owl and Pacific fisher. The Shasta-Trinity National Forest expects the network of areas withdrawn from active timber management (e.g., wilderness, late-successional reserves, riparian reserves, and administratively withdrawn areas) along with standards and guidelines related to snag, log, and hardwood retention to provide habitat adequate to maintain viable well-distributed populations of Forest Service sensitive species (Quinn, 2008).

Shasta-Trinity Land and Resource Management Plan (1995) direction applicable to fishers includes the following:

Pg. 3-25-26 Management Indicator Assemblages - Late Seral Stage Wildlife Assemblage: The late seral stages are important to wildlife for cover, thermal cover, large trees for nesting, large snags and down logs, vertical diversity, older over-mature habitat, etc. Some species represented in this assemblage are northern spotted owl, goshawk, **fisher**, marten, Trowbridge shrew, and northern flying squirrel.

Pg. 3-27 Sensitive Species – Pacific Fisher: The fisher frequents riparian areas as well as dense, deciduous stands of many forest types. Current management direction is to provide a network of suitable habitat to include linkage in the form of dispersal habitat. This direction is being fulfilled with the implementation of the Late Successional Reserve and Riparian Reserve systems. In addition wildernesses, roadless areas, and wild and scenic rivers help provide habitat and maintain viability of the species.

Pg. 4-5 Monitor and protect habitat for Federally listed threatened and endangered (T & E) and candidate species.

Pg. 4-5 Manage habitat for sensitive plants and animals in a manner that will prevent any species from becoming a candidate for T & E status.

Pg. 4-6 Wildlife: Meet habitat or population objectives established for management indicators. Maintain natural wildlife species diversity by continuing to provide special habitat elements within Forest ecosystems.

Forest Wide Standards and Guidelines:

Pg.4-14 Snags: Over time, provide the necessary number of replacement snags to meet density requirements as prescribed for each ROD allocation and/or management prescription. Live, green culls and trees exhibiting decadence and/or active wildlife use are preferred.

Pg. 4-14 Dead/Down Material: Maintain unburned dead/down material in the quantity prescribed for each land allocation and/or management prescription.

Pg. 4-14 Seral Stages: Provide for and maintain at least five percent of each timber type/seral stage. Determine specific arrangements (size, distribution, and location) of seral stages for each Management Area in order to meet species viability criteria as shown in Fisher Habitat Capability Model in Appendix G. (Pg. G-5).

Pg. 4-14 Hardwoods: Where hardwoods occur naturally within existing conifer types on suitable timber lands, manage for a desired future condition for hardwoods as identified during ecosystem analysis consistent with management prescription standards and guidelines. Retain groups of hardwoods over single trees.

Pg.4-14 Corridors: Provide connecting travel corridors for wildlife species, particularly late-successional dependent species, by using Riparian Reserves and silvicultural prescriptions.

Pg. 4-30 Maintain and/or enhance habitat for TE & S species consistent with individual species recovery plans.

Pg. 4-30 Survey and evaluate habitat for TE & S species at the project level in coordination with the USFWS.

P. 4-61 Matrix Lands Standards and Guidelines: Provide specified amounts of coarse woody debris.

Manage to provide a renewable supply of large down logs well distributed across the Matrix landscape in a manner that meets the needs of species and provides for ecological functions.

Coarse woody debris already on the ground should be retained and protected to the greatest extent possible from disturbance during treatment (e.g., slash burning and yarding) which might otherwise destroy the integrity of the substrate.

Down logs should be left within forest patches that are retained under green-tree retention guidelines in order to provide the microclimate that is appropriate for various organisms that use this substrate.

Pg 4-61 Emphasize green-tree and snag retention in Matrix management

Retain at least 15 percent of the area associated with each cutting unit (stand).

As a general guide, 70 percent of the total area to be retained should be aggregates of moderate to larger size (0.2 to 1 hectare or more) with the remainder as dispersed structures (individual trees, and possibly including smaller clumps less than 0.2 ha.). Larger aggregates may be particularly important where adjacent areas have little late-successional habitat. To the extent possible, patches and dispersed retention should include the largest, oldest live trees, decadent or leaning trees, and hard snags occurring in the unit. Patches should be retained indefinitely.

As a minimum, snags are to be retained within the harvest unit at levels sufficient to support species of cavity-nesting birds at 40 percent of potential population levels based on published guidelines and models or an average of 1.5 snags per acre greater than 15 inches in diameter and 20 feet in height. The objective is to meet the 40 percent minimum standard throughout the Matrix, with per-acre requirements met on average areas no larger than 40 acres. To the extent possible, snag management within harvest units should occur within the areas of green-tree retention. The needs of bats should also be considered in these standards and guidelines as those needs become better known. Snag recruitment trees left to meet an identified, near-term (less than 3 decades) snag deficit do not count toward green-tree retention requirements.

Standards and Guidelines from Prescription III Objective: Emphasis of vegetation management activities will be to meet recreation, visual and wildlife objectives while maintaining healthy and vigorous ecosystems.)

Pg. 4-65. Disperse openings created by timber harvesting throughout project areas. Size of openings will average 5 acres or less.

Pg. 4-65. Maintain an average of 10 tons of unburned dead/down material per acre on slopes less than 40 percent. Preference is to have a portion of this tonnage in large material (i.e. 4-6 logs over 10 feet long at the largest diameter available). Where feasible, maintain the same amount on slopes over 40 percent.

Pg. 4-66 Use this prescription to help provide additional habitat for fisher, marten and goshawk

Standards and Guidelines from Prescription VIII (Objective: Vegetative manipulation will provide habitat for those wildlife species primarily dependent on early and mid-seral stages.)

Pg. 4-67 Maintain an average of 5 tons of unburned dead/down material per acre on slopes less than 40 percent. Preference is to have a portion of this tonnage in large material (i.e. 4-6 logs over 10 feet long at the largest diameter available). Where feasible, maintain the same amount on slopes over 40 percent.

Spatial Scales and Time lines Analyzed

The fisher analysis area was established using the same general technique and principles used to depict the ‘spotted owl action area’ for analyzing the federally listed (threatened) northern spotted owl because the status of the fisher has been deemed warranted for federal listing but precluded by pending proposals for other species with higher listing priorities (U.S. Fish and Wildlife Service; April 8, 2004).

Truex et al (1998) and Lamberson et al (2000) determined that female fisher survival was the single most important demographic parameter of fisher population stability. The actual size and configuration of a female fisher home range varies and is seldom known. The analysis area used to evaluate potential impacts to fisher related to this project was based on average female fisher home range (5,800 acres) from studies conducted by Yeager (2005) on the Shasta-Trinity National forest.

A 21,006 acre fisher analysis area for the Salt project was developed by creating a 1.7 mile radius circle (5,800 acres) buffer around all units proposed for treatment within the project area. Fisher habitat was also evaluated at the project area and fisher territory level. Project area analysis includes those areas (units/stands) proposed for treatment.

Timelines used in this analysis begins immediately following treatment and includes projections of stand changes and recovery in excess of 100 years.

Existing Condition (Environmental Baseline)

Fisher habitat exists within the 4,278 acre Salt project area. No moderate or high quality resting and denning habitat exists within the project area. A majority of the fisher habitat in the project area is low quality resting and denning habitat and foraging habitat.

Map A1 in Appendix A displays the location of available fisher habitat in the Salt project area and fisher analysis area. Table 10 displays the quantity and quality of available fisher habitat in the Salt project area.

Table 10. Available Existing Fisher Resting, Denning and Foraging Habitat in the Salt Project Area as per Late-successional (Late Seral) and Old-growth Habitat, Vegetation Types, and Crown Diameter & Canopy Closure.

Habitat Quality	Description Crown Diameter, Canopy Closure and Vegetation Types	Acres (%) of Existing Available Fisher Habitat in Salt Project Area
Resting and Denning Habitat		
High Quality (old-growth)	4G & 4N mixed conifer, Douglas-fir, ponderosa pine, and white fir	0
Moderate Quality (dense late-successional)	3G mixed conifer, Douglas-fir, ponderosa pine, and white fir	0
Low Quality (moderately dense late-successional)	3N mixed conifer, Douglas-fir, ponderosa pine, and white fir	3,532 (95%)
Foraging Habitat		
low density late-successional and younger conifer	mixed conifer, Douglas-fir, ponderosa pine, and white fir 4P, 4S, 3P, 3S, 2G, 2N, 2P, 2S, 1G, 1N, 1P, and 1S (from better to worse quality)	158 (4%)
Marginal Quality (fishers forage in a wide variety of habitat types that bear little or no resemblance to late-successional conifer forests)	Chaparral, shrub, hardwood and foothill pine	50 (1%)
Total Available Fisher Habitat		**3,740**

Capable Habitat or Habitat Capability – is potential habitat that has the capacity, when fully developed, to provide suitable habitat for a species. Capability depends on site conditions, such as climate, slope, landform, soils, geology and vegetation types and stages.

Twenty-eight acres of land within the project area is considered “not capable. The project area has 481 acres of conifer plantations in the 1-24 foot tree size. Plantations range in age from approximately 10 to 33 years old. Reference plantation photo in Figure 2. Plantation and “non-capable acres are not included in the fisher habitat acreages displayed in Table 9.

Figure 2. Sample photograph of a plantation unit (unit 45).

The acres of conifer plantations within the project area and analysis area would be considered "capable" and may be providing some amount of fisher foraging habitat (depending upon individual stand canopy closure and development) as well as connectivity between existing available fisher habitat. Buck (1982) and Mullis (1985) documented fishers hunting in plantations with greater than 80 percent canopy closure and average tree heights of 5 to 10 feet.

Most of the 21,006 acre fisher analysis area is considered fisher habitat. A majority of the fisher habitat in the analysis area is low quality resting and denning habitat and foraging habitat. The 2008 Telephone wildfire affected habitat within the fisher analysis area. Table 11 displays the quantity and quality of habitat in the fisher analysis area as well as the acreage affected by the Telephone wildfire.

Table 11. Acres of Fisher Habitat within the Analysis Area and Quantity Affected by Wildfire

Habitat Quality	Description Crown Diameter, Canopy Closure and Vegetation Types	Pre-Wildfire Acres (%) of Existing Available Fisher Habitat in Analysis Area	Acres Affected by the Telephone Wildfire in Analysis Area
Resting and Denning Habitat			
High Quality (old-growth)	4G & 4N mixed conifer, Douglas-fir, ponderosa pine, and white fir	127 (<1%)	66 - Low Severity 15 - Moderate Severity
Moderate Quality (dense late-successional)	3G mixed conifer, Douglas-fir, ponderosa pine, and white fir	0	0
Low Quality (moderately dense late-successional)	3N mixed conifer, Douglas-fir, ponderosa pine, and white fir	16,752 (92%)	928 – low severity 220 moderate severity 9 – high severity
Foraging Habitat			
low density late-successional and younger conifer	mixed conifer, Douglas-fir, ponderosa pine, and white fir 4P, 4S, 3P, 3S, 2G, 2N, 2P, 2S, 1G, 1N, 1P, and 1S (from better to worse quality)	954 (5%)	29 – low severity 5 moderate severity
Marginal Quality (fishers forage in a wide variety of habitat types that bear little or no resemblance to late-successional conifer forests)	Chaparral, shrub, hardwood and foothill pine	538 (3%)	73 – low severity 40 – moderate severity 6 – high severity
Total Fisher Habitat		**18,371**	**1,096 - low severity** **280 - moderate severity** **15 - high severity**

There are 1,196 acres of non-National Forest System lands not included in Table 10. Twenty acres of non-National Forest System Land within the fisher analysis area burned at low severity and another four acres burned at moderate severity. One-hundred twenty-six acres of land within the fisher analysis area is considered “not capable. Of the 1,313 acres of conifer plantations in the fisher analysis area, 12 acres burned at low severity and 21 acres burned at moderate to high severity.

A majority of the available habitat in the fisher analysis area did not burn in the Telephone wildfire. The effects of fire on mammal species are related to the uniformity and pattern of fire on the landscape (Smith, 2000). Effects to fisher habitat in the areas that burned were variable. Areas that burned at the high severity level no longer provide habitat for fisher. Areas that burned at low levels of severity will continue to provide fisher with habitat. Moderate severity burn areas may or may not continue to provide habitat for fishers.

Most of the landscape that did burn, burned at low levels of severity. In areas of low to moderate severity, small trees, small down woody debris and herbaceous groundcover were removed. Some important habitat components for fisher were lost. Canopy closure was reduced. Some existing

snags were burned up in the fire. Denning, resting and foraging habitat was reduced with the burning up and charring of down woody debris. Grasses, herbaceous vegetation and shrubs would be expected to begin recovering within a year following the fire. Within the fisher habitat that burned moderately severe, some trees likely were killed or scorched badly enough that they will eventually die and fall. Thus, some snags and down woody material were/will be created.

Some habitat fragmentation, particularly along ridgelines that burned severely, has occurred as a result of the Telephone fire. A small amount of high quality old growth denning and resting habitat was reduced as a result of the wildfire.

Habitat heterogeneity (patchiness of the vegetation) across the analysis area increased. This will be beneficial to fisher and their prey base over the long term. Conditions for another wildfire event occurring within the area burned have been reduced, thus maintaining a majority of the remaining habitat values for fishers over the long term.

It is likely that an individual fisher or two utilize some of the habitat available within the project area. No fisher sightings have been documented within the Salt project area, but there have been four fisher sightings in the vicinity. For purposes of this analysis, the four fisher sightings were each buffered by 5,800 acres in order to establish a potential home range for each individual.

The four potential home ranges (territories) intersect portions of the 21,006 acre fisher analysis area established for the Salt project. Two of the fisher territories, numbers 604 and 819, overlap with the Salt project area. The 2008 Telephone wildfire affected habitat within fisher territory 604 that occurred outside the project area but within the fisher analysis area. Acres affected by the Telephone wildfire are displayed in the existing condition for fisher territory 604.

Map A-1 depicts the existing habitat quality condition for fisher. Tables 12 and 13 display the available fisher habitat in the Salt project area and fisher analysis area for territories 604 and 819, respectively.

Table 12. Acres and Percentage of Available Fisher Habitat in the Salt Project Area and Fisher Analysis Area for Fisher Territory 604

Habitat Quality	Acres (%) of Existing Available Fisher Habitat in Salt Project Area	Acres (%) of Existing Available Fisher Habitat in Analysis Area	Total Acres of Fisher Habitat in Project and Analysis Area
High Resting Denning	0	69 (2%)	69
Moderate Resting Denning	0	0	0
Low Resting Denning	2048 (96%)	2486 (83%)	4,534
Foraging Habitat	61 (3%)	308 (10%)	369
Marginal Foraging	16 (~1%)	145 (5%)	161
Total Acres (%) Fisher Habitat	**2,125 (41%)**	**3,008 (59%)**	**5,133**

Not included in Table 12 above, within the project area and analysis area, 29 acres of habitat in fisher territory 604 is considered “not capable” and 466 acres are young conifer plantations. In the analysis area, 23 acres are non-National Forest System lands. Of the 23 acres of non-National Forest System land, 15 acres burned at low severity and 1 acre burned at moderate severity in the Telephone fire. An additional 156 acres of the 5,808 acre territory #604 lies outside the project area and analysis area.

A majority of the available habitat in fisher territory 604 did not burn in the Telephone wildfire. The Telephone wildfire affected 447 acres of resting and denning habitat and 45 acres of marginal foraging habitat. In fisher territory 604, 29 acres of high quality resting and denning habitat burned at low severity, while 10 acres burned at moderate severity. Three-hundred-ten, 97 and 1 acre of low quality resting and denning habitat burned at low, moderate and high severity, respectively. In marginal foraging habitat, 24 acres burned at a low level of severity, 15 acres burned at moderate severity and 6 acres were severely burned.

Table 13. Acres and Percentage of Available Fisher Habitat in the Salt Project Area and Fisher Analysis Area for Fisher Territory 819

Habitat Quality	Acres (%) of Existing Available Fisher Habitat in Salt Project Area	Acres (%) of Existing Available Fisher Habitat in Analysis Area	Total Acres of Fisher Habitat in Project and Analysis Area
High Resting Denning	0	0	0
Moderate Resting Denning	0	0	0
Low Resting Denning	84 (98%)	1,688 (97%)	1,772
Foraging Habitat	0	0	0
Marginal Foraging	2 (2%)	48 (3%)	50
Total Acres Fisher Habitat	**86 (5%)**	**1,736 (95%)**	**1,822**

Not included in Table 13 above, within the analysis area, 203 acres of habitat in fisher territory 819 are young conifer plantations. Sixty-five percent or 3,783 acres of the 5,808 acre fisher territory 819, lies outside the project area and analysis area.

Environmental Consequences

In addition to the Forest Plan standards and guidelines listed for the species, the resource protection measures (on pages 16 and 17 of this document), will be applied, as appropriate, for the action alternatives 2 and 3 below.

Alternative 1 – No Action

Under the No Action alternative, current management plans would continue to guide existing and previously authorized activities within the project area. Habitat conditions would not be expected to change appreciably within the next 10 years, barring a wildfire event. Existing structural characteristics, canopy closure and snag numbers and down woody material would not change appreciably within the next 10 years.

The existing amounts of low quality resting and denning habitat and foraging habitat for fishers would remain. In the long term (>10 years) further development of large old trees within stands would likely progress slowly due to existing tree densities and competition for sunlight, nutrients and water. In the long term (>10 years) snag numbers and down woody material would be expected to increase as trees die due to crowded conditions, insects and disease.

Cumulative Effects

There are no cumulative effects because there are no direct or indirect effects of the No Action Alternative.

Determination of Effects and Rationale

There would be no change to the existing environment within the Salt project area, therefore, Alternative 1, No Action would result in **no impact** to fishers or their habitat.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Because there is no high or moderate quality resting and denning habitat within the Salt project area, it is unlikely that a female fisher and her young would be displaced or disturbed during the denning season as a result of implementing Alternative 2. Disturbance and/or displacement of fishers from low quality resting and denning habitat or foraging habitat could occur as a result of implementing Alternative 2. It is unlikely, but possible that a resting or denning fisher could be killed during tree felling operations.

Changes to the quality and quantity of available fisher habitat in the project area and fisher territory 604 would occur as a result of implementing Alternative 2. No habitat modification in fisher territory 819 would occur as a result of Alt 2. There would be no change in the amount of marginal fisher habitat or habitat not "capable" in the project area. There would be no changes to high and moderate quality resting and denning habitat that occurs in fisher territory 604 and the analysis area.

Map A-2 in Appendix A displays fisher habitat quality relative to Alternative 2. Table 14 displays the acreage changes to low quality resting and denning habitat and foraging habitat within the project area, fisher territory 604 and the analysis area with the implementation of Alternative 2.

Table 14: Changes to Fisher Habitat at Three Scales with Alternative 2.

Habitat	Change in Acres Available Fisher habitat in Project Area and Analysis Area	Change in Acres Available Fisher Habitat in Fisher Territory 604 within the project area
Low Quality Resting and Denning	Decrease of 44 acres	Decrease of 33 acres
Foraging	Increase of 44 acres	Increase of 33 acres

The proposed regeneration harvest and shelterwood treatments with green tree retention would cause a 1.2 percent decrease in the amount of available low quality resting and denning habitat for fishers in the project area with the implementation of Alternative 2. Forty-four acres of low quality resting and denning habitat would be converted to foraging habitat which would increase by 28 % in the project area. There would be a 1.6% decrease in low quality resting and denning habitat in that portion of fisher territory 604 that occurs within the project area and <0.3% decrease in low quality resting and denning habitat over the analysis area. Foraging habitat would increase 28% in that portion of fisher territory 604 that occurs within the project area. Foraging habitat within the analysis area would increase 4.6%.

The immediate effect of the proposed treatments would result in a reduction of vertical and horizontal structure by removing smaller diameter trees. Tree removal would also reduce crown closure up to 60% in the 103 acre shaded fuel break (i.e. 40% canopy closure will be retained). Canopy closure would be reduced to 50% closure in all other thinned units except for 41 acres

within intermittent or ephemeral stream riparian reserves, which will be reduced to no more than 40% (i.e. 60% canopy closure will be retained). Reduction of structure and canopy closure would reduce cover, decrease resting, denning and foraging substrate. Fisher would likely continue to use the habitat; however the quality of fisher habitat and prey habitat would be reduced. Reduction of canopy closure and woody debris substrate increases fisher vulnerability to predation. The modeled projection of crown canopy 50 years following treatment would range from 54 to 75% (Petersen and Amell, 2009).

Pre-commercially thinning plantations would have a negligible effect on fisher habitat in the near term. Long term (>30 years) trees should grow more rapidly and develop into desirable fisher habitat.

Fisher habitat fragmentation across 103 acres would continue with the maintenance thinning of the shaded fuel break. Fragmentation of fisher habitat would also occur as a result of the proposed regeneration harvest and shelterwood treatments with green tree retention on 58 acres. Fisher would generally avoid these fragmented habitats. An individual that moves across or within fragmented habitat would be at increased risk of predation.

Currently there is an average of 13 dead trees per acres across the project area. Six of the 13 dead trees per acre average 12.1 inches dbh or greater (Petersen and Amell 2009). Some dead, dying and mistletoe infected trees would be removed. Some loss of snags <19 inches dbh and down woody material in the 3” to 20” class would also reduce existing and future resting, denning and foraging substrate and increase fisher vulnerability to predation. However, resource protection measures will assure that existing snags and down logs greater than 19” in diameter will be retained, unless they are in a skid trail, landing site, or other exceptions. An average of 1.5 snags per acre greater than 15 inches in diameter and 20 feet in height will be retained. Snags felled for safety reasons would be left on site. Additionally an average of 5 tons of downed material per acre or 10 tons of downed material per acre, depending upon land management allocation, will be retained with a preference to have 4 to 6 logs per acre at the largest available diameter. All hardwoods that have a reasonable chance of surviving and thriving after stand treatments will also be retained.

Reconstruction of roads, construction of temporary roads, landing development and borrow pit expansion would remove about 1 acre of low quality resting and denning habitat for >30 years. The decommissioning of 13.8 miles of road would in time, add to low quality resting and denning habitat availability.

Some shrubs, herbs, grasses and forbs would be expected to develop as a result of increased sunlight on the forest floor until the canopy gradually closes again. An increase in shrubs, herbs, grasses and forbs would provide fishers with cover, foraging opportunities and may increase prey diversity.

Depending upon the existing vegetative stage of the stands, the modeled quadratic mean diameter of trees 50 years after treatment is projected to be in the range of 22 - 29 inches (Petersen and Amell, 2009). The projected number of years to achieve a 30 inch quadratic mean diameter for all trees ranges from 60 to >100 years (Petersen and Amell, 2009). A reduction in the number of smaller trees would reduce competition for nutrients, light and water and increase the growth and size of the remaining largest trees ((the average diameter of retained trees would be about 16.5 inches DBH (Petersen, personal communication)) and hasten the development of desirable late-successional stand conditions which would be favorable to fishers in the long term (>50 years).

A reduction in the density of smaller trees, standing dead and down woody debris would reduce the wildfire hazard in the project area. Reducing the wildfire hazard would maintain and promote fisher habitat within the project area for about 20 years (Lewis, 2009).

Cumulative Effects

The following projects and activities are anticipated to occur within the fisher analysis area between now and December 2012.

A watershed restoration project to decommission roads that are no longer needed for management action is planned within the project area. This action would not be expected to have a significant cumulative effect with the actions planned in the Salt project.

The Shasta-Trinity is in the process of proposing to re-issue term livestock permits in the Upper South Fork and Post Creek Cattle and Horse Allotment (reference the Environmental Assessment for the Upper South Fork & Post Creek Range Allotments, 2008). Fifteen-thousand eight-hundred ninety-two acres of the Post Creek Pastures 1 and 2, Wildwood Pasture 1 and the Upper South Fork Pasture occur within the fisher analysis area. Activities proposed include continuation of grazing between June 1 and October 31, vegetation monitoring, maintenance of fencing and corrals, construction and reconstruction of fences. The preferred range alternative (2) would have no discernible impacts to the resources and values of riparian reserves or riparian/wet meadow habitat. There would be no direct effects to fishers from grazing activities proposed. Indirect effects through alteration of vegetation and thus small mammal abundance and diversity are possible, but are expected to be highly dispersed, immeasurable and discountable. Due to the low level and dispersed nature of the effects of the proposed grazing no impacts to the highly mobile and opportunistic fisher are anticipated (USDA Shasta-Trinity National Forest, 2008).

Within the analysis area, the Seven Bone, Tower Fire Salvage Owl and West Smoky pre-commercial thinning of conifer plantations would affect 326 acres of “capable” fisher habitat. The short and long term direct and indirect effects of pre-commercial thinning activities to fisher and their habitat for these three proposed projects would be expected to be similar as described above in Alternative 2.

Trinity roadside hazard abatement project proposes to remove hazard trees within up to 150 feet on both sides of maintenance level 2-5 roads. Removal of dead trees could potentially reduce existing and future denning, resting and foraging substrate for fishers and increase the area of habitat fragmented by roads.

Forest-wide travel management planning is proposed. It is anticipated that this planning document will direct changes to the amount of on and off-road travel (eliminating cross country travel) and specifically designate the roads and trails authorized for use. The effects of roads and trails and accessibility with regard to fishers and their habitat, in general, include: disturbance, displacement, increased fisher vulnerability to mortality via vehicles and humans with guns and traps, habitat fragmentation and the reduction in denning, resting and foraging habitat due to the loss of snags and down woody material from firewood cutters. The Salt project would result in a reduction in road use with the decommissioning of roads and there will likely be a cumulative reduction of road use with the travel management designation process.

Determination of Effects and Rationale

Alternative 2 would not affect any high or moderate quality fisher habitat. Alternative 2 would cause a reduction in key fisher habitat components such as canopy closure, standing dead snags

and down woody debris across 1,619 acres. Alternative 2 would reduce 44 acres of low quality denning and resting habitat to foraging habitat, which is <0.3% reduction over the analysis area. Therefore: Alternative 2 **may impact individual fishers but would not likely cause a change in the U.S. Fish and Wildlife Service prioritization towards federal listing.**

NOTE: Generally, the analysis for Forest Service sensitive species focuses on whether or not the action "is likely to lead to a trend in Federal listing." However, the U.S. Fish and Wildlife Service has already determined that the listing of the Pacific Fisher is 'warranted, but precluded' by higher priorities (USDI, 2004). Therefore we have evaluated here whether or not the proposed action is likely to cause a significant enough shift in the population factors that it would cause the FWS to reprioritize the Pacific fisher and accelerate the development of a listing package and its official listing as a threatened and endangered species.

Alternative 3

Direct and Indirect Effects

Direct and indirect effects to fishers and their habitat with the implementation of Alternative 3 would be similar to Alternative 2 with the following exceptions.

Two-hundred-three (12.5%) fewer acres of vegetation would be treated in Alternative 3. Fewer acres treated would lessen the effects of disturbance and displacement of fishers that may occur within the project area.

Map A-3 in Appendix A displays fisher habitat relative to Alternative 3. Table 15 displays the changes to low quality resting and denning habitat and foraging habitat within the project area, fisher territory 604 and the analysis area with the implementation of Alternative 3.

Table 15: Changes to Fisher Habitat at Three Scales with Alternative 3.

Habitat	Change in Acres Available Fisher habitat in Project Area and Analysis Area	Change in Acres Available Fisher Habitat in Fisher Territory 604
Low Quality Resting and Denning	Decrease of 30 acres	Decrease of 30 acres
Foraging	Increase of 30 acres	Increase of 30 acres

There would be approximately a 0.9 percent decrease in the amount of available low quality resting and denning habitat for fishers in the project area with the implementation of Alternative 3. Thirty acres of low quality resting and denning habitat would be converted to foraging habitat which would increase by 19 % in the project area. There would be a 1.5% decrease in low quality resting and denning habitat in that portion of fisher territory 604 that occurs within the project area and <0.2% decrease in low quality resting and denning habitat over the analysis area. Foraging habitat would increase 49% in that portion of fisher territory 604 that occurs within the project area. Foraging habitat within the analysis area would increase 3.1%.

Alternative 3 would treat four percent less of the project area and better quality fisher habitat would remain in the habitat treated. Existing fisher habitat conditions and key fisher habitat components would be maintained on 203 acres of existing fisher habitat. Not treating 203 acres would lessen the effects of the project on key fisher habitat components such as canopy, closure,

snags, and down woody debris. More standing dead trees and down woody debris would remain in the project area.

Less reduction in canopy closure would occur in Alternative 3. Canopy closure would be reduced to 60% closure in all thinned units as well as in the shaded fuelbreak in Alternative 3. No thinning treatments would occur in any riparian reserves, preserving the existing canopy closure in those areas. The difference to fisher between 50% canopy closure in Alternative 2 and 60% in Alternative 3 is not measurable; however the risk of predation of individuals would be expected to be less in Alternative 3. Because canopy closure would be reduced less during treatment, higher levels of canopy closure would be achieved sooner. Canopy closure would be projected to be higher in 50 years by implementing Alternative 3. The modeled projection of crown canopy 50 years following treatment would range from 59 to 77% (Petersen and Amell, 2009) or slightly (approximately 2-4%) more canopy closure available to fishers in 50 years.

In Alternative 3, the effects of fragmentation of fisher habitat would occur on 28 fewer acres.

Depending upon the existing vegetative stage of the stands, the modeled quadratic mean diameter of trees 50 years after treatment by implementing Alternative 3 is projected to be in the range of 19 - 27 inches (Petersen and Amell, 2009). The projected number of years to achieve a 30 inch quadratic mean diameter for all trees ranges from 85 to >100 years (Petersen and Amell, 2009). The DBH of the trees 50 years following treatments proposed in Alternative 3 would be slightly less (approximately 2-3 inches) than with Alternative 2.

Cumulative Effects

Cumulative effects for Alternative 3 would be the same as those for Alternative 2

Determination of Effects and Rationale

Alternative 3 would not affect any high or moderated quality fisher habitat. It would cause a reduction in key fisher habitat components such as canopy closure, standing dead snags and down woody debris across 1,415 acres. Alternative 3 would reduce 30 acres of low quality denning and resting habitat to foraging habitat, which is <0.2% decrease over the analysis area. Therefore: Alternative 3 **may impact individual fishers but would not likely cause a change in the U.S. Fish and Wildlife Service prioritization towards federal listing.**

NOTE: Generally, the analysis for Forest Service sensitive species focuses on whether or not the action “is likely to lead to a trend in Federal listing.” However, the U.S. Fish and Wildlife Service has already determined that the listing of the Pacific Fisher is ‘warranted, but precluded’ by higher priorities (USDI, 2004). Therefore we have evaluated here whether or not the proposed action is likely to cause a significant enough shift in the population factors that it would cause the FWS to reprioritize the Pacific fisher and accelerate the development of a listing package and its official listing as a threatened and endangered species.

American Marten

Natural History

The American marten is broadly distributed. Currently in California, *Martes americana* continue to be well-distributed throughout the Sierra Nevada and Cascades, but *Martes americana humboldtensis* are absent from the northwestern California coastal range (Zielinski et al, 1997).

On the Shasta-Trinity National Forests, marten are found at higher elevations (>4500') of mature white and red fir or mixed wood forests (Quinn, 2008).

Martens are closely associated with late-successional coniferous forests having complex physical structure at or near the ground (*in* Slauson et al 2000). Lower branches of living trees, tree boles in various stages of life and death, coarse woody debris in various forms, middens of red squirrels, shrubs and rock fields can all contribute to marten structural needs (Buskirk and Zielinski). Late-seral forest conditions provide marten with increased rest and den sites and higher numbers and production of preferred prey species (Kirk, 2007). Large course woody debris and downfall provides refuge sites and allows marten access to subnivien habitat during the winter. Overhead canopy closure that exceeds 40% provides protection from predators. Larger amounts of habitat, larger patch sizes and larger areas of interior forest (e.g. core areas) are important to marten occurrence (Kirk, 2007).

Marten home range size varies depending upon prey abundance and habitat type. In the Sierra Nevada of California, marten home ranges have been reported to vary from 0.7 to 2.9 square miles for males and from 0.3 to 2.3 square miles females (*in* Buskirk and Zielinski). Corridors of mature forest with dense canopy closure and abundant quantities of large woody debris on the ground are important to marten for dispersal and travel.

Marten forage on small mammals, birds, carrion, bird eggs, insects and fruits (NatureServe, 2008).

The forests preferred by martens continue to face threats from timber harvest, wildfire and climate changes associated with global warming (Kirk, 2007). Further loss of late-successional forests will adversely affect marten population viability (Kirk, 2007).

Management Direction

Current management direction for marten is similar to that for the fisher. Land and Resource Management Plan direction for the Shasta-Trinity National Forest specific to marten is found on pg. 3-27: "It is a close relative of the fisher and both belong to the mustelid family. The marten prefers stands of coniferous forest, primarily the true fir types at higher elevations."

Spatial Scales Analyzed and Time lines Analyzed

The 21,006 acre fisher analysis was checked for marten sightings. Since no marten are known to occur in this larger scale surrounding the Salt project area, marten habitat was evaluated only at the project level. Project level analysis includes those areas (units/stands) proposed for treatment.

Timelines used in this analysis begins immediately following treatment and includes projections of stand changes and recovery in excess of 89 years.

Existing Condition (Environmental Baseline)

No sightings of marten have occurred in the southern half of Trinity County (Quinn, personal communication). The 21,006 acre fisher analysis area surrounding the Salt project was checked for marten sightings. No marten occurrences have been documented in the project area or the surrounding fisher analysis area.

High and/or moderate quality marten habitat does not exist in the project area. (Reference Shasta-Trinity Land and Resource Management Plan, Appendix G, page G-11 for a description of marten

habitat used in this evaluation). The project area has 4,278 acres of marginal mixed conifer marten habitat below 4,000 ft. elevation.

Environmental Consequences

In addition to the Forest Plan standards and guidelines listed for the species, the resource protection measures (on pages 16 and 17 of this document), will be applied, as appropriate, for the action alternatives 2 and 3 below.

Alternative 1 – No Action

Under the No Action alternative, current management plans would continue to guide existing and previously authorized activities within the project area. Habitat conditions would not be expected to change appreciably within the next 10 years, barring a wildfire event. The existing amounts of marginal mixed conifer habitat would remain.

Cumulative Effects

There are no cumulative effects because there are no direct or indirect effects of the No Action Alternative.

Determination of Effects and Rationale

There would be no change to the existing marginal habitat for marten within the Salt project area, therefore, Alternative 1; No Action would result in **no impact** to marten or their habitat.

Alternatives 2 or 3

Direct and Indirect Effects

No direct effects to marten are anticipated with the implementation of either Alternative 2 or Alternative 3 because the marginal habitat in the project area is unoccupied.

Reference Map A-4 and A-5 in Appendix A for marginal marten habitat in the project area affected by Alternative 2 and Alternative 3, respectively. Alternative 2 would treat a total of 1,138 acres of marginal marten habitat (see Map A-4 in Appendix A). All but 44 acres of the marginal marten habitat treated would remain marginal habitat. Forty-four acres of regeneration harvest and shelterwood with green tree retention treatment would change from marginal habitat to “capable”. These 44 acres of capable habitat would not return to marginal habitat for at least 89 years.

Alternative 3 would treat a total of 994 acres of marginal marten habitat (see Map A-5 in Appendix A). Following treatment all but 31 acres would remain marginal marten habitat. Thirty acres of shelterwood with green tree retention treatment would change marginal marten habitat to “capable”. These 30 acres of ‘capable” habitat would not return to marginal habitat for at least 89 years.

Changes to the amount of down woody debris and canopy and number of existing snags as discussed in Alternative 2 and Alternative 3 in the fisher section of this document would have similar negative effects for marten and as with fisher, the resource protection measures will also reduce potential impacts to marten including: retaining snags and down logs greater than 19” in diameter; retaining an average of 1.5 snags per acre greater than 15 inches in diameter and 20 feet in height; and, retaining an average of 5 tons of downed material per acre (or 10 tons of downed

material per acre depending upon land management allocation) with a preference to have 4 to 6 logs per acre at the largest available diameter. Retaining hardwoods will also reduce potential impacts to marten.

Cumulative Effects

The proposed projects and the effects of those projects to marten and their habitat would be expected to be similar that discussed for fishers.

Determination of Effects and Rationale

Alternative 2 would treat 1,138 acres of unoccupied marginal marten habitat within the project area. Forty-four acres of marginal marten habitat would be reduced to “capable” habitat for the long term (>89 years). Therefore, Alternative 2 **may impact individual marten but would not likely result in a trend toward listing or loss of viability.**

Alternative 3 would treat 1,025 acres of unoccupied marginal marten habitat within the project area. Thirty acres of marginal marten habitat would be reduced to “capable” habitat for the long term (>89 years). Therefore, Alternative 3 **may impact individual marten but would not likely result in a trend toward listing or loss of viability.**

Northern Goshawk

Natural History

Northern goshawks have broad geographic and elevational distributions in North American Andersen et al, 2004). In northern California, goshawks are considered permanent residents (NatureServe, 2008). Reliable population trend data on goshawks do not exist in the Western United States (Andersen et al 2004). Goshawk populations in California are considered vulnerable (NatureServe, 2008). Goshawks are known to occur in Trinity County and on the Shasta-Trinity National Forest.

The size of goshawk home ranges vary regionally, seasonally and individually. Goshawks exhibit considerable versatility in habitat use. Forested stands with complex structure having large amounts of down woody debris and snags provide the best foraging habitat for goshawks. Adequate perches for hunting and flight space for maneuvering are other important characteristics of forested stands used for foraging by goshawks. The majority of species that prefer late successional characteristics such as the goshawk, find suitable habitat in size classes 4-6, with 25 foot or greater crown diameters and crown closure densities exceeding 39% (US Forest Service, 1999).

Goshawks prey on a variety of species that inhabit both early and late successional forests (Andersen et al 2004). Medium sized birds such as northern flickers, American robins and Steller’s jays and small mammals such as tree and ground squirrels, rabbits, hares, and chipmunks are primary prey of goshawks. Keane (1999) found Douglas squirrels to be a year-round key prey species of goshawks in the Lake Tahoe region of California.

Goshawks select nest areas that are typically composed of late-successional forests. In general, nests are constructed in the largest trees of dense, mature stands with high canopy closure (60-88%) in northern California (Hargis et al, 1993)) with an open understory (The Nature Conservancy, 1999). Goshawk territories typically have more than one nest. Woodbridge et al

(1993) found that goshawk territories in northern California typically used 3-9 alternative nests distributed among 1-5 different forest stands ranging from 10-284 acres in size. Distances between territories ranged between 0.8 and 3.8 miles (Woodbridge et al, 1993).

Timber harvest that includes removal of large nest trees reduces stand density and canopy closure is the principal threat to breeding populations (NatureServe, 2008). Fire suppression and insect and tree disease outbreaks can result in the deterioration or loss of nesting habitat (Graham et al. 1999).

Management Direction

The Northwest Forest Plan Record of Decision (1994), which directs management activities for the maintenance and/or recovery of species associated with late-successional forest ecosystems, was incorporated into the Shasta-Trinity Land and Resource Management Plan (1995). In addition, the Shasta-Trinity Forest Plan provides for viability of goshawks through land allocations and standards and guidelines for late successional dependent species.

Shasta-Trinity Land and Resource Management Plan (1995) direction specifically applicable to goshawks includes the following:

Pg. 3-25-26 Management Indicator Assemblages - Late Seral Stage Wildlife Assemblage: The late seral stages are important to wildlife for cover, thermal cover, large trees for nesting, large snags and down logs, vertical diversity, older over-mature habitat, etc. Some species represented in this assemblage are northern spotted owl, **goshawk,** fisher, marten, Trowbridge shrew, and northern flying squirrel.

Pg. 3-27 Goshawks – Current management direction is to protect each known nest site during planning and implementation. Besides protection of individual goshawk nests, additional habitat can be found in reserved areas (i.e. wilderness) and other places managed for older over-mature habitats.

Pg. 4-30 Require Limited Operating Periods adjacent to active goshawk nesting sites until the young have fledged.

In addition, management direction listed in the fisher section of this document (pages 19-22) for snags and down woody debris retention also applies to goshawks because they are also important features of goshawk habitat.

Spatial Scales Analyzed and Time lines Analyzed

In order to evaluate the effects of the action alternatives on northern spotted owls, a 16,920 acre analysis area was established by developing a 1.3 mile buffer around all proposed harvest units (Quinn, 2007). The 16,920 acre analysis area established for the spotted owl was also used to evaluate project effects to goshawk habitat. This analysis area is also appropriate for goshawks because spotted owls are late-successional (late seral) habitat management indicator species and goshawks are also associated with late successional forest habitat.

Goshawk habitat is also evaluated at the project area level and includes only those areas directly impacted by the proposed actions.

Timelines used in this analysis begins immediately following treatment and includes projections of stand changes and recovery in excess of 100 years.

Existing Condition (Environmental Baseline)

The 4,278 acre Salt project area and the 16,920 acre analysis area has goshawk habitat. Map A-6 in Appendix A displays the location and type of goshawk habitat present in the project area and analysis area.

Moderate and low quality habitat for goshawks exists in the project area. A majority (96%) of the goshawk habitat in the project area is considered moderate quality nesting, post-fledging and foraging habitat. Table16 displays the goshawk habitat capability (quality) in the Salt project area.

Table 16. Acres of Goshawk Habitat Ranked by Quality in the Salt Project Area

Habitat Quality	Description Crown Diameter, Canopy Closure and Vegetation Types	Acres (%)
High	4G & 4N mixed conifer, Douglas-fir, ponderosa pine, and white fir	0
Moderate	3 N & 3G mixed conifer, Douglas-fir, ponderosa pine, and white fir	3,532 (96%)
Low	All remaining >2	158 (4%)
Total Goshawk Habitat		**3,690**

Not included in Table 14 are 588 acres of conifer plantations in the 1-24 foot tree size.

Low, moderate and a small amount (<1%) of high quality nesting, post-fledging and foraging habitat exists within the larger analysis area. A majority (94%) of the goshawk habitat in the analysis area is moderate quality nesting, post-fledging and foraging habitat.

Table 17. Goshawk Habitat in the 16,920 acre Spotted Owl Analysis Area as per Vegetation Types, Crown Diameter and Canopy Closure.

Habitat Capability (Quality)	Acres (%) of Existing Available Habitat in Analysis Area	Acres of Habitat Affected by the Telephone Wildfire
High Quality	94 (<1%)	47- low severity 11 - moderate severity
Moderate Quality	13,642 (94%)	671 - low severity 126 – moderate severity 1 – high severity
Low Quality	812 (~6%)	29 – low severity 5 – moderate severity
Total Goshawk Habitat	**14,548**	**747 - low severity** **142 - moderate severity** **1 - high severity**

Land not listed nor considered in Table 17 includes approximately 660 acres of non-National Forest System Lands and 2,373 acres of conifer plantations in the 1-24 foot tree size. Ninety-five acres of plantations burned at low severity, 53 acres burned at moderate severity and 7 acres were severely burned in the Telephone wildfire. The acres of conifer plantations within the project area and analysis area would be considered “capable” and may be providing goshawks with some amount of foraging habitat (depending upon individual stand canopy closure and development) as well as connectivity between existing available goshawk habitat.

A majority of the available habitat in the goshawk analysis area did not burn in the Telephone wildfire. Effects to goshawk habitat in the areas that burned were variable. Areas that burned at

the high severity level no longer provide habitat for goshawk. Areas that burned at low levels of severity will continue to provide goshawk with habitat. Moderate severity burn areas may or may not continue to provide habitat for goshawks.

Most of the landscape that burned did so at low levels of severity. A small amount of high and moderate quality goshawk habitat was reduced as a result of the wildfire. In areas of low to moderate severity, small trees, small down woody debris and herbaceous groundcover were removed. Some important habitat components for goshawk were lost. Canopy closure was reduced. Some existing snags were burned up in the fire. Down woody debris and ground cover for prey was reduced. Grasses, herbaceous vegetation and shrubs would be expected to begin recovering within a year following the fire. Within goshawk habitat that burned moderately severe, some trees likely were killed or scorched badly enough that they will eventually die and fall. Thus, some snags and down woody material were/will be created.

Habitat heterogeneity (patchiness of the vegetation) across the landscape would have increased as a result of low severity burned areas. This will be beneficial to goshawk and their prey base over the long term. Conditions for another wildfire event occurring within the area burned have been reduced, thus maintaining a majority of the remaining habitat values for goshawk over the long term

It is possible that the project area and/or larger analysis area is utilized by goshawks even though no goshawk sightings have occurred in either area.

Environmental Consequences

In addition to the Forest Plan standards and guidelines listed for the species, the resource protection measures (on pages 16 and 17 of this document), will be applied, as appropriate, for the action alternatives 2 and 3 below.

Alternative 1 – No Action

Direct and Indirect Effects

Under the No Action alternative, current management plans would continue to guide existing and previously authorized activities within the project area. Habitat conditions would not be expected to change appreciably within the next 10 years, barring a wildfire event. Existing structural characteristics, canopy closure and snag numbers and down woody material would not change appreciably within the next 10 years.

The existing amounts of moderate and low quality nesting and foraging habitat for goshawks would remain. In the long term (>10 years) further development of large old trees within stands would likely progress slowly due to existing tree densities and competition for sunlight, nutrients and water. In the long term (>10 years) snag numbers and down woody material would be expected to increase as trees die due to crowded conditions, insects and disease.

Cumulative Effects

Because there are no direct and indirect effects, there are no cumulative effects.

Determination of Effects and Rationale

There would be no change to the existing amount and quality of habitat for goshawks within the Salt project area, therefore, Alternative 1, No Action would result in **no impact** to goshawks or their habitat.

Alternative 2 – Proposed Action

Direct and Indirect Effects

Because the project area is not currently known to be occupied by goshawks, there should be no direct effects to goshawks with the implementation of Alternative 2. Resource protection measures state that should a new goshawk territory be discovered prior to or during implementation, conferencing with a biologist will occur and a buffer zone and limited operating period will be established.

There would be more changes to the quality rather than the quantity of available goshawk habitat in the project area with the implementation of Alternative 2. Map A-7 in Appendix A displays the habitat quality changes as a result of Alternative 2. Table 18 displays the acreage changes to low and moderate quality nesting and foraging habitat within the project area and the analysis area with the implementation of Alternative 2.

Table 18. Changes to Goshawk Habitat at Two Scales with Alternative 2.

Habitat	Change in Acres Available Goshawk habitat in the Project Area and Analysis Area
High	0
Moderate	-44
Low	+44

The proposed regeneration harvest and shelterwood with green tree retention treatment would cause 1.3% decrease in the amount of available moderate quality nesting and foraging habitat for goshawks in the project area with the implementation of Alternative 2. Forty-four acres of moderate quality nesting and foraging habitat would be reduced to low quality goshawk habitat. By this action, low quality habitat in the project area would increase by 28%.

Likewise, the proposed regeneration harvest and shelterwood with green tree retention treatment would cause 0.3% decrease in the amount of available moderate quality nesting and foraging habitat for goshawks in the larger analysis area with the implementation of Alternative 2. By this action, low quality habitat in the analysis area would increase by 5.4%.

Thinning treatments of the shaded fuel break would likely maintain the habitat as foraging for goshawks. Precommercially thinning plantations would have a negligible effect on goshawk habitat in the near term. Long term (>30 years) trees should grow more rapidly developing into desirable goshawk habitat.

The immediate effect of the proposed treatments across 1,085 acres would result in a reduction of vertical and horizontal structure by removing smaller diameter trees. Tree removal would also reduce crown closure up to 60% in some areas, such as in the shaded fuel break. Canopy closure would be reduced to 50% closure in all thinned units except for 41 acres within intermittent or ephemeral stream riparian reserves, which will be reduced to 60%. The canopy closure in shaded fuelbreaks would be 40%. Reduction of structure and canopy closure would reduce cover and

decrease perching and foraging substrate while at the same time increasing goshawks' flight maneuverability and increasing goshawk prey vulnerability. Goshawks would likely continue to use the habitat; however the quality of goshawk habitat and prey habitat would be reduced,

The modeled projection of crown canopy 50 years following treatment would range from 54 to 75% (Petersen and Amell, 2009).

Some dead, dying and mistletoe infected trees would be removed. Removal of trees with dwarf mistletoe brooms will likely be detrimental to wildlife species that nest in mistletoe brooms including northern goshawks (Pilliod et al, 2006). Removal of dying trees and those infected with mistletoe would reduce future snags and down woody debris. Some loss of snags <19 inches dbh and down woody material in the 3" to 20" class would also reduce existing prey habitat and foraging opportunities for goshawks. However, resource protection measures will assure that existing snags and down logs greater than 19" in diameter will be retained, unless they are in a skid trail, landing site, or other exceptions. An average of 1.5 snags per acre greater than 15 inches in diameter and 20 feet in height will also be retained. Snags felled for safety reasons would be left on site. Additionally an average of 5 tons of downed material per acre (or 10 tons of downed material per acre depending upon land management allocation) will be retained with a preference to have 4 to 6 logs per acre at the largest available diameter, providing habitat for prey species.

Reconstruction of roads, construction of temporary roads, landing development and borrow pit expansion would alter about one acre of goshawk habitat.

The regeneration harvest unit, shelterwood with green tree retention unit, reconstructed roads, construction of temporary roads, landing development and expansion of the borrow pit would create edge habitats that are sometimes used by foraging goshawks. The thinning of the existing shaded fuel break would also likely to continue to provide some foraging opportunities for goshawks.

Some shrubs, herbs, grasses and forbs would be expected to develop as a result of increased sunlight on the forest floor until the canopy gradually closes again. An increase in shrubs, herbs, grasses and forbs would provide goshawks foraging opportunities and may increase prey diversity.

Depending upon the existing vegetative stage of the stands, the modeled quadratic mean diameter of trees 50 years after treatment is projected to be in the range of 22 - 29 inches (Petersen and Amell, 2009). The projected number of years to achieve a 30 inch quadratic mean diameter for all trees ranges from 60 to >100 years (Petersen and Amell, 2009). A reduction in the number of smaller trees would reduce competition for nutrients, light and water and increase the growth and size of the remaining largest trees ((the average diameter of retained trees would be about 16.5 inches DBH (Petersen, personal communication)) and hasten the development of desirable late-successional stand conditions which would be favorable to goshawks in the long term (>50 years).

A reduction in the density of smaller trees, standing dead and down woody debris would reduce the wildfire hazard in the project area. Reducing the wildfire hazard would maintain and promote goshawk habitat within the project area for about 20 years (Lewis, 2009)

Cumulative Effects

The following projects and activities are anticipated to occur within the goshawk analysis area between now and December 2012.

A watershed restoration project to decommission roads that are no longer needed for management action is planned within the project area. This action would not be expected to have a significant cumulative effect with the actions planned in the Salt project.

The Shasta-Trinity is in the process of proposing to re-issue term livestock permits in the Upper South Fork and Post Creek Cattle and Horse Allotment (reference the Environmental Assessment for the Upper South Fork & Post Creek Range Allotments, 2008). 9,230 acres of the Post Creek Pastures 1 and 2 and 3,655 acres of Wildwood Pasture 1 occur within the goshawk analysis area. Activities proposed include continuation of grazing between June 1 and October 31, vegetation monitoring, maintenance of fencing and corrals, construction and reconstruction of fences. The preferred range alternative (2) would have no discernible impacts to the resources and values of riparian reserves or riparian/wet meadow habitat. There would be no direct effects to goshawks from grazing activities proposed. Indirect effects of grazing on goshawks include possible alteration of prey availability and diversity through reduction or change in prey species habitat. Monitoring of location of animals and forage utilization throughout the grazing season, and adherence to limits on utilization of available forage, should minimize these impacts. Any change in prey abundance and diversity is likely to be masked by other factors such as climate or predation from other sources, and thus cannot be quantified. Effects from grazing are therefore believed to be immeasurable and so minor as to be insignificant and discountable (USDA Shasta-Trinity National Forest, 2008).

Within the analysis area, the Seven Bone, Tower Fire Salvage Owl and West Smoky pre-commercial thinning of conifer plantations would affect 184 acres of “capable” goshawk habitat. The short and long term direct and indirect effects of pre-commercial thinning activities to goshawks and their habitat for these three proposed projects would be expected to be similar as described above in Alternative 2.

South Fork roadside hazard abatement project proposes to remove hazard trees within up to 150 feet on both sides of maintenance level 2-5 roads. Removal of dead trees would reduce existing and future perching and foraging substrate for goshawks.

Forest-wide travel management planning is proposed. It is anticipated that this planning document will direct changes to the amount of on and off-road travel (eliminating cross country travel) and will designate specific roads and trails authorized for use. The effects of roads and trails and accessibility with regard to goshawks and their habitat, in general, include: disturbance, displacement, increased risk of mortality via humans with guns, increased “edge” habitat used by foraging goshawks and the reduction in perching and prey habitat due to the loss of snags and down woody material by firewood cutters. The Salt project would result in a reduction in road use with the decommissioning of roads and there will likely be a cumulative reduction of road use with the travel management designation process.

Determination of Effects and Rationale

Alternative 2 would treat 1,085 acres of unoccupied goshawk habitat within the project area. More changes to the quality rather than the quantity of available goshawk habitat in the project area would result from thinning treatments proposed across 1,085 acres in Alternative 2. Important goshawk habitat components within areas treated would be reduced. Forty-four acres

of moderate quality goshawk habitat would be reduced to low quality habitat for the long term (>89 years). This represents a negligible 0.3% decrease in the amount of available moderate quality nesting and foraging habitat for goshawks in the larger analysis area. Therefore, Alternative 2 **may impact individual goshawks but would not likely result in a trend toward listing or loss of viability.**

Alternative 3

Direct and Indirect Effects

Because the project area is not currently known to be occupied by goshawks, there should be no direct effects to goshawks with the implementation of Alternative 3. Resource protection measures state that should a new goshawk territory be discovered prior to or during implementation, conferencing with a biologist will occur and a buffer zone and limited operating period will be established. Indirect effects to goshawk habitat with the implementation of Alternative 3 would be similar to Alternative 2 with the following exceptions.

Two-hundred-three (12.5%) fewer acres of vegetation would be treated in Alternative 3 and better quality goshawk habitat would remain in the habitat treated. Fewer acres treated would lessen the amount of goshawk habitat affected by the project. Map A-8 in Appendix A displays the available goshawk habitat quality with the implementation of Alternative 3. Table 19 displays the changes to moderate and low quality goshawk nesting and foraging habitat within the project area and analysis area.

Table 19. Changes to Goshawk Habitat at Two Scales with Alternative 3.

Habitat	Change in Acres Available Goshawk habitat in the Project Area and Analysis Area
High	0
Moderate	-30
Low	+30

The proposed shelterwood with green tree retention treatment would cause a 0.9% decrease in the amount of available moderate quality nesting and foraging habitat for goshawks in the project area with the implementation of Alternative 3. Thirty acres of moderate quality nesting and foraging habitat would be reduced to low quality goshawk habitat. By this action alternative, low quality goshawk habitat in the project area would increase by 19%.

Likewise, the proposed shelterwood with green tree retention treatment would cause a negligible (0.02%) decrease in the amount of available moderate quality nesting and foraging habitat for goshawks in the larger analysis area with the implementation of Alternative 3. By this action alternative, low quality goshawk habitat in the analysis area would increase by 3.7%.

Alternative 3 would treat four percent less of the project area. Existing goshawk habitat conditions and key goshawk habitat components would be maintained on 204 acres of existing goshawk habitat. Not treating 204 acres would lessen the effects of the project on key goshawk habitat components such as canopy, closure, snags, and down woody debris. More standing dead trees and down woody debris would remain in the project area.

Less reduction in canopy closure would occur in Alternative 3. Canopy closure would be reduced to 60% closure in all thinned units as well as in the shaded fuelbreak in Alternative 3. No thinning

treatments would occur in any riparian reserves, preserving the existing canopy closure in those areas. The difference to goshawks between 50% canopy closure in Alternative 2 and 60% in Alternative 3 is not measurable, however the overall quality of the habitat would be higher in Alternative 3 and the risk of predation of individuals would be expected to be less. Because canopy closure would be reduced less during treatment, higher levels of canopy closure would be achieved sooner. Canopy closure would be projected to be higher in 50 years by implementing Alternative 3. The modeled projection of crown canopy 50 years following treatment would range from 59 to 77% (Petersen and Amell, 2009) or slightly (approximately 2-4%) more canopy closure for goshawks in 50 years.

Depending upon the existing vegetative stage of the stands, the modeled quadratic mean diameter of trees 50 years after treatment by implementing Alternative 3 is projected to be in the range of 19 - 27 inches (Petersen and Amell, 2009). The projected number of years to achieve a 30 inch quadratic mean diameter for all trees ranges from 85 to >100 years (Petersen and Amell, 2009). The DBH of the trees 50 years following treatments proposed in Alternative 3 would be slightly less (approximately 2-3 inches) than with Alternative 2.

Cumulative Effects

Cumulative effects for Alternative 3 would be the same as those for Alternative 2

Determination of Effects and Rationale

Alternative 3 would cause a reduction in key goshawk habitat components such as canopy closure, standing dead snags and down woody debris across 945 acres. Alternative 3 would reduce 30 acres of moderate quality goshawk habitat to low quality habitat. This represents a negligible 0.02% of the analysis area. Therefore: Alternative 3 **may impact individual goshawks but would not likely result in a trend toward listing or loss of viability.**

Townsend’s Big-eared Bat

Natural History

Townsend’s big-eared bat is distributed widely across western North America. Local distribution is bounded by the presence of caves and similar structures, most of which are the result of specific geological conditions and processed, and which are not distributed evenly across the landscape (Gruver and Keinath, 2006). Townsend’s big-eared bats are noted to occur in both Shasta and Trinity Counties in California (NatureServe, 2008).

On the West Coast, Townsend’s big-eared bats are found regularly in forested regions and buildings, and in areas with a mosaic of woodland, grassland and or shrubland. Commonly occurs in mesic habitats characterized by coniferous and deciduous forests (NatureServe, 2008).

In California, small colonies of this bat species uses caves, mines and buildings, generally in open attics. Individual bats are known to use fire scarred basal tree hollows for night roosts (Fellers and Pierson, 2002). Townsend’s big-eared bats are known to switch roost sites within and between seasons.

Maternity and hibernation colonies typically are in caves and mine tunnels in elevations between 4,500 – 10,460 ft (Gruver and Keinath, 2006). In the central part of California, solitary males and small groups of females are known to hibernate in buildings (Fellers and Pierson, 2002). In

California, maximum known distance traveled to hibernacula is 20 miles (*in* Gruver and Keinath, 2006).

Connectivity of habitat may be especially important as commuting distance from roosts to foraging or drinking habitat increases (Gruver and Keinath, 2006). Maximum one-way distances traveled between roosts and foraging areas in California ranged between 3.1 and 8 miles (Fellers and Pierson, 2002).

Foraging occurs in a wide variety of habitats. In the West, *Cornynorhinus townsendii* forage in woodlands, canopy gaps, vegetated stream corridors and other linear landscape elements, but avoid foraging and traveling in open areas and grazed lands. In coastal California, Fellers and Pierson (2002) found both males and females foraged along the edges of riparian vegetation dominated by Douglas-fir, California bay and willow species. Foraging sites that have dense and structurally diverse vegetation may support greater abundances of insect prey and provide escape from potential avian predators are likely preferred (Gruver and Keinath, 2006).

Townsend's big-eared bats are moth specialists, emerging from its roost to begin foraging about 60 minutes after sunset (*in* Gruver and Keinath, 2006). In California, Fellers and Pierson (2002) found that they foraged among foliage near the perimeter of trees, usually between mid-canopy and near the top of the canopy as well as gleaned insects directly from substrates.

Given the general lack of data on the historic distribution of Corynorhinus townsendii, current distribution trends are difficult to assess. Long term monitoring data for Townsend's big-eared bats are generally lacking and patchy at best (Gruver and Keinath, 2006). There is general concurrence among bat biologists that there has been a downward trend in abundance of Townsend's big-eared bat (*Corynorhinus townsendii*) in the western portion of its range over the past half-century (Gruver and Keinath, 2006). Surveys conducted by Pierson and Rainey in 1994 for California Department of Fish and Game showed marked population declines in the State (Pierson et al 1999).

Threats to Townsend's big-eared bats include displacement and disturbance by humans and destruction of roost and hibernaculum sites, including uninformed closure of abandoned mines (Gruver and Keinath, 2006). Pesticide applications that reduce populations of moths, such as spruce budworms and gypsy moths reduce foraging opportunities for these bats. Pesticide application contributes to bioaccumulation hazards in bats. Exposure to mining related toxins (heavy metals) found in mine adits, waste and water also contribute to bioaccumulation hazards in bats.

Management Direction

Shasta-Trinity Land and Resource Management Plan direction applicable to Townsend's big-eared bats includes the following

Pg. 3-25 and 3-26. Cliffs, Caves, Talus, and Rock Outcrops Wildlife Assemblage. Some species represented by this assemblage are: Shasta salamander, canyon wren, peregrine falcon and **Townsend's big-eared bat**

Pg. 4-5 Manage habitat for sensitive plants and animals in a manner that will prevent any species from becoming a candidate for T & E status.

Pg. 4-14 Cliffs, Caves, Taluses, Rock Outcrops: Manage these unique habitats on a site-by-site basis to protect their existing micro environments and the viability of dependent animal and plant species. Manage nearby water sources to perpetuate natural cave processes.

Pg.4-14 Corridors: Provide connecting travel corridors for wildlife species, particularly late-successional dependent species, by using Riparian Reserves and silvicultural prescriptions.

Pg. 4-30 Survey and evaluate habitat for TE & S species at the project level in coordination with the USFWS.

Pg 4-61 Emphasize green-tree and snag retention in Matrix management

Retain at least 15 percent of the area associated with each cutting unit (stand).

As a general guide, 70 percent of the total area to be retained should be aggregates of moderate to larger size (0.2 to 1 hectare or more) with the remainder as dispersed structures (individual trees, and possibly including smaller clumps less than 0.2 ha.). Larger aggregates may be particularly important where adjacent areas have little late-successional habitat. To the extent possible, patches and dispersed retention should include the largest, oldest live trees, decadent or leaning trees, and hard snags occurring in the unit. Patches should be retained indefinitely.

As a minimum, snags are to be retained within the harvest unit at levels sufficient to support species of cavity-nesting birds at 40 percent of potential population levels based on published guidelines and models or an average of 1.5 snags per acre greater than 15 inches in diameter and 20 feet in height. The objective is to meet the 40 percent minimum standard throughout the Matrix, with per-acre requirements met on average areas no larger than 40 acres. To the extent possible, snag management within harvest units should occur within the areas of green-tree retention. The needs of **bats** should also be considered in these standards and guidelines as those needs become better known. Snag recruitment trees left to meet an identified, near-term (less than 3 decades) snag deficit do not count toward green-tree retention requirements.

Spatial Scales Analyzed and Time lines Analyzed

The maximum foraging distance for Townsend's big-eared bats from roost sites in California is eight miles. An analysis area for Townsend's big-eared bats was developed by using an eight mile radius from the center of the project area (see Map A-9 in Appendix A).

The project area was also evaluated for roosting and foraging habitat for this species.

Timelines used in this analysis begins immediately following treatment and includes projections of stand changes and recovery in excess of 89 years.

Existing Condition (Environmental Baseline)

Marcot (1984) reported *Plecotus townsendii* in four limestone caves on the Shasta-Trinity National Forest between March 6 and April 8 in 1984. Two out of the four locations were determined to be outside the Shasta-Trinity National Forest boundary and one appears to be a legal description error. One of Marcot's occurrences is 18 miles northwest of the project area. Another documented Townsend's big-eared bat occurrence is 62 miles northeast of the project area. It has not been verified whether or not Townsend's big-eared bats occupy or utilize the Salt project area.

There are four locations of caves within the 8 mile bat analysis area. Two caves are approximately 5 miles east of the center of the Salt project area. It is not known if these two caves are occupied by bats and/or what species of bats inhabit them. Two other caves are approximately 10 miles west of the project area center.

There are four known mine adits within the 8 mile bat analysis area, near Hall City Caves, which are located about five miles east of the project area center. There are other mine adits within the bat analysis area, some of which have bat gates installed on them. Presumably, bats occupy these mine adits, but the species of bats is unknown. There are potentially other mine adits in the bat analysis area, but the location and number are unknown.

Foraging and roosting habitat is likely present within the project area and the 8 mile bat analysis area. Map A-11 in Appendix A and Table 20 display some of the Management Indicator Habitat Assemblages occurring in the project area that may be occupied or utilized by Townsend's big-eared bats.

Table 20. Acres of Potential Townsend's Big-eared Bat Management Indicator Habitat Assemblages that occur in the Salt Project Area

Habitat Type	Acres
Chaparral	48
cliff	28
Late (snags)	673
open	3529
Grand Total	4278

Foraging and roosting habitat for Townsend's big-eared bats was altered within the 8 mile analysis area as a result of three wildfires that burned a total of 5,984 acres. Four-thousand-sixty-three acres burned low severity, 1,766 acres burned moderate severity and 155 acres were severely burned. Some roosting habitat (snags) was lost in the wildfires. Some trees likely were killed or scorched badly enough that they will eventually die, creating snags and roosting habitat for Townsend's big-eared bats. Habitat heterogeneity (patchiness of the vegetation) across the analysis area will likely improve foraging habitat conditions for Townsend's big-eared bats as a result of the wild fires.

> "Clutter" is the number of obstacles a bat must detect and avoid in a given area. Clutter affects maneuverability and influences habitat use by bats.

The wild fires created small openings in the canopy, decreasing flight "clutter and increasing maneuverability for foraging. Insect populations should rebound in the low to moderately severe burn areas once vegetation resprouts following fire.

Environmental Consequences

In addition to the Forest Plan standards and guidelines listed for the species, the resource protection measures (on pages 16 and 17 of this document), will be applied, as appropriate, for the action alternatives 2 and 3 below.

Alternative 1 – No Action

Direct Effects and Indirect Effects

Under the No Action alternative, current management plans would continue to guide existing and previously authorized activities within the project area. Habitat conditions for bats would not be expected to change appreciably within the next 10 years, barring a wildfire event.

Cumulative Effects

There are no cumulative effects because there are no direct or indirect effects of the No Action Alternative.

Determination of Effects and Rationale

There would be no change to the existing habitat for bats within the Salt project area, therefore, Alternative 1, No Action would result in **no impact** to Townsend's big-eared bats or their habitat.

Alternative 2 or Alternative 3

Direct and Indirect Effects

While occupancy and/or use of the project area by Townsend's big-eared bats is uncertain, felling a roost structure (snag <19inches) could result in the mortality of the bat(s) inside the roost (Hayes and Loeb, 2007). Resource protection measures will assure that with few exceptions existing potential roosting and nesting sites (snags greater than 19" in diameter) will be retained in all units. Exceptions may occur if the snag is in a skid trail, landing site, or temporary road location.

Bats roosting in caves and mine adits within the 8 mile analysis area would not be affected by the Salt project.

The immediate effect of the proposed treatments would result in changes to the density and vertical and horizontal structure of the vegetation by removing smaller diameter trees. A decrease in the density of trees and the opening of the canopy would increase bat foraging areas, increase their foraging maneuverability and alter the thermal properties in and adjacent to live trees with cavities and snags used for roosting (Hayes and Loeb, 2007).

Reconstruction of roads, construction of temporary roads, landing development and borrow pit expansion would create openings that may be utilized by bats for foraging. Some shrubs, herbs, grasses and forbs would be expected to develop as a result of increased sunlight on the forest floor until the canopy gradually closes again. An increase in shrubs, herbs, grasses and forbs and would provide additional foraging opportunities for bats and may increase prey diversity.

Cumulative Effects

The following projects and activities are anticipated to occur within the 8 mile bat analysis area between now and December 2012.

The Shasta-Trinity is in the process of proposing to re-issue term livestock permits in the Upper South Fork and Post Creek Cattle and Horse Allotment (reference the Environmental Assessment for the Upper South Fork & Post Creek Range Allotments, 2008). Activities proposed include continuation of grazing between June 1 and October 31, vegetation monitoring, maintenance of fencing and corrals, construction and reconstruction of fences. The preferred range alternative (2)

would have no discernible impacts to the resources and values of riparian reserves or riparian/wet meadow habitat. There would be no direct effects to Townsend's big-eared bats from grazing activities proposed. Indirect effects to these species may be through alteration of their prey base as a result of vegetative manipulation by stock or through changing aquatic environments along with their dependant insect populations. These impacts are expected to be very localized and of small scale and of no impact to these highly mobile and wide-ranging bats (USDA Shasta-Trinity National Forest, 2008).

Pre-commercial thinning projects proposed would decrease the density of trees, increase the amount of bat foraging areas and increase their foraging maneuverability

South Fork roadside hazard abatement project proposes to remove dead trees within up to 150 feet on both sides of maintenance level 2-5 roads. Removal of dead trees would reduce existing roosting habitat for bats.

The opening of the canopy resulting from fuel break maintenance in the Rattlesnake Fuels Reduction would increase bat foraging areas and increase their foraging maneuverability. Loss of prey (insect) habitat would be expected with the removal of shrubs and small trees in the understory.

Forest-wide travel management planning is proposed. It is anticipated that this planning document will direct changes to the amount of on and off-road travel (eliminating cross country travel) and will specifically designate roads and trails authorized for use. The effects of roads and trails management with regard to bat habitat would be a gradual change to the amount of "edge" habitat used by foraging bats and a reduction in the loss of roosting habitat, snags, due to firewood cutters – since access will be reduced. The Salt project would result in a reduction in road use with the decommissioning of roads and there will likely be a cumulative reduction of road use with the travel management designation process.

Determination of Effects and Rationale

Actions proposed in Alternative 2 or Alternative 3 would alter the amount and quality of the roosting and foraging habitat of Townsend's big-eared bats within the Salt project area. Foraging habitat and opportunities would likely increase in either Alternative 2 or 3. Snag roosting habitat would decrease in quality (thermal properties). Therefore:

Alternative 2 **may impact individual Townsend's big-eared bats but would not likely result in a trend toward listing or loss of viability.**

Alternative 3 **may impact individual Townsend's big-eared bats but would not likely result in a trend toward listing or loss of viability.**

Pallid Bat

Natural History

Pallid bats range throughout western and southwestern United States and Mexico. Pallid bats occur throughout California, except in the high Sierra Nevadas where they are considered permanent residents. They are known to occur on the Shasta-Trinity National Forest, although they have not been reported in Trinity County, California (NatureServe 2008).

Pallid bats are found in a variety of habitats and elevations. They are commonly found in arid deserts and grasslands, often near rocky outcrops, cliffs and water. They also inhabit chaparral shrublands and higher elevation (>7,000') coniferous forests.

Day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, tree cavities and various human structures. Pallid bats roost alone, in small groups or gregariously and may switch day roosts on a daily and seasonal basis.

Pallid bats travel 0.31 to 1.55 miles from day roosts for foraging (CA Dept. of Fish and Game 2008). Pallid bats are opportunistic generalists that glean a variety of large insects, such as crickets, grasshoppers and scorpions, usually taken from the ground (Western Bat Working Group, 2005)

Winter habits are poorly known, but this species apparently does not migrate long distances between summer and winter sites. In some parts of the species range, males and females have been found hibernating alone or in small groups, wedged deeply into narrow fissures in mines, caves and buildings (Western Bat Working Group, 2005).

Data are lacking for population and population trends. Threats to pallid bats include mass displacement due to disturbance. Damage or destruction of roosts and hibernacula as a result of recreational activities, forestry practices, prescribed or wild fire (Western Bat Working Group, 2005).

Management Direction

Shasta-Trinity Land and Resource Management Plan direction applicable to pallid bats includes the following

Pg. 3-25 and 3-26. Wildlife Assemblages. Cliffs, caves, talus, and rock outcrops are geologic features that provide unique habitat for wildlife. Chaparral is a diverse combination of shrubs that provide habitat for many wildlife species.

Pg. 4-5 Manage habitat for sensitive plants and animals in a manner that will prevent any species from becoming a candidate for T & E status.

Pg. 4-14 Cliffs, Caves, Taluses, Rock Outcrops: Manage these unique habitats on a site-by-site basis to protect their existing micro environments and the viability of dependent animal and plant species. Manage nearby water sources to perpetuate natural cave processes.

Pg. 4-30 Survey and evaluate habitat for TE & S species at the project level in coordination with the USFWS.

Spatial Scales Analyzed

The maximum foraging distance for pallid bats from roost sites in California is 1.55 miles. An analysis area for pallid bats was developed by using a 1.55 mile radius around the perimeter of the project area. The project area was also evaluated for roosting and foraging habitat for this species.

Existing Condition (Environmental Baseline)

It is not known whether the Salt project area is used by pallid bats. Map A-10 in Appendix A and Table 21 below display some of the Management Indicator Habitat Assemblages occurring in the project area and pallid bat analysis area that may be occupied or utilized by pallid bats.

Table 21. Acres of Potential Pallid Bat Management Indicator Habitat Assemblages in the Salt Project Area and Analysis area

Habitat Type	Acres In Project Area	Acres in Analysis Area
chaparral	48	201
cliff	28	2
Total	**76**	**203**

In the project area and in the analysis area, snag habitat and some of the more open conifer habitat could also provide suitable foraging habitat and roost sites for pallid bats.

No chaparral or cliff habitat within the pallid bat analysis area was affected by 2008 wild fires.

Environmental Consequences

In addition to the Forest Plan standards and guidelines listed for the species, the resource protection measures (on pages 16 and 17 of this document), will be applied, as appropriate, for the action alternatives 2 and 3 below.

Alternative 1 – No Action

Direct Effects and Indirect Effects

Under the No Action alternative, current management plans would continue to guide existing and previously authorized activities within the project area. Habitat conditions for bats would not be expected to change appreciably within the next 10 years, barring a wildfire event.

Cumulative Effects

There are no cumulative effects because there are no direct or indirect effects of the No Action Alternative.

Determination of Effects and Rationale

There would be no change to the existing habitat for bats within the Salt project area, therefore, Alternative 1, No Action would result in **no impact** to pallid bats or their habitat.

Alternative 2 or Alternative 3

Direct and Indirect Effects

While occupancy and/or use of the project area by pallid bats is uncertain, trapping or crushing of a roosting pallid bat(s) could occur in the borrow pit expanded to support the construction and maintenance of forest roads (Hayes and Loeb, 2007).

No changes to chaparral or cliff habitats would occur in Alternative 2 or Alternative 3.

Borrow pit expansion, reconstruction of roads, construction of temporary roads, landing development and borrow pit expansion would create openings that may be utilized by pallid for foraging.

Not much is known about foraging habitat of pallid bats. However, it is likely that the increases in some shrubs, herbs, grasses and forbs that would develop as a result of increased sunlight on the forest floor by opening the canopy would provide additional gleaning opportunities for pallid bats and may increase prey diversity.

Cumulative Effects

Foreseeable actions and their effects to the pallid bat and/or its habitat would be similar to that described for Townsend's big-eared bats

Determination of Effects and Rationale

An individual pallid bat using the expanded borrow pit for road work may inadvertently be crushed or trapped. Actions proposed in Alternatives 2 or Alternative 3 would alter the amount of foraging habitat for pallid bats within the Salt project area. Foraging habitat and opportunities would likely increase in either Alternative 2 or 3.

Alternative 2 **may impact individual pallid bats but would not likely result in a trend toward listing or loss of viability.**

Alternative 3 **may impact individual pallid bats but would not likely result in a trend toward listing or loss of viability.**

Western Red Bat

Natural History

Western red bats are broadly distributed across much of the western United States (Western Bat Working Group, 2005) and throughout most of California (NatureServe, 2008). It is known to occur in northern California but has not been reported in Trinity County, California.

Western red bat habitat includes mixed conifer and hardwood forests near riparian and riparian edge habitats (NatureServe, 2008). Western red bats are typically solitary, roosting primarily in the foliage of trees or shrubs, commonly in edge habitats. While they roost solitarily, they forage in close association with one another in summer. Roost sites are generally hidden from view from all directions except below, allowing the bat to drop downward for flight. Tree roost sites are generally located on the south or southwest side of the tree (Western Bat Working Group, 2005). This bats feeds on flying nocturnal insects.

The species is considered highly migratory and they appear to migrate in groups.

Loss of riparian zones and foraging habitat of red bats are considered threats. Pesticide applications that reduce populations of insects reduce foraging opportunities for these bats. Pesticide application contributes to bioaccumulation hazards in bats.

Management Direction

Shasta-Trinity Land and Resource Management Plan direction applicable to Western red bats includes the following

Pg. 4-5 Manage habitat for sensitive plants and animals in a manner that will prevent any species from becoming a candidate for T & E status.

Pg.4-14 Corridors: Provide connecting travel corridors for wildlife species, particularly late-successional dependent species, by using Riparian Reserves and silvicultural prescriptions.

Pg. 4-30 Survey and evaluate habitat for TE & S species at the project level in coordination with the USFWS.

Spatial Scales Analyzed

The project area was evaluated for roosting and foraging habitat for this species.

Existing Condition (Environmental Baseline)

Mixed conifer forests adjacent to riparian areas occur within the project area. Map A-11 in Appendix A displays the areas of potential western red bat habitat in the Salt project area. Table 22 displays the type and acres of riparian habitat within the project area.

Table 22. Acres by Type of Riparian Habitat within the Project Area

Riparian Type	Acres
Perrenial	357
Intermittent	305
Ephemeral	372

Roosting and foraging habitat for Western red bats occur within and adjacent to the Salt project area.

Environmental Consequences

In addition to the Forest Plan standards and guidelines listed for the species, the resource protection measures (on pages 16 and 17 of this document), will be applied, as appropriate, for the action alternatives 2 and 3 below.

Alternative 1 – No Action

Direct Effects and Indirect Effects

Under the No Action alternative, current management plans would continue to guide existing and previously authorized activities within the project area. Habitat conditions for bats would not be expected to change appreciably within the next 10 years, barring a wildfire event.

Cumulative Effects

There are no cumulative effects because there are no direct or indirect effects of the No Action Alternative.

Determination of Effects and Rationale

There would be no change to the existing habitat for bats within the Salt project area, therefore, Alternative 1, No Action would result in **no impact** to western red bats or their habitat

Alternative 2 or Alternative 3

Direct and Indirect Effects

While occupancy and/or use of the project area by western red bats is uncertain, felling trees during thinning operations could result in the mortality of a roosting bat (Hayes and Loeb, 2007).

Not much is known about foraging habitat of western red bats. Vegetative actions proposed in Alternative 2 or Alternative 3 are likely to have a positive effect on foraging habitat and foraging opportunities for western red bats. It is likely that the increases in edge and openings and the development of shrubs, herbs, grasses and forbs as a result of increased sunlight on the forest floor would provide additional foraging opportunities for western red bats. The riparian reserve resource protection measures will retain potential riparian habitat for this species.

Cumulative Effects

Foreseeable actions and their effects to the Western red bat and/or its habitat would be expected to be similar to that described for Townsend's big-eared bats

Determination of Effects and Rationale

An individual western red bat may be killed during tree felling operations. Actions proposed in Alternative 2 or Alternative 3 would increase western red bat foraging habitat and foraging opportunities by creating more edge and small openings.

Alternative 2 **may impact individual western red bats but would not likely result in a trend toward listing or loss of viability.**

Alternative 3 **may impact individual western red bats but would not likely result in a trend toward listing or loss of viability.**

References

Andersen, David E., Krista E. M. Galley, Cole Crocker-Bedford, Stephen DeStefano, Michael I. Goldstein, Kimberly Titus, John J. Keane, Robert G. Anthony, Robert N. Rosenfield. The status of northern goshawks in the western United States. Bethesda, MD: Wildlife Society, [2004]. 24 p. Technical Review; 04-01.

Aubry, K. and c. M. Raley. 2006. Ecological characteristics of fishers (*Martes pennanti*) in the southern Oregon Cascade range. USDA Forest Service Pacific northwest Research Station, Olympia, Washington, USA.

Buck S. G. 1982. Habitat utilization by fisher (Martes pennanti) near Big Bar, California [MS thesis]. Arcata (CA): Humboldt State University. 85 p.

Buskirk, Seven W. and William J. Zielinski. 1997. American marten (*Martes americana*) ecology and conservation. Pages 17-22 in J.E. Harris, and C.V. Ogan, (eds.), Mesocarnivores of northern California: biology, management, and survey techniques, workshop manual. August 12-15, 1997, Humboldt State University, Arcata, CA. The Wildlife Society, California North Coast Chapter, Arcata, CA. 127 pp.

California Department of Fish and Game. Pallid Bat. Available at: http://www.delta.dfg.ca.gov/reports/stanriver/sr448.asp. Accessed 4/16/200.

Department of Interior. Fish and Wildlife Service. April 8, 2004. Federal Register Doc 04-7941. 12-month finding for a petition to list the West Coast distinct population segment of the fisher (Martes pennanti under the Endangered Species Act of 1973, as amended. 48 pp.

Fellers, G. M. and Elizabeth D. Pierson. Habitat use and foraging behavior of Townsend's big-eared bat (*Corynorhinus townsendii*) in coastal California. Journal of Mammalogy. Vol. 83, no. 1 (Feb. 2002): p. 167-177.

Foss, Jacqueline. Soil Scientist. TEAMS Enterprise. Salt Timber EIS. 2009. Draft Soil Resource Report. 27 pp.

Graham, R. T., R. L. Rodrigues, K. M. Paulin, R. L. Player, A. P. Heap, and R. Williams. 1999. The Northern Goshawk in Utah: habitat assessment and management recommendations. USDA Forest Service, rocky Mountain Research Station, General Technical Report RMRS-GTR-22. 48 pp. *In* Nature Serve, 2008.

Green, G. A., L. A. Campbell, and D. C. Macfarlane. Submitted**.** A conservation assessment for fishers (*Martes pennanti*) in the Sierra Nevada of California. USDA Forest Service, pacific Southwest Region, Vallejo, California. 72 pp.

Golightly, R. T., T. F. Penland, W. J. Zielinski, and J. M. Higley. 2006. Fisher diet in the Klamath/North Coast Bioregion. Unpublished report, Department of Wildlife, Humboldt State University, Arcata, CA. 56 pp.

Gruver, J. C and D. A. Keinath (2006, October 25). Townsend's Big-eared Bat (*Corynorhinus townsend*ii): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: http://www.fs.fed.us/r2/projects/scp/assessments/townsendsbigeardbat.pdf

Hargis, Christina D., Clinton McCarthy and Richard D. Perloff. 1993. Home ranges and habitat of Northern Goshawks in eastern California. *In* Block, Morrison and Reiser, Editors. The Northern Goshawk Ecology and Management. Proceedings of a Symposium of the Cooper Ornithological Society, Sacramento, CA

Hayes, John P. and Susan C. Loeb. The Influences of Forest management on Bats in North America. In Bats in Forests. P. 207-235.

Jennings, Mark R. and Marc P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. Final Report submitted to the California Department of Fish and Game Inland Fisheries Division. Under Contract Number 8023. 90 pp.

Keane, J. J. 1999. Ecology of the northern goshawks in the Sierra Nevada, California. Dissertation, University of CA, Davis, USA.

Kirk, Thomas A. 2007. Landscape-scale Habitat Associations of the American Marten (*Martes americana*) in the Greater Southern Cascades Region of California. Master of Science Thesis. Humboldt State University. 115 pp.

Lamberson R. H., R. L. Truex, W. J. Zielinskie, and D. Macfarlane. 2000. Preliminary analysis of fisher population viability in the Southern Sierra Nevada. 20 pp.

Lewis, Glenn. Fuels Specialist. USDA Forest Service. TEAMS Enterprise. 2009. Salt Fire/Fuels Report. 23pp.

Marcot, Bruce G. 1984. Winter use of some Northwestern California Caves by Western Big-Eared Bats and Long-eared Myotis. The Murrelet 65:46.

Mullis, C. 1985. Habitat utilization by fisher (Martes pennanti) near Hayfork Bally, California. Master's Thesis. Department of Wildlife Humboldt State University, Arcata, California.

NatureServe. 2008. *Accipiter gentili – Northern Goshawk.* NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: December 12, 2008).

NatureServe. 2008. *Actinemys marmoratamarmorata* – Northern Pacific Pond Turtle. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Anodonta californiensis* – California Floater. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Antrozous pallidus* – Pallid Bat. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Corynorhinus townsendii* – Townsend's Big-eared Bat. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 24, 2008).

NatureServe. 2008. *Empidonax traillii* – Willow flycatcher. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 18, 2008).

NatureServe. 2008. *Fluminicola seminalis* – Nugget Pebblesnail. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Hydromantes shastae* – Shasta Salamander. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Juga occata* – Scalloped Juga. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Lasiurus blossevillii* – Western Red Bat. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Martes Americana* – American Marten. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 24, 2008).

NatureServe. 2008. *Monadenia troglodytes* – Shasta Sideband. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Pisidium ultramontanum* – Montane Peaclam. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Rana cascadae* – Cascades Frog. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Rana boylii* – Foothill Yellow-legged Frog. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Rhyacotriton variegatus* – Southern Torrent Salamander. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Trilobopsis roperi* – Shasta Chaparral. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Trilobopsis tehamana* – Tehama Chaparral. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Vespericola pressleyi* – Big Bar Hesperian. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

NatureServe. 2008. *Vespericola shasta* – Shasta hesperian. NatureServe Explorer: An Online Encyclopedia of Life [web application], Version 7.0 (1 February 2008). Arlington, VA. *Online:* http://www.natureserve.org/explorer. (Accessed: March 17, 2008).

Parsons, Annette. 2003. Burned Area Emergency Rehabilitation (BAER) Soil Burn Severity Definitions and Mapping Guidelines Draft. 12 pp.

Petersen, Gary. Silviculturist. TEAMS Enterprise. Personal Communication. July 15, 2008.

Petersen, Gary and Larry Amell. Silviculturist. TEAMS Enterprise. 2009. Salt Timber harvest and Fuels hazard Reduction Project. Silviculture Report. 36 pp.

Pierson, E. D., M. C. Wachenhut, J. S. Altenbach, P. Bradley, P. Call, D. L. Genter, C. E. Harris, B. L. Keller, B. Lengus, L. Lewis, B. Luce, K. W. Navo, J. M. Perkins, s. Smith, and L. Welch. 1999. Species conservation assessment and strategy for Townsend's big-eared bat (*Corynorhinus townsendii townsendii* and *Cornorhinus townsendii pallescens*). Idaho Conservation Effort, Idaho Department of Fish and Game, Boise, Idaho.

Pilliod, David S.; Bull, Evelyn L.; Hayes, Jane L.; Wales, Barbara C. 2006. Wildlife and Invertebrate response to fuel reduction treatments in dry coniferous forests of the Western united States: a synthesis. Gen. Tech. Rep. RMRS-GTR-173. Fort Collins, CO: U. S. Department of Agriculture, Forest Service, rocky Mountain Research Station. 34 p.

Quinn, T. A. Wildlife Biologist. Shasta-Trinity National Forest. Personal communications on February 14, 2008; September 8, 2008; September 9, 2008; October 10, 2008; November 7, 2008.

Quinn, T. A. Wildlife Biologist. USDA Forest Service. Shasta-Trinity National Forest. April 25, 2008. Wildlife Biological Evaluation for the Gemmill Thin Project Environmental Impact Statement. 43 pp.

Slauson, Keith M., William J. Zielinski, John P. Hayes. 2000. Ecology of American Martens in Coastal Northwestern California. Progress Report 1. 27 pp.

Siegel, R. B. and D. F. DeSate. 1999. Version 1.0. The draft avian conservation plan for the Sierra Nevada Bioregion: conservation priorities and strategies for safeguarding Sierra bird populations. Institute for Bird Populations report to California Partners in Flight.

Smith, Jane Kapler, ed. 2000. Wildland fire in ecosystems: effects of fire on fauna. Gen. Tech. Rep. RMRS-GTR-42-vol. 1. Ogden, UT: U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 83 pp.

The Nature Conservancy. 1999. Species Management Abstract. Northern goshawk (*Accipiter gentilis).* 13 pp.

Truex R.L., Zielinski W.J., Golightly R.T., Barrett R.L., Wisely S.M. 1998. A meta-analysis of regional variation in fisher morphology, demography, and habitat ecology in California [draft report submitted to California Department of Fish and Game]. Arcata (CA): USDA Forest Service, Pacific Southwest Research Station, Redwood Sciences Lab.

URS Greiner Woodward Clyde. 2000. Middle Hayfork Creek and Salt Creek Watershed Analysis.

U.S. Department of Agriculture, Forest Service. 1995. Shasta-Trinity National Forests Land and Resource Management Plan. Shasta-Trinity National Forests, Redding CA.

U.S. Department of Agriculture. Forest Service. Pacific Southwest Region. Shasta-Trinity National Forest. January 5, 2007. Environmental Assessment Upper South Fork and Post Creek Range Allotments. 52 pp.

USDA Forest Service and USDI Bureau of Land Management. 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (Northwest Forest Plan). Portland, Oregon.

U. S. Dept. Interior. U. S. Fish and Wildlife Service. 2004. 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 12-month Finding for a Petition to List the West Coast Distinct population Segment of the Fisher (*Martes pennanti*). Federal Register: April 8, 2004. Vol 69. No. 68. 48 pp.

U.S. Department of the Interior, Fish and Wildlife Service. 2004. Final Twelve Month Administrative Finding in Response to a Petition to List the Pacific Fisher. Sacramento, CA.

Western Bat Working Group. 2005. Species Accounts. *Antrozous pallidus* Pallid Bat. 4pp.

Western Bat Working Group. 2005. Species Accounts. *Lasiurus blossevillii* Western Red Bat. 2 pp.

Woodbridge, Brian and Phillip J. Detrich. 1993. Territory occupancy and habitat patch size of Northern Goshawks in the southern Cascades of California. *In* Block, Morrison and Reiser, Editors. The Northern Goshawk Ecology and Management. Proceedings of a Symposium of the Cooper Ornithological Society, Sacramento, CA

Yeager, J. Scott. 2005. Habitat at Fisher Resting Sites in the Klamath Province of Northern California. Master's Thesis. Humboldt State University. 75 pp.

Zielinski, William J. Richard L. Truex, Chester V. Ogan, and Kelly Brusse. 1997. Detection Surveys for Fishers and American Martin in California, 1989 – 1994: Summary and Interpretations.

Zielinski, William J., R. L. Truex, G. A. Schmidt, F. V. Schlexer, K. N. Schmidt and R. H. Barrett. 2004 Home Range Characteristics of Fishers in California. Journal of Mammalogy, 85(4):649-657.