Biological Assessment and Biological Evaluation

for

Threatened, Endangered, Proposed, and Sensitive Wildlife Species That May be Affected

by the

Eddy Gulch Late-Successional Reserve Fuels / Habitat Protection Project

Salmon River and Scott River Ranger Districts
Klamath National Forest

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I. Background/History

The purpose of this Biological Assessment and Biological Evaluation (BA/BE) is to address the effects of the Eddy Gulch Late-Successional Reserve Fuels / Habitat Protection Project (Eddy Gulch Late-Successional Reserve [LSR] Project) on Endangered, Threatened, or Proposed species (and their designated Critical Habitat) that are federally listed under the *Endangered Species Act* (ESA). This BA/BE also analyzes effects on species listed as "Sensitive" by the United States Department of Agriculture (USDA) Forest Service, Pacific Southwest Region (Region 5). This assessment has been prepared in accordance with legal requirements set forth under Section 7 of the ESA (50 Code of Federal Regulations [CFR] 402; 16 United States Codes [USC] 1536 (c)).

The Eddy Gulch LSR Project involves reducing fire danger by removing excessive fuel hazards and increasing the forest's resiliency to the spread of wildfires in order to conserve late-successional habitat and protect communities and municipal water supplies in the Klamath National Forest. The Eddy Gulch LSR Project has the potential to affect the following ESA-listed species that occur in the Assessment Area: northern spotted owl (NSO), *Strix occidentalis caurina*, and its Critical Habitat. The list of federally listed species was obtained online at http://arcata.fws.gov/specieslist (USFWS 2009). The Region 5 Sensitive Species list was provided by the USDA Pacific Southwest Region on March 3, 2005; the list was updated on October 15, 2007. This BA/BE addresses the following species from those lists:

Threatened

Northern spotted owl	(*Strix occidentalis caurina*)
Marbled murrelet	(*Brachyramphus marmorata*)

Sensitive

Peregrine falcon	(*Falco peregrinus anatum*)
Northern goshawk	(*Accipter gentiles*)
Great gray owl	(*Strix nebulosa*)
Swainson's hawk	(*Buteo swainsoni*)
Bald eagle	(*Haliaeetus leucocephalus leucocephalus*)
Willow flycatcher	(*Empidonax trailii*)
Greater sandhill crane	(*Grus canadensis tabida*)
California wolverine	(*Gulo gulo luteus*)
Pacific fisher	(*Martes pennanti pacifica*)
American marten	(*Martes americana*)
Sierra Nevada red fox	(*Vulpes vulpes necator*)
Pallid bat	(*Antrozous pallidus*)
Townsend's big-eared bat	(*Corynorhinus townsendii*)
Western pond turtle	(*Emys marmorata marmorata*)

Foothill yellow-legged frog	(*Rana boylii*)
Cascade frog	(*Rana cascade*)
Southern torrent salamander	(*Rhyacotriton variegates*)
Siskiyou Mountain salamander	(*Plethodon stormi*)
Blue-gray taildropper slug	(*Prophysaon coeruleum*)
Tehama chaparral snail	(*Trilobopsis tehamana*)

Critical Habitat

Northern spotted owl, designated January 15, 1992, revised August 13, 2008
Marbled murrelet, designated May 24, 1996

The Eddy Gulch LSR Project is not within the range of the following species: marbled murrelet or its designated Critical Habitat (coastal forests), the Sierra Nevada red fox (Cascades Mountains and Sierran Crest),Siskiyou Mountains salamander, or the blue-gray taildropper. There is no habitat in the Assessment Area for the Swainson's hawk (perennial grassland, grassy shrub steppe, or agricultural landscapes), great gray owl (mountain meadows within forested habitat), and greater sandhill crane (wetlands, marshes, or irrigated fields). Thus, these seven species are not addressed further in this document.

Consultation

The United States Fish and Wildlife Service (USFWS) in Yreka, California, is a collaborating and consulting agency for the Eddy Gulch LSR Project. The USFWS issued the species list for the Klamath National Forest on April 23, 2003 (USFWS reference 1-1 -03-SP- 1810), and an updated list was generated from the computer database on May 13, 2009 (reference #52820799-8338). The list fulfills the requirement to provide a current species list pursuant to Section 7(c) of the ESA, as amended.

Collaboration between the contractor (RED, Inc. Communications) wildlife biologist and the USFWS began on September 25, 2007, when David Johnson, USFWS Level 1 representative, attended the interdisciplinary (ID) team meeting in Yreka, California, and a field trip to the project Assessment Area on September 26, 2007, to better understand baseline conditions and determine potential effects of the project. Formal consultation under the ESA began on July 7, 2008. Additional consultation occurred in November 2008 when updated NSO distribution data became available, which resulted in changes to the Proposed Action. A subsequent meeting took place in January 2009.

The USFWS representative on the project attended ID team meetings; reviewed and commented on the Stewardship Fireshed Analysis for the Eddy Gulch LSR Project; assisted with preparation of the purpose and need for the project; reviewed the early design of the Proposed Action and subsequent versions until it was finalized for the draft environmental impact statement (EIS); reviewed and provided comments on the preliminary draft EIS; and participated in ESA streamlining consultation meetings and conference calls. The purpose for all communications was to ensure that the proposed activities would not adversely affect NSOs or their Critical Habitat.

The ID team biologists, Klamath National Forest, and USFWS Level 1 representative reviewed locations of the proposed treatment units relative to NSO habitat, potential effects of the proposed treatments, and appropriate measures to minimize adverse effects on NSO and its Critical Habitat (using, for example, the 2007 programmatic prescribed fire and fuels hazard reduction BA) (USFS 2007). The USFWS and Klamath National Forest staff conducted unit-level reviews of proposed activities in NSO core areas and home ranges to determine the potential risks to NSOs and their habitat.

This BA/BE addresses the Proposed Action and its compliance with Section 7 of the ESA. Section 7 assures that, through consultation (or conferencing for proposed species) with the USFWS, federal actions do not jeopardize the continued existence of any Threatened, Endangered or Proposed species, or result in the destruction or adverse modification of Critical Habitat.

II. Current Management Direction

Programmatic management direction is provided by the Klamath National Forest Land and Resource Management Plan (Klamath LRMP) (USFS 1995). The Klamath LRMP incorporates direction from the Record of Decision for Amendments to the Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl—also known as the Northwest Forest Plan (USDA, USDI 1994a). The Klamath LRMP was updated using the guidelines provided by the Forest and Rangeland Renewable Resource Planning Act of 1974, as amended by the National Forest Management Act of 1976, and the National Environmental Policy Act of 1976.

A. Project Location

The Eddy Gulch LSR Project Assessment Area is located on the Salmon River and Scott River Ranger Districts, Klamath National Forest, in southwestern Siskiyou County. The LSR is located mostly west of Etna Summit, south of North Russian Creek and the town of Sawyers Bar, east of Forks of Salmon, and north of Cecilville. The LSR is about 61,900 acres in size, making it one of the largest LSRs on the Klamath National Forest. The LSR encompasses much of the area between the North and South Forks of the Salmon River, as well as headwaters of Etna Creek. Elevations range from 1,100 feet to about 8,000 feet. The terrain is generally steep and dissected by sharp ridges and streams. There are a few private inholdings in the LSR and along the main Salmon River and other stream corridors adjacent to the LSR.

The legal description for the Eddy Gulch LSR includes the following (all Mount Diablo Meridian):

T38N, R11W, Sections 2-5, 8-10, and 17-19
T38N, R12W, Sections 1-3, 9-16, and 22-24
T39N, R10W, Sections 2-10, 15-21, and 29-31
T39N, R11W, Sections 1-18, 20-29, and 32-36
T39N, R12W, Sections 11-14, 23-25, and 36
T40N, R10W, Sections 3-5, 8-11, and 13-35
T40N, R11W, Sections 24-27 and 34-36
T41N, R10W, Sections 2-5, 8-17, 20-24, 26-29, and 31-34
T42N, R10W, Sections 28-29 and 32-35

B. Purpose of the Eddy Gulch LSR Project

The purpose of the Eddy Gulch LSR Project is to provide an ecosystem-based approach for maintaining and conserving late-successional forest ecosystems, which serve as habitat for late-successional-forest dependent species, as well as ensuring the safety of persons and communities.

The Proposed Action has been designed to meet the purpose of the Eddy Gulch LSR Project (expressed below in two objectives) and to satisfy the need for action by using mechanical and prescribed burn treatments to reduce fuels and minimize the threat of stand-replacing wildfire. The two objectives are as follows (no priority is assumed):

1. *Habitat Protection*—Protect existing and future late-successional habitat from threats of wildfire that occur inside and outside the Eddy Gulch LSR.

2. *Community Protection*—Reduce wildfire threat to communities and municipal water supplies and ensure public and firefighter safety.

These objectives guided the development of the proposed treatments and activities designed to maintain or establish a trend towards desired natural and social resource conditions. The existing and desired conditions are summarized in "Chapter 1: Purpose and Need," with details provided in the various resource sections in Chapter 3 of the draft EIS and the individual resource reports.

C. Terms

Throughout this BA/BE, acres presented will be identified (or apparent from context) as applying to one of the following areas:

Eddy Gulch LSR — the entire 61,900-acre LSR.

Assessment Area — the 37,239-acre portion of the Eddy Gulch LSR west of Etna Summit where various treatments are proposed. All released roadless areas that occur in the LSR were excluded from planning efforts and are therefore not part of the Assessment Area.

Treatment Unit — the acres proposed for some type of treatment under a particular alternative.

Action Area — for this BA/BE, the Action Area analyzed for most wildlife species that could be *directly affected* by the project includes only the 25,696 acres (within the 37,239-acre Assessment Area) that are actually proposed for treatment under Alternative B (Proposed Action), as described below. However, for species that occur outside the Action Area and that may be *indirectly affected* by the proposed treatments, the Action Area extends beyond the Assessment Area. These species include the NSO, northern goshawk, fisher, and some aquatic species. For each NSO activity center, the effects on habitat within the estimated home range (1.3-mile radius) was analyzed, and in many cases, this home range radius fell outside of the Assessment Area. A similar analysis was done for goshawks using a 1-mile radius. The Action Area for fisher includes the treatment units, as well as a 1.5- to 2.0-mile buffer that would contain one or more fisher home ranges.

III. Summary of the Alternatives

Chapter 2 in the EIS presents more information about the three alternatives, and Appendix A in this BA/BE contains project maps.

A. Alternative A: No Action

The no-action alternative is described as continuation of the current level of management and public use—this includes road maintenance, dispersed recreation (hunting, fishing, camping, and hiking), mining, watershed restoration projects, and the modeled wildfire. The time frame for analysis is considered to be 20 years. Given the fuel hazard in the Eddy Gulch LSR and current predictions of climate change, it is assumed at least one wildfire will escape initial attack during the 20-year period and burn under 90th percentile weather conditions (defined as 10 percent of the days in the historical weather database that had lower fuel moisture and higher wind speeds compared to the rest of the days) (refer to the Eddy Gulch LSR EIS). An analysis of a wildfire for three days that escaped initial attack in the Eddy Gulch LSR Project Assessment Area indicates that fire would burn 7,200 acres. Of those 7,200 acres, 1,355 acres (19 percent) would be surface fire; 5,065 acres (70 percent) would be a passive crown fire; and 780 acres (11 percent) would be an active crown fire.

B. Alternative B: Proposed Action

The Klamath National Forest proposes 25,969 acres of treatments to protect late-successional habitat and communities. Three primary treatment types were identified in the Assessment Area: Fuel Reduction Zones (FRZs), Prescribed Burn Units (Rx Units), and Roadside (RS) treatments along emergency access routes, which are described below.

- **FRZs**—strategically located on ridgetops to increase resistance to the spread of wildfires. The FRZs would be wide enough to capture most short-range spot fires, and ground, ladder, and crown fuels would be reduced so as to change crown fires to surface fires within the treated areas. The FRZs would provide safe locations for fire-suppression personnel to take fire-suppression actions during 90th percentile weather conditions, and they serve as anchor points for additional landscape-level fuel treatments, such as underburning.

  - ***Proposed Action.*** Construct 16 FRZs totaling 8,291 acres to increase resistance to wildfires. The 8,291 acres includes 931 acres in 42 M Units (thinning units) and 7,383 acres in fuel reduction areas (outside the M Units) to reduce ground and ladder fuels.

- **Rx Units**—a series of landscape-level treatments (ranging from 250 to 4,300 acres in size) designed to increase resilience to wildfires by reducing ground and ladder fuels. Most of these treatments would occur on south-facing aspects where fuels dry faster, and treatments would support the role of the FRZs.

  - ***Proposed Action***. ***Implement*** 17,524 acres of Rx Units to increase resiliency to wildfires.

- **RS treatments**—along 60 miles of emergency access routes identified in the Salmon River Community Wildfire Protection Plan (CWPP) (SRFSC 2007) and designed to facilitate emergency access for residents to evacuate and for suppression forces to safely enter the LSR in the event of a wildfire.

  - ***Proposed Action.*** Treat 44 miles of emergency access routes in FRZs and Rx Units (treatments would be similar to the FRZ or Rx Unit the route passes through) and 16 miles (with 154 acres of treatments) of RS treatments outside of FRZs and Rx Units (Map A-2)—a total of 60 miles of RS treatments along emergency access routes.

C. Alternative C: No New Temporary Roads Constructed

Alternative C responds to public concerns regarding the environmental and economic effects of constructing new temporary roads. Alternative C is similar to the Proposed Action but approximately 1.03 miles (5,443 feet) of new temporary roads identified in the Proposed Action would not be constructed. As a result, no fuels treatments would occur in portions of seven M Units. This reduces the total acres of treatments in M Units from 931 acres under Alternative B to 832 acres in Alternative C. Fuels treatments could not be carried out in those M Units because of excessive treatment costs, high existing dead crown fuel loadings, and potential heat damage to the overstory if these untreated units were prescribed burned.

Under Alternative C, the FRZs would continue to total 8,291 acres; however, 99 acres in M Units would remain untreated. The total number of acres treated by tractor yarding would remain at 361 acres; however, the acres of cable yarding would be reduced from 570 acres under Alternative B to 471 acres under Alternative C (Maps A-3a and A-3b in Appendix A of this document). Reducing acres of M Units treated would also reduce the number of acres treated in two Rx Units because excessive fuels remaining in M Units would preclude safely burning portions of the two Rx Units. Six-foot-wide control lines would be constructed around the perimeter of those untreated areas to keep prescribed burns out of those portions of Rx Units. There would be no changes in the miles of emergency access routes treated, transportation plan, or resource protection measures.

IV. Details on the Proposed Action

A. Fuel Reduction Zones

The Proposed Action consists of 16 FRZs, totaling 8,291 acres. The construction of the FRZs would generally be consistent with "Activity Design Criterion 9: Shaded Fuelbreak," as described in the Klamath National Forest Forestwide Late-Successional Reserve Assessment (forestwide LSR assessment) (USFS 1999). The exception to Criterion 9 is that forest canopy cover may be less than 40 percent in FRZs.

The FRZs have two components: M Units (thinning units) and fuel reduction areas.

B. M Units (Inside FRZs)

Forty-two M Units, totaling 931 acres, would be treated in the FRZs consistent with the range of natural variation. A "Designation by Description" prescription with variable spacing would be used to retain the largest trees generally within 14–28 feet of the next adjacent largest conifer tree. Tree removal would thin from below, removing trees 8–28 inches diameter at breast height (dbh). No trees larger than 20 inches dbh would be removed from the following M Units: 8, 24, 31, and 43 to retain large trees in NSO habitat. Additional emphasis would be given to retaining desired conifer species and all hardwoods. Post-treatment canopy cover would range from 32 to 50 percent. Snags and CWD would be reduced, where needed, to ensure firefighter safety; however, Klamath LRMP Standards and Guidelines would be achieved on a landscape level. Tractor yarding would occur on 361 acres and cable yarding on 570 acres. Following completion of thinning, all slash in tractor units would be grapple piled and burned, and all slash in cable units would be lopped and scattered and broadcast burned. Fuels treatments will remove slash and other ground fuels to achieve post-treatment flame lengths of less than 2 feet, with fuel loads maintained to achieve flame lengths of less than 4 feet over time. Crown base heights would be 8–15 feet to minimize crown fires.

Proposed Temporary Roads and Landings

The construction of new temporary roads and the use of former logging access routes are proposed to access specific M Units.

- Approximately 1.03 miles (5,433 feet) of new temporary roads would be used to access all or portions of seven M Units. These roads would be closed (ripped and mulched, as needed) following thinning.
- Approximately 0.98 mile (5,177 feet) of former logging access routes would be re-opened (vegetation removed and bladed) to access all or portions of five M Units. These routes would be water-barred and closed immediately after thinning is completed.
- Five short spurs, each less than 100 feet long, would be bladed for tractor or cable yarding operations in two units.
- Existing landings would be used and no new landings are proposed. The ID team considered using whole-tree yarding to reduce slash treatments, but it would require larger landings and additional clearing and was therefore not considered further.

Proposed Haul Routes and Drafting Sites

Haul Roads. There are five basic routes that would be used to haul products out of the Assessment Area following thinning; all of these routes have been used in the past and are suitable for use with this project:

- **2E001 (Sawyers Bar).** The route connects to County Road 1C01 with haul to Etna and Highway 3 to Yreka.
- **40N61 (Whites Gulch Rd).** The route connects to County Road 1C01 with haul to Etna and Highway 3 to Yreka.
- **FS39.** The route connects with County Road 1C02 with haul to Callahan and Highway 3 to Yreka.
- **39N20.** The route connects with County Road 1C02 at Shadow Creek with haul to Callahan and Highway 3 to Yreka.

- **39N23.** The route connects with County Road 1C02 at Cecilville with haul to Callahan and Highway 3 to Yreka.

Drafting Sites. Roads will be watered to reduce dust during hauling. Water drafting sites for dust abatement will occur at designated sites for that purpose—existing drafting sites and access routes will be used. No vegetation removal will be allowed at drafting sites with the exception of vegetation trimming done in such a way that existing vegetation and associated root strength along stream banks and access routes are maintained.

C. Fuel Reduction Areas (Inside FRZs)

The "fuel reduction areas" in FRZs are areas outside of M Units and total 7,383 acres. Ground and ladder fuels (conifer trees up to 10 inches dbh) would be masticated on 3,184 acres on slopes less than 45 percent. Prescriptive burning, outside of M Units, would be used on 5,107 acres on slopes greater than 45 percent. Prescribed burning would result in some mortality of intermediate, dominant, and codominant trees. Mortality would be highest in the smaller intermediate trees, and total mortality would not exceed 10 percent in a burn block. Most mortality would occur to individual trees scattered throughout the entire burn area; however, small openings may also occur where groups of 3 to 5 trees could be killed when high concentrations of surface fuels occur. Mortality would be lower in mid-successional and late-successional stands where trees are larger, the bark is thicker, and the branches are higher on trees. The sum of all openings in a burn unit would not exceed 10 percent of any unit. Post-treatment flame lengths would be less than 2 feet, with fuel loads maintained to achieve flame lengths of less than 4 feet over time. Crown base heights would be 8–15 feet to minimize crown fires.

Plantations would be thinned to a 20-foot by 20-foot spacing, using mastication on slopes less than 45 percent. On slopes greater than 45 percent, plantations would be prescribed burned, except in eight strategic plantations in five FRZs where hand thinning, pruning (maintaining 60 percent canopy cover), and pile and burn would be necessary to maintain the integrity of the FRZs. Those treatments would occur on 56 acres in FRZ 2, 17 acres in FRZ 3, 28 acres in FRZ 5, 49 acres in FRZ 9, and 9 acres in FRZ 14.

D. Rx Units (Outside FRZs)

There are 11 Rx Units in the Eddy Gulch LSR Assessment Area, totaling 17,524 acres. The Rx Units range in size from approximately 250 to 4,300 acres and would be generally located between the FRZs. The treatments would be consistent with "Activity Design Criterion 8: Hazard Reduction–Prescribed Burning," as described in the forestwide LSR assessment (USFS 1999).

Broadcast burning, ignited by hand or with "ping pong" balls from a helicopter, would be used to remove ground and small ladder fuels (less than 4 inches dbh) and to achieve post-treatment flame lengths of less than 2 feet, with fuel loads maintained to achieve flame lengths of less than 4 feet over time. Implementation of prescribed burns would not be consistent across each Rx Unit, but rather small patches of heavier fuels would be maintained in burn areas, mimicking the range of natural variation that was created by the pre-European fire regime. Prescribed burning would result in some mortality of intermediate, dominant, and codominant trees. Mortality would be highest in the smaller intermediate trees, and total mortality would not exceed 10 percent in a burn block. Most mortality would occur to smaller individual trees scattered throughout the entire burn area; however, small openings may also occur where groups of 3 to 5 trees could be killed when high concentrations of surface fuels occur. Mortality would be lower in mid-successional and late-successional stands where trees are larger, the bark is thicker, and the branches are higher on trees. The sum of all openings in any given burn unit would not exceed 10 percent. Snags and CWD densities would be consistent with Standards and Guidelines contained in the Klamath LRMP. Roads, topographic features, and hand-cut control lines would control prescribed fire size. Existing landings would be used if burning is ignited from a helicopter. Burns may be accomplished when air quality, weather, and fuel moisture conditions could be met.

E. Roadside Treatments Along Emergency Access Routes (including Hazard Tree Removal)

Treatments are proposed along 60 miles of emergency access routes; 44 of the 60 miles would receive the same treatment as the FRZ or Rx Unit the route passes through. The following are the RS treatments proposed along 16 miles (approximately 154 acres) of emergency access routes that do not pass through FRZs or Rx Units:

- RS 1 treatments would consist of hand thin and pile burn of trees up to 6 inches dbh on slopes greater than 45 percent (43.1 acres).

- RS 2 treatments would involve mastication to remove trees less than 10 inches dbh on slopes less than 45 percent (40.6 acres).

- RS 3 treatments are in Riparian Reserves and would only consist of mastication, hand thin, and pile burn (69.5 acres).

Generally, the RS treatments would occur along the following roads:

- NFS Road 39 from County Road 1CO2 up to the northeast corner where it intersects the boundary of FRZ 15;
- NFS Road 40N61 (Whites Gulch) from the intersection with Road 39 to the county road; and
- the south side of NFS Road 40N54 from the intersection of the county road east to the intersection of 40N35.

All hazard trees would be identified and removed in accordance with Klamath National Forest Hazard Tree Policy (USFS 2005); hazard trees are expected to be individual trees found only along road prisms. To maintain the canopy cover requirements listed in the Salmon River CWPP, only small fuels within 50 feet of the road would be removed. A masticator would be used on slopes less than 45 percent (40.6 acres) to remove trees less than 10 inches dbh. Trees up to 6 inches dbh would be removed by hand on slopes greater than 45 percent (43.1 acres) and piled and burned. Either mastication or hand thinning and pile burning would be used in 69.5 acres of Riparian Reserves.

V. Timing of the Project

The following sequence of treatments would be used to implement the Eddy Gulch LSR Project:

1. Complete FRZs (M Units and RS treatments) during the first four years.

   Construct FRZs in the following order:

   FRZs 2, 3, 12, 13
   FRZs 14, 15
   FRZs 4, 5, 6, 9
   FRZs 7, 10, 11
   FRZs 16, 17, 20

2. Complete FRZs (mastication and prescribed burn) during the first six years following the order above. Some prescribed burning may occur in Rx Units adjacent to FRZs to establish control points.
3. Complete Rx Units during the first 11 years. The approximate order would be:
4. Northwest and western portion of Rx Unit 1 and Rx Unit 12
5. Rx Unit 3 and Rx Unit 8
6. East side Black Bear Ranch Road in Rx Unit 1 and Rx Unit 2
7. West portion of Rx Unit 4 and Rx Unit 11
8. East portion of Rx Unit 4 and Rx Unit 9
9. Remainder of Rx Unit 1 and Rx Unit 5
10. Rx Unit 6 and Rx Unit 7
11. Within occupied or unsurveyed suitable habitat, no more than 50 percent of the nesting, roosting, or foraging habitat would be burned or mechanically treated in a single year in any one 7th-field watershed up to 3,500 acres in size. If the 7th-field watershed is more than 3,500 acres, apply the design criteria at the 8th-field watershed scale or in some other manner that meets the intent of the design feature.

VI. Resource Protection Measures / Project Design Features

Resource protection measures, also referred to as mitigation measures, are designed to avoid or substantially reduce a project's significant adverse environmental effects. The following resource protection measures have been incorporated into the Proposed Action. These measures are in addition to Standards and Guidelines contained in the Klamath LRMP.

A. Northern Spotted Owls

- No activities will occur between February 1 and September 15 within an active NSO 70-acre nest core.

- Noise-producing activities that are above ambient noise levels will not occur between February 1 and July 9 within 0.25 mile of an occupied activity center or unsurveyed suitable nesting/roosting habitat.

- No activities that remove or downgrade suitable NSO habitat will occur between February 1 and September 15 within 0.5 mile of an occupied activity center or unsurveyed suitable nesting/roosting habitat.

- Burning will not occur between February 1 and July 31 within 0.25 mile of an occupied activity center or unsurveyed suitable nesting/roosting habitat. If the following conditions are met seasonal restrictions may be waived:

  – A topographic feature buffers the activity center or unsurveyed suitable nesting/roosting habitat from smoke, or burning is conducted uphill of the known activity center or unsurveyed suitable nesting/roosting habitat.

  AND

  – Smoke is managed so that light to moderate dispersed smoke may be present within a canyon or drainage but dissipates or lifts within 24 hours.

  – Ignition will be discontinued if heavy, concentrated smoke begins to inundate the 0.25-mile buffer late in the afternoon.

- There will be no seasonal restrictions on burning or use of mechanized equipment if protocol surveys are current and adverse.

- As an option to full protocol surveys, burning or other activities that will not remove or downgrade suitable NSO habitat may occur in spring if three surveys are completed in the year-of-action implementation and meet the following standards: (1) the first and second surveys begin after March 1 and are separated by a minimum of five days; (2) the third survey occurs after April 15; and (3) no owls are detected. If an NSO is detected during any of the surveys, no burning may occur within 0.25 mile of the activity center between February 1 and July 31, and no activities that create noise above ambient levels may occur within 0.25 mile of the activity center between February 1 and July 9, unless surveys determine *Non-Nesting* status. To determine *Non-Nesting* status, two observations of the owl(s) are required during the nest survey period (April 1 to June 1). Observations must be at least three weeks apart, with the second observation occurring after April 15.

- Temporary roads will be located to avoid trees larger than 20 inches dbh, where feasible.

- No more than 50 percent of the suitable habitat within a home range will be treated (thinning, underburning, and other fuels treatments) in a given year.

B. Northern Goshawk

- A seasonal restriction of March 1 to August 31 will apply to all activities (including activities that degrade or are beneficial) that modify habitat within 0.5 mile, or create smoke or noise above ambient levels within 0.25 mile of historic sites or any additional nest sites that are discovered in the Assessment Area.

- If protocol-level surveys indicate that an historic site is not occupied by breeding goshawks, seasonal restrictions may be waived.

C. Peregrine Falcon

- A seasonal restriction of February 1 to July 31 will apply to all activities that create noise above ambient levels within 0.25 to 0.5 mile (dependent on topographic features) of any active eyries that may be discovered in the Assessment Area.

D. Bald Eagle

- A seasonal restriction of January 1 to August 31 will apply to all activities that modify habitat within 0.5 mile, or that create smoke or noise above ambient levels within 0.25 mile of historic sites or any additional nest sites that are discovered in the Assessment Area.

VII. Environmental Baseline (Existing Conditions)

A. NSO and NSO Critical Habitat

The NSO and its Critical Habitat are the only ESA-listed species that occurs in the Action Area or may be affected by the Proposed Action. The Assessment Area falls within Managed Owl Conservation Area (MOCA)-35 and the Scott and Salmon Mountains NSO Critical Habitat Unit (CHU 25), subunit 35.

Approximately 45,220 acres of the 61,900-acre Eddy Gulch LSR (73 percent) are capable of producing late-successional habitat (USFS 1999, Table 2.38). Currently, at least 18,780 acres (or about 42 percent of the capable late-successional habitat [USFS 1999]) are vegetated by late-successional habitat. The combined acres vegetated by late-successional and mid-successional forest total 35,710 acres (or about 79 percent of the capable late-successional habitat). Relative to other LSRs in the Klamath National Forest, the Eddy Gulch LSR ranks moderate for both the proportion of late-successional and combined mid-successional / late-successional forested habitat (USFS 1999, 2:49).

The Eddy Gulch LSR (except the Etna side) is within Key Watersheds, identified in the Klamath LRMP as important for providing high-quality cold water for at-risk fish stocks (USFS 1995). Important to meeting Key Watershed objectives are 8,624 acres of Riparian Reserves, primarily comprised of steep headwater channels and moderate- to low-gradient mid-reaches whose function is largely influenced by riparian vegetation and large wood recruitment. The Riparian Reserves include lands adjacent to all permanently flowing streams, constructed ponds and reservoirs, wetlands, lakes and natural ponds, seasonally flowing or intermittent streams, floodplains, and unstable and potentially unstable land (USDA, USDI 1994b). The Riparian Reserves are important to the terrestrial ecosystem, as well, because they serve as habitat or movement corridors for terrestrial species such as the Pacific fisher.

Past disturbance and fire suppression have created many of the dense stand conditions observed in the Eddy Gulch LSR today. Many of the dense stands have an unnaturally high proportion of shade-tolerant species, such as white fir, and have begun to experience significant density-related mortality. This mortality, over-stocked stands, and ladder fuels contribute to excessive fuel hazards, which in turn, increase the probability of high-intensity wildfires. Management of excessive fuel hazards will be important if late-successional habitat is to be maintained or increased. Because many of the stands in the LSR originated after mining-related disturbance in the late 1800s, much of the forested habitat in the LSR tends toward the “late-successional” condition. Remnant old-growth stands that survived the mining era in the Eddy Gulch LSR are primarily found in the upper Murphy Gulch (Bacon Rind area), upper Matthews Creek, upper Callahan Gulch, lower West Shadow Creek, and upper East Fork of Whites Gulch.

Currently, 30 percent of the LSR is characterized by late-successional forest. Much of the remaining forest contains mid-successional stands that regenerated during the fire suppression era. There are also plantations scattered throughout the landscape (Maps A-4a and A-4b in Appendix A of this document). Many of the early to mid-successional stands contain a high density of trees with a dbh less than 10 inches, and little understory development (such as coarse woody debris [CWD] or brushy areas) or are in a transitional understory development as the stand increase in average dbh (up to 18 inches dbh). Although larger late-successional trees still occur in some of these early successional stands, other structural components, such as CWD and large snags, are lacking.

Historically, fires in the Klamath Mountains were frequent and generally of low to moderate or mixed severity (Agee 1993; Taylor and Skinner 1998, 2003; Odion et al. 2004). Fire exclusion and other management activities in the Klamath National Forest over the last 100 years have led to changes in the frequency and intensity of wildfires (Taylor and Skinner 2003). Fire suppression, in particular, has caused changes in stand structures and fuel accumulation that, while generally contributing stand structural elements such as snags and downed wood used by late-successional forest-related species, has led to larger and more intense wildfires in the Klamath National Forest than what occurred historically.

The severity of historical fire regime patterns in the region played an important role in defining the stands in the landscape (Skinner et al. 2006). These fires were frequent and burned at low to severe intensity in the Klamath Mountains Bioregion (northwestern California and southwestern Oregon), resulting in more open stands. The lower slopes experienced the lowest-severity fires, while the upper third of slopes experienced the highest-severity fires. With such a mosaic of different successional stands across the landscape, there was more spatial complexity (Taylor and Skinner 1998, 2003). The late-successional stands would have been unevenly distributed across the landscape.

Vegetation on the landscape became more homogeneous over time as fire suppression became more effective. The forests today are less spatially complex with denser canopy cover. They provide a higher concentration of shade-tolerant species and a greater concentration of fuels (Skinner 1995; Taylor and Skinner 2003; Skinner et al. 2006). Such current forest components provide for more intense, high-severity fires, which differs from the historical patterns (Skinner et al. 2006), suggesting that current stands are less sustainable than they might have been historically.

B. Federally Threatened Species: Northern Spotted Owl

The NSO is the only terrestrial wildlife species listed under the ESA that occurs or has habitat in the Eddy Gulch LSR. Currently, the primary range-wide threats to NSO are habitat loss from timber harvest, habitat loss from fire (or other natural events such as insects and disease), and barred owls (*Strix varia*), which have expanded into the range of NSO (USFWS 2008a).

Fire is now considered a greater threat to NSO habitat on federal lands than timber harvest or other management activities, especially in the relatively dry Klamath Province of Oregon and California, where loss of NSO habitat from fire has exceeded habitat loss from timber harvest since 1994 (USFWS 2008a). Recognition of the threat of fire stimulated the USFWS to identify recovery actions unique to the Klamath Province, including developing a strategy to achieve sustainable, fire-resilient and fire-resistant forests (Recovery Action 8) and the creation of a Dry Forest Landscape Work Group (Recovery Action 9) that will reexamine the effectiveness of the LSR system in the dynamic landscapes of the Klamath Province (USFWS 2008a).

Barred owls have displaced NSOs from many areas and are largely responsible for the alarming 7.1 percent annual decline of NSOs in Washington (Lint 2005). Whether the NSOs will be able to persist in areas with barred owls is unknown, but evidence to date suggests that NSOs are more likely to persist in, or be displaced into, drier areas, steep slopes, or higher elevations because barred owls prefer riparian areas with gentler terrain (Gutiérrez et al. 2007; USFWS 2008a). Individual barred owls were first detected in the Assessment Area in 2003 and have been occasionally detected (J. Rockweit, pers. comm. 2008); none of the NSOs tracked by Franklin's demographic study group have been displaced by barred owls, and no barred owl pairs have been observed in the Assessment Area (J. Rockweit, pers. comm. 2008). These factors suggest that the Eddy Gulch LSR, compared with other LSRs, may be relatively inhospitable to barred owls and an important refugium for NSOs.

NSOs inhabit older forests because they contain the necessary structures for nesting, roosting, foraging, and dispersal (Forsman et al. 1984; Gutiérrez 1996; LaHaye and Gutiérrez 1999). The habitat features that support *nesting and roosting* include:

- a multilayered, multispecies canopy with overstory trees larger than 30 inches dbh;
- moderate to high canopy closure (60 to 90 percent);
- a high incidence of trees with large cavities or other types of deformities (such as broken tops, mistletoe infections, and other evidence of decadence) (White 1996; LaHaye and Gutiérrez 1999);
- numerous large snags and an abundance of fallen trees and CWD;
- sufficient open space below the canopy for NSOs to fly (Thomas et al. 1990); and
- basal area in nest stands that may often exceed 200 square feet/acre (Solis and Gutiérrez 1990).

Table 1 compares the minimum habitat requirements (considered by the USFWS [2008b] to be necessary for supporting nesting/roosting in interior northern California) with current conditions in the project Assessment Area. The nesting/roosting habitat currently occupied by NSOs in the Assessment Area has features consistent with those described in Table 1 (2nd column), but there are no *quantitative* data for occupied nesting/roosting stands in the Eddy Gulch LSR. The mid- to late-successional Douglas-fir stands sampled for this project (see 4th column in Table 1 and, in Table 2, the 1st and 2nd columns) were mostly along ridges and not necessarily representative of nesting/roosting habitat that often occurs on the lower third of slopes, within 0.5-mile core areas more frequently used by owls.

Table 1. Minimum NSO habitat requirements compared to current conditions.

Minimum NSO Nesting/Roosting Habitat Requirement*	Current Nesting/Roosting Habitat Occupied by NSO in the Assessment Area[a]	Minimum NSO Foraging Habitat Requirement	Current Foraging Habitat Occupied by NSO in the Assessment Area*
Basal area ranges from 150 to more than 210 square feet per acre	Average basal area of 266 square feet per acre	Mix of basal areas ranging from 120 to over 180 square feet per acre	Average basal area ranges from 216 square feet per acre in Douglas-fir stands to 355 square feet per acre in red fir stands
8 trees per acre over 26 inches dbh	Average 20 trees per acre	At least 5 trees per acre over 26 inches dbh	Average 5 to 43 trees per acre larger than 24 inches dbh
At least 60 percent canopy cover	Average 72 percent canopy cover	Mix of canopy closures ranging from 60 to 100 percent	Average 58 to 73 percent canopy cover

Note: *USFWS 2008b.

Table 2. Current stand structure on ridgetops where proposed M Units are located.

SAF Forest Type[a]	CWHR Successional Stage[b]	TPA[c]	TPA >10 inches	TPA >24 inches	BA[c]/ac >10 inches	Average dbh[c] >10 inches	Canopy Closure (percent)
Douglas-fir	Mid-successional (MS)	441	135	5	192	16.1	73
Douglas-fir	MS/Late-successional (LS)	235	120	20	249	19.5	72
White Fir	MS	299	190	9	302	17.1	61
White Fir	MS/LS	275	124	29	284	20.5	58
Red Fir	LS	613	113	43	350	23.8	59
Mixed-conifer	LS	255	159	28	320	19.2	69

Notes:

a. SAF = Society of American Foresters.

b. CWHR = California Wildlife Habitat Relationship.

c. TPA = trees per acre.
BA = basal area.
dbh = diameter at breast height.
> = greater than.

Foraging habitat generally has attributes similar to those found in nesting/roosting habitat but may not always support successful nesting (USFWS 1992). Although general attributes, such as large trees, are common to foraging habitat across the NSO range, Irwin et al. (2007) suggest that optimal foraging conditions are found when the basal area is between 160 to 320 square feet per acre. The variability is in response to the main species of local prey (northern flying squirrels [*Glaucomys sabrinus*], or woodrats [*Neotoma* spp.]), which are the predominant prey both in biomass and frequency (Forsman et al. 1984; Zabel et al. 1995; Ward et al. 1998; Forsman et al. 2004). Woodrats are generally the dominant prey item in the drier forests typically found in the southern portion of the NSO range (Forsman et al. 1984; Zabel et al. 1995; Sztukowski and Courtney 2004), which includes the Eddy Gulch LSR (J. Rockweit, pers. comm. 2008). Dusky-footed woodrats (*N. fuscipes*) generally reside in brushy habitats (Williams et al. 1992), and densities have been found to be highest in 20- to 30-year-old sapling / bushy pole timber (Sakai and Noon 1993) or, in older forests, typically near riparian areas with fruit- and mast-producing hardwoods (Carey et al. 1999). Forests with little understory appear to be poorly suited for dusky-footed woodrats but are used by flying squirrels. Where wood rats are the primary prey, studies have found that, although NSOs selectively forage in areas with large trees (Call et al. 1992; Irwin et al. 2007), they also selectively forage along forest edges (Zabel et al. 1995; Ward et al. 1998) and riparian areas (Irwin et al. 2007). Canopy cover may not be a strong predictor of foraging habitat (Irwin et al. 2007), but NSOs typically avoid areas with less than 40 percent canopy (Call et al. 1992). Based on research (USFWS 2008a, 2008c) in the Klamath Mountains and California Cascades physiographic provinces, the USFWS (2008b) considers the minimum habitat requirements necessary to support foraging in interior northern California (also refer to Table 2 above) to include a combination of stands that contain a mix of basal areas ranging from 120 to over 180 square feet per acre, at least 5 trees per acre over 26 inches dbh, a mix of canopy closures ranging from 60 to 100 percent, and stands that contain a mix of basal areas ranging from 80 to 120 square feet per acre and at least 40 percent canopy closure. The mid- to late-successional stands sampled for this project contained average basal areas that ranged from 216 square feet per acre in Douglas-fir stands to 355 square feet per acre in red fir stands, 58 to 73 percent canopy cover, and from 5 to 43 trees per acre larger than 24 inches dbh (refer to Table 2 above).

Dispersal habitat, at a minimum, consists of stands with adequate tree size and canopy closure to provide protection from avian predators and at least minimal foraging opportunities (USFWS 2008a). Neither stand- nor landscape-level forest attributes have been thoroughly evaluated in terms of facilitating successful dispersal (Buchanan 2004), but dispersing juveniles that use open areas, such as clearcuts, suffer increased mortality if they cannot find cover (Franklin and Gutiérrez 2002). However, based on the movement of radio-tracked owls, openings do not appear to act as barriers to dispersal until they reach the size of large nonforested valleys or large water bodies (Forsman et al. 2002). It is unlikely that there are any limitations to NSO dispersal in the Assessment Area because most of the area is forested with at least 40 percent canopy cover, and adjoining drainages are typically connected by at least narrow patches of forest, even where most of the surrounding vegetation is dominated by nonforest types.

The Eddy Gulch LSR provides approximately 12,577 acres of nesting/roosting habitat and 16,220 acres of foraging habitat, for a total of 28,797 acres (47 percent of the 61,900-acre LSR) of NSO habitat (USFS 1999) (see Maps A-4a and A-4b in Appendix A of this document). Habitat acreages are useful, but acreage does not reflect other factors that affect NSO habitat use or their influence on NSO survival or reproduction. The most recent landscape-level analyses found that, in the southern portion of the subspecies' range, highest fitness is achieved where a mosaic of large patches of late-successional habitat are interspersed with other vegetation types that increase the amount of edge habitats (Franklin et al. 2000; Franklin and Gutiérrez 2002; Zabel et al. 2003; Olson et al. 2004). Homogeneous expanses of older forests, while generally supporting greater adult survival than younger forests or small patches of older forests (Franklin et al. 2000; Olson et al. 2004; Dugger et al. 2005), did not support a stable or increasing population (Franklin et al. 2000; Olson et al. 2004; also see Dugger et al. 2005). Franklin et al. (2000) hypothesized that a mosaic of different vegetation and successional stages may offer a stable prey resource for NSOs while providing adequate protection from predators. In the Eddy Gulch LSR, nesting/roosting and foraging habitat are fairly widely distributed in patches that range in size from less than a few acres to more than 500 acres. Although some patches of NSO habitat are isolated by nonhabitat, most patches of nesting/roosting habitat are connected by suitable foraging or dispersal habitat. Overall, the size, distribution, and connectivity of nesting/roosting habitat and foraging habitat vary among NSO territories, but in general, the pattern suggests high habitat fitness potential (Franklin et al. 2000).

The USFWS (Johnson et al. 2006) also used a landscape-level analysis to examine eight abiotic factors to help distinguish 36 activity centers from unused sites in three Klamath National Forest LSRs. The USFWS found that activity centers were associated with basin-like topography, the lower half of slopes, and streams. Additionally, numerous published articles have demonstrated that NSOs prefer using lower-slope or mid-slope sites for foraging, roosting, and nesting, especially as sites are related to drainages or surface water (see Solis and Gutiérrez 1990; Blakesley et al. 1992; Lahaye and Gutiérrez 1999). As might be expected, these abiotic habitat selection features coincide with conditions that favor forest growth and historically were relatively resistant to fire. Most of the activity centers in the Assessment Area are located in areas with similar topographic characteristics; that is, core areas are found no higher than mid-slope and are typically centered on prominent drainages.

C. Distribution and Population Trends

A total of 23 activity centers have been identified inside the Eddy Gulch LSR, 20 of which are in or overlapping the project Assessment Area (see Maps A-4a and A-4b in Appendix A of this document). However, scattered sections in the Assessment Area, totaling 10 to 15 percent of the LSR, have not been surveyed, and at least three activity centers have not been surveyed for the past 10 years. The mapped activity centers are widely distributed across the LSR, but almost all occur below 5,500 feet on the lower one-half to two-thirds of the slope and in areas with basin-like topography, consistent with the findings from Johnson et al. (2006). Areas that apparently lack NSOs, but that have physical attributes (such as low-elevation basins) associated with sustainable activity centers, include China Gulch, Counts Gulch, Crawford Creek southwest of Grouse Point, and Butcher Gulch. Butcher Gulch may currently contain sufficient nesting, roosting, and foraging habitat, but the other areas may lack sufficient NSO habitat at this time.

The only portion of the Assessment Area that has been surveyed regularly is the long-term Klamath demographic study area on the west end of the Eddy Gulch LSR. This area has been surveyed annually since at least 1986 and includes five mapped activity centers[1] that are included in the data set analyzed by Franklin et al. (2000) and other demographic analyses, such as the 18-year (1985–2003) estimates of population growth, survivorship, and reproduction (Lint 2005; Anthony et al. 2006). These analyses found that the NSO has experienced a range-wide decline of about 3.7 percent per year, and the northwestern California population has declined about 1.5 percent per year. Annual adult survival in the northwestern California population was 86.9 percent, and greater than the 85 percent thought to be key to stationary populations (Lint 2005), but has also been declining. Adult females fledged 0.33 young per year, which was slightly less than the range-wide average. The number of young fledged annually in the five activity centers tracked by Franklin in the Eddy Gulch LSR averaged 0.38 over the last 22 years.

D. USFWS Section 7 Consultation Home Range Assessment

The amount of suitable habitat in a home range has been shown to influence NSO productivity and survivorship (Bart 1995; Franklin et al. 2000; Dugger et al. 2005). Consequently, when evaluating potential project effects on an NSO activity center, the USFWS evaluates the amount and type of habitat within an owl's home range to assess the quality or apparent fitness potential of that activity center. The average home range size varies geographically (USFWS 1990; Zabel et al. 1995), but the estimated annual home range in the Klamath Province is approximately 3,330 acres. For planning purposes, the USFWS (1992, 2008a) uses a 1.3-mile radius circle containing 3,398 acres to estimate the size and amount of home ranges. The portion of the home range that receives disproportionately high use (the core area) during the breeding season is smaller than that used during the remainder of the year (Forsman et al. 1984; Sisco 1990; Glenn et al. 2004; Bingham and Noon 1997; Irwin et al. 2000), so the USFWS also examines habitat within the core area, which is defined by a circle with a 0.5-mile radius (502 acres) from the activity center.

The USFWS has concluded that NSO survivorship and productivity are reduced when the amount of nesting/roosting or foraging habitat within a 0.5-mile core area falls below 80 percent of the area, and the amount of suitable habitat within a home range falls below 40 percent of the area (Simon-Jackson 1989; Thomas et al. 1990; USFWS 1990; D. Johnson, pers. comm. 2008). In the California Klamath Province, this equates to approximately 400 to 1,335 acres of suitable habitat, respectively (USDA, USDI 1990; Thomas et al. 1990; see also Franklin et al. 2000). In 2001 an interagency team of USFWS and Forest Service personnel produced a habitat-based model to predict the probability of NSO occupancy (USDA, USDI 2001), and their modeling results suggest that the probability of occupancy is highest when the ratio of nesting/roosting habitat to foraging habitat within a NSO core area is 2:1. Thus, the USFWS currently considers the minimum amount of NSO habitat to avoid "take" under the ESA to consist of at least 250 acres of nesting/roosting and 150 acres of foraging habitat within a 0.5-mile core area and at least 935 additional acres of foraging habitat within a 1.3-mile home range outside the core area (D. Johnson, pers. comm. Jan. 2009).

Approximately 28 home ranges of historic and recent activity centers overlap Eddy Gulch LSR, with fewer than that found in the Assessment Area (Maps A-4a and A-4b in this document). None of the activity centers in the Assessment Area meet or exceed 400 acres of nesting/roosting/foraging

1. The area includes six mapped Klamath National Forest activity centers, but two adjacent activity centers have never been occupied simultaneously, so Franklin's demographic study group considers the area to be occupied by only one pair that may alternate activity centers.

habitat within the 0.5-mile core area. However, almost all of the activity centers meet or exceed the 1,335 acres of nesting/roosting and foraging habitat within the 1.3-mile home range. Of the five activity centers that have less than the target 1,335 acres in the home range, only one (KL1047) has an apparent habitat deficit (approximately 16 percent) greater than 10 percent in the 1.3-mile home range.

E. Managed Owl Conservation Areas, Critical Habitat, and Critical Habitat Units

Managed Owl Conservation Areas

The Eddy Gulch LSR occurs within MOCA-35. MOCAs are areas defined in the NSO Recovery Plan (USFWS 2008a) that contain or will develop habitat intended to support stable and well-distributed populations of NSOs over time and allow for movement of NSOs across a larger network of MOCAs and other suitable habitats (USFWS 2008a). The Eddy Gulch LSR is included within a Type 1 MOCA, which is expected to support 20 or more pairs of breeding NSOs now or in the future. MOCAs in the Klamath Provinces of Oregon and California, including MOCA-35 in the Eddy Gulch LSR, are considered parts of an interim network until a landscape-management strategy is developed and adopted in these fire-prone provinces (USFWS 2008a).

Critical Habitat and Critical Habitat Units

The Eddy Gulch LSR occurs within the Scott and Salmon Mountains NSO CHU 25. The Scott and Salmon Mountains CHU subunit 35 includes all of the Eddy Gulch LSR, with the exception of 1,960 acres of private lands. NSO Critical Habitat and CHUs were originally designated by the USFWS in 1992 (USFWS 1992) but revised on August 13, 2008 (USFWS 2008c). They are based on a network of MOCAs.

The Assessment Area occurs within subunit 35 of the Scott and Salmon Mountains NSO CHU 25 (USFWS 2008c). The boundaries of subunit 35 closely align with the USFWS 1992 designation of NSO CHU CA25. Therefore, any analysis conducted herein for subunit 35 would also be applicable to CA25 as designated by the USFWS in 1992.

The goal of established CHUs is to maintain habitat that provides the Primary Constituent Elements (PCEs) that create self-sustaining and interconnected populations of the NSO over time. PCEs are the biological and physical features of critical habitat that are essential to the NSO conservation and recovery. The four PCEs identified in the Recovery Plan (USFWS 2008a) are nesting, roosting, foraging, and dispersal habitat.

Subunit 35 of the Scott and Salmon Mountains CHU, combined with the contiguous habitat in the Marble Mountains Wilderness, is expected to support 22 nesting pairs over time (D. Johnson, pers. comm. 2008). Historical surveys indicate that the Eddy Gulch LSR has supported between 19 and 25 NSO activity centers (USFS 1999), which is within or exceeds the Scott and Salmon Mountains CHU subunit 35 objective of 22 pairs. Subunit 35 also helps to connect the Western Klamath-Siskiyou Mountains CHU across the high-elevation habitat in the Salmon-Trinity Alps Wilderness and east to the Shasta-McCloud area of concern. Existing dispersal habitat within and surrounding the Scott and Salmon Mountains CHU subunit 35 exceeds 50 percent (with the possible exception of the Lower South Fork Salmon River, which was estimated to be 48 percent in 1992) (USFS 1999, ch. 2, pg.49).

Thus, Subunit 35 appears to be providing intra-provincial connectivity with adjacent Wilderness Areas and other CHUs.

F. Effects on Northern Spotted Owl and Critical Habitat

Alternative A: No Action

Direct and Indirect Effects on NSO Habitat in Areas Not Affected by Wildfire

Under the no-action alternative, and in the absence of wildfire, there would be no direct effects on NSOs or their habitat.

The amount or quality of NSO habitat in the Assessment Area would change slowly in areas not affected by fire. Continued forest growth could have beneficial or adverse indirect effects, depending on local conditions. In relatively young or open stands, continued forest growth could benefit NSOs by allowing for a slow increase in tree size, basal area, canopy cover, snags, and CWD. This could lead to an increase in the number of activity centers and the amount of nesting/roosting or foraging habitat in existing activity centers. Continued forest growth could also decrease fire risk as young or open stands develop a moister microclimate. In most stands, continued growth would increase stand density, density-related tree mortality, fuel hazards, and the probability of a stand-replacing fire. Continued growth could make some stands too dense for owls (Irwin et al. 2007) and reduce overall stand diversity. In summary, young or open stands not occupied by NSOs would most likely benefit from continued forest growth, but understory stand densities in many other areas, including stands occupied by NSOs, would most likely exceed the optimal stand density for nesting/roosting or foraging habitat because high understory density would limit owl movement. The risk of stand-replacing fires will also increase as ladder fuels increase.

Direct and Indirect Effects on NSO Habitat in Areas Affected by Wildfire

The modeled wildfire (refer to Section III.A. above) would have various direct effects on Critical Habitat, NSOs, NSO habitat, and NSO prey, depending on the location, season, intensity, and pattern of the wildfire. Smoke may not affect most NSOs (Bevis et al. 1997); however, heavy and continuous smoke may affect NSOs during the nesting season when young birds cannot escape the fire (USDA 2007). Fire may also increase the risk of predation on NSOs as they move to unfamiliar territory, into more open habitats, or during the day.

There are approximately 28,797 acres of suitable NSO habitat in the portion of the Scott and Salmon Mountains CHU subunit 35 contained in Eddy Gulch LSR. Over time, if left untreated, all of these acres have the potential to be affected by wildfire.

The 7,200-acre modeled fire would include 1,368 acres of low- to moderate-intensity fire that could benefit NSOs immediately after the fire by removing cover and/or concentrating prey into remaining patches of habitat (Lyon et. al. 2000). Jenness et al. (2004) concluded that relatively low-intensity ground fires probably have little or no short-term effect on the presence or reproductive success of Mexican spotted owls (*S. occidentalis lucida*). Similarly, Bond et al. (2002) hypothesized that NSOs have the ability to withstand the immediate, short-term (1-year) effect of fire occurring at primarily low to moderate severity within their territory. There would be short-term benefits as a result of the mosaic of small openings that would invigorate forest understory and create new snags and CWD used by NSO prey, resulting in additional prey. Low- to moderate-intensity fires would reduce fuels, thereby reducing the likelihood of future stand-replacing fires.

The modeled fire resulted in 81 percent crown fire (5,832 acres), where a moderate- to high-intensity fire could consume NSO nesting/roosting or foraging habitat, and extensive consumption of snags, CWD, understory, and litter and duff layers would reduce prey abundance. The modeled fire would have various indirect effects. Crown fires would result in substantial mortality, initiating successional changes that would replace mid- and late-successional forest stands with brush fields and dense young forests and increase the probability of future high-intensity wildfire. Fire may also affect enough nesting/roosting or foraging habitats that it could lead to changes in NSO occupancy of the area (Clark 2007). Excessive habitat loss in a core area and/or home range would most likely cause abandonment of one or more activity centers during or shortly following fire.

The USFWS considers habitat (in interior California) necessary to support NSOs consist of 400 acres of suitable habitat made up of at least 250 acres of nesting/roosting and 150 acres of foraging habitat in the 0.5-mile core area. All but one core area within the Eddy Gulch Assessment Area are currently below 250 acres of nesting/roosting habitat. A crown fire would result in 75 percent mortality to trees greater than 20 inches dbh, removing most suitable nesting/roosting habitat, and creating an adverse effect on NSO habitat in the Assessment Area. When the simulated fire behavior was compared to available nesting/roosting habitat, crown fires could adversely affect any of the 20 core areas. Table 3 shows the existing number of nesting/roosting acres with the potential number of acres and the percentage of nesting/roosting habitat that would be removed by the modeled fire in each of the 20 core areas, as any one of the core areas is susceptible to crown fire.

There are approximately 28,797 acres of suitable NSO habitat in the portion of the Scott and Salmon Mountains CHU subunit 35 contained in Eddy Gulch LSR. Over time, if left untreated, all of these acres have the potential to be affected by wildfire. Approximately 81 percent of the 7,200-acre wildfire would adversely affect PCEs in 20 percent of the suitable NSO habitat in CHU subunit 35 in the Eddy Gulch LSR. Thus, the no-action alternative would have long-term adverse effects on Critical Habitat and the four PCEs by taking no action and failing to reduce the risk of stand-replacing fire in the landscape in a minimum of 5,832 acres within the Eddy Gulch LSR.

Moderate- to high-intensity fire could consume Critical Habitat. The modeled fire would have various indirect effects. Crown fires would initiate successional changes that would replace mid- and late-successional forest stands with brush fields and dense young forests and increase the probability of future high-intensity wildfire. Fire may also affect enough of existing Critical Habitat that it could lead to changes in NSO occupancy of the area. Excessive Critical Habitat loss would most likely cause abandonment of one or more activity centers during or shortly following fire.

Table 3. NSO core areas, in or overlapping the Assessment Area, that are susceptible to the simulated wildfire under the no-action alternative.

Activity Center	Acres of Nesting / Roosting Habitat in Core Areas	Acres of Nesting / Roosting Habitat in Core Areas Removed by Crown Fire	Percentage of Nesting / Roosting Habitat in Core Areas Adversely Affected by Crown Fire
KL0257	102	60	59
KL0365	141	51	36
KL1012[a]	174	140	80
KL1013	150	73	49
KL1014[a]	203	66	33
KL1028[a, b]	266	249	94
KL1030	244	150	61
KL1031[a]	140	129	92
KL1032[a, b]	161	154	96
KL1033[a]	254	165	65
KL1034[a]	209	138	66
KL1035[a]	169	116	69
KL1039	184	122	66
KL1040	166	104	63
KL1041	142	88	62
KL1046[a]	165	71	43
KL1047	100	89	89
KL1090	93	20	22
KL1258	132	23	17
KL4026[a]	171	145	85

Notes:

a. Denotes activity centers within which core areas would be treated with prescribed burning under Alternative B and therefore are not expected to be susceptible to crown fires and habitat loss.

b. Denotes activity centers within which portions of the core areas would not be treated with prescribed burning under Alternative C, and therefore are expected to remain susceptible to crown fires and some habitat loss

Cumulative Effects on NSO and Critical Habitat

Changes to NSO habitat would be as described under direct and indirect effects. In the absence of fire, continued forest growth may increase NSO habitat in some areas, but fire hazard would increase in most areas. Proposed future activities on the Salmon River and Scott River Ranger Districts include the following: installation of telephone and fiber-optic lines along existing roads through the Ranger District; North Forks road maintenance (stormproofing 76 miles of road requiring blading, improving road drainage, and protecting riparian and stream systems; decommissioning 36 miles of roads to reduce sediment delivery to streams; and adding 2.4 miles of existing road); and the construction of a fuelbreak system west of Black Bear Ranch (approximately 700 acres of ridgetop fuel reduction). These proposed future activities would have little effect on future wildfire behavior within the Assessment Area; therefore, the no-action alternative increases the potential for fire to remove the existing physical and biological features important to functioning Critical Habitat as well as dispersal habitat. Local community fuel reduction projects are small and would have little effect in reducing the risk or extent of fire in the Assessment Area.

Alternatives B and C

Both action alternatives would have similar effects on NSOs and are therefore discussed together, except where specifically stated otherwise. Thinning and fuel reduction activities will produce heat, smoke, visual, and noise disturbance that could affect NSOs. All potential adverse effects will be fully mitigated through implementation of resource protection measures (Section VI above) that prohibit activities in established buffer areas around occupied activity centers.

Direct and Indirect Effects on NSO Habitat

Effects of Treating M Units (Inside FRZs)

Thinning in M Units could reduce three features that are used to define suitable NSO nesting/roosting or foraging habitat: canopy cover, basal area, and the number of large-diameter trees. Treatments in M Units would have little effect on individual NSO or their Critical Habitat because

- the M Units are along ridges, and the physiographic features associated with most of the M units indicate a low probability of use by foraging or nesting/roosting individuals;
- the M Units avoid all but one NSO core area, part of which occurs along a ridgeline; and
- all NSO home ranges in which M Units occur will retain habitat sufficient to support NSOs following treatment.

Mechanical thinning of M Units in NSO home ranges would downgrade[2] 36.4 acres of nesting/roosting habitat to foraging habitat (Table 4), and 199.7 acres of foraging habitat within home ranges would be modified. In some cases affected habitat polygons are shared by more than one NSO activity center (see Table 5), and individual M Units are counted more than once, but acreage calculations are not.

Treatments would modify 199.7 acres of foraging habitat in nine 1.3-mile radius home ranges. Treatments in M Unit 19 would modify 5.7 acres of foraging habitat within a core area (KL 1032), where foraging habitat exceeds the required 150 acres of foraging habitat (Table 5). The Proposed Action has been designed to maintain basal area and trees per acre that are characteristic of NSO foraging habitat, and thus proposed treatments are not expect to create habitat changes that would affect occupancy of the activity centers.

2. Definitions for treatments to owl habitat:
- Downgrade—proposed treatment will change the habitat suitability classification from nesting/roosting to foraging or from foraging to dispersal.
- Modify—treatment proposed within owl home ranges will not change the habitat suitability class, but will alter the current canopy cover, basal area, and/ or trees per acres.
- Remove—proposed treatment will remove habitat, no habitat suitability classification will apply to remaining habitat.

Table 4. Breakdown of NSO habitat within M Units, pre- and post-treatment.

M Unit	Total Acres	Within Home Range or Core Area?[a]	Pre-Treatment NSO Habitat Within M Unit		Habitat Removed or Downgraded Within M Unit		Post-Treatment NSO Habitat Within M Unit	
			N/R[b]	F[b]	N/R	F	N/R	F
3	7	HR	0	1.5	0	0	0	1.5
4	33	HR	0	30	0	0	0	30
7N	14	No habitat	0	0	0	0	0	0
7S	19	HR	0	1.3	0	0	0	1.3
8	5	HR	1.4	0	1.4	0	0	1.4
9	29	HR	1.1	23.6	1.1	0	0	24.7
10	32	HR	0	6.14	0	0	0	6.14
10[c]	32		1.2	2.6	1.2	0	0	3.8
11	3	No habitat	0	0	0	0	0	0
12	22	HR	0.2	2.37	0.2	0	0	2.39
13	32		9.7	16.5	9.7	0	0	26.2
15	138		0	6.3	0	0	0	6.3
16	4	No habitat	0	0	0	0	0	0
17	12	HR	0	10.36	0	0	0	10.36
19	46	HR and CA	0	5.7	0	0	0	5.7
20	13	HR	0	0.18	0	0	0	.18
21	108	HR	0	15.80	0	0	0	15.8
21[c]	108		5.3	58.6	5.3	0	0	63.9
22	7	HR	0	4.6	0	0	0	4.6
23	42	HR	2.5	29.1	2.5	0	0	31.6
24	45	HR	8.7	28.6	8.7	0	0	37.3
25	27	No habitat	0	0	0	0	0	0
30	9		0	8.8	0	0	0	8.8
31	20	HR	0	7.54	0	0	0	7.54
32	5	HR	0	0.9	0	0	0	0.9
35	4	No habitat	0	0	0	0	0	0
36	21	No habitat	0	0	0	0	0	0
37	12	No habitat	0	0	0	0	0	0
38	12	No habitat	0	0	0	0	0	0
39	14	HR	0	0.38	0	0	0	0.38
40	7	HR	0	3.41	0	0	0	3.41
43	12	HR	1.1	2.21	1.1	0	0	3.31
51	12	HR	0.2	2.8	0.2	0	0	3
52	19		0	10.7	0	0	0	10.7
54	37		0	1.4	0	0	0	1.4
60	17	No habitat	0	0	0	0	0	0
61	25	HR	0	1.5	0	0	0	1.5
65	6	HR	0	1.57	0	0	0	1.57
65[c]	6		0	2.6	0	0	0	2.6
66	2	HR	0	2	0	0	0	2
73	26	HR	14.5	7.76	14.5	0	0	22.26
75	9	HR	2.4	6.44	2.4	0	0	8.84
76	8	HR	4.3	3.91	4.3	0	0	8.21
79	13		0	12.3	0	0	0	12.3
80	3	No habitat	0	0	0	0	0	0

Notes:

a. All M Units are found within Critical Habitat.

b. N/R = nesting/roosting; F = foraging.

c. M Units also found partially within home range.

Table 5. Acres of proposed thinning in M Units in occupied NSO habitats.

	Pre-project Habitat Within 0.5-Mile Core Area			Acres Habitat Downgraded[a] or Removed[b] in 0.5-mile Core Area		Post-project Acres Habitat in 0.5-mile Core Area		Pre-project Habitat Within 1.3-mile Home Range			Acres Habitat Downgraded or Removed in 1.3-mile Home Range		Post-project Acres Habitat in 1.3-mile Home Range	
Activity Center	**NR [250][c]**	**F [150]**	**Total [400]**	**NR**	**F**	**NR**	**F**	**NR**	**F**	**Total [1,335][d]**	**NR**	**F**	**NR**	**F**
KL1012	174	111	285	0	0	174	111	865	909	1,774	0	0	865	909
KL1013	150	115	365	0	0	150	115	838	751	1,589	0	0	838	751
KL1014	203	152	355	0	0	203	152	797	951	1,748	0	0	797	951
KL1028	267	84	351	0	0	267	84	826	592	1,418	11.2	0	814.8	603.2
KL1029	207	156	363	0	0	207	156	920	760	1,680	0	0	920	760
KL1030	244	94	338	0	0	244	94	727	552	1,279	0	0	727	552
KL1031	140	199	339	0	0	140	199	775	774	1,549	2.4	0	772.6	776.4
KL1032	161	192	353	0	0	161	192	521	947	1,468	0	0	521	947
KL1033	254	133	387	0	0	254	133	987	1,042	2,029	8	0	979	1,050
KL1034	209	46	255	0	0	209	46	1,003	985	1,988	14.7	0	988.3	999.7
KL1035	169	230	399	0	0	169	230	793	1,231	2,024	0.4	0	792.6	1,231.4
KL1047	100	187	287	0	0	100	187	316	748	1,064	0	0	316	748
KL4026	171	159	330	0	0	171	159	747	1,000	1,747	11.2	0	735.8	1,011.2

Notes:

a. Defined as changing the current habitat classification from nesting/roosting to foraging.

b. Defined as changing the current habitat classification to an unclassified state.

c. USFWS minimum acres necessary to support breeding pairs.

d. USFWS minimum acres of combined nesting/roosting and foraging habitat necessary in NSO home ranges.

Treatments in M Units would remove small trees and reduce the basal area and canopy cover in 36.4 acres of nesting/roosting habitat in home ranges of six activity centers (Table 5), two of which overlap the same M Units. Treatments would downgrade mapped nesting/roosting habitat in two NSO home ranges (8 acres in KL1033 and 14.7 acres in KL1034). Treatments in M Units would also downgrade additional acres of mapped nesting/roosting habitat (11.2 acres in KL1028, 2.4 acres in KL1031, 0.4 acre in KL1035, and 11.2 acres in KL 4026) in four NSO home ranges. All treatments occur on ridgetops, a landscape feature not typically used as nesting/roosting habitat (Irwin et al. 2000; Irwin et al. 2004), thus it probably functions as foraging habitat, which is in excess in all of the activity centers (Table 5).

The Proposed Action is designed to retain trees larger than 20 inches dbh, and the post-treatment basal area will meet or exceed standards for foraging habitat. Because the treatment units will maintain the targets for basal area and trees per acres (greater than 24 inches), these units are expected to function as NSO foraging habitat post-treatment. Reducing the canopy cover is consistent with that of the pre-European fire regime (please refer to the Silviculture Report for the Eddy Gulch LSR Project 2009), and it will allow more sunlight to reach the forest floor, increasing surface resources in the long term and increasing prey that are dependent on those resources.

All home ranges in which there are M Units exceed the 1,335 acres of suitable habitat and the 935 acres of suitable foraging habitat outside the core area, so M Unit treatments would not affect occupancy. Additionally, creating such mosaics of different vegetation and successional stages may offer a stable prey base (Franklin et al. 2000).

Limited thinning outside of core areas is unlikely to affect NSO habitat use as the thinning activities are either along ridgetops away from known usage areas, or thinned acres are found within home ranges that have an excess of habitat (beyond USFWS minimum requirements). Some owls may shift their activity centers in response to thinning, but changes in home range sizes attributable to thinning treatments are unlikely (Irwin et al. 2000). Effects are especially unlikely where thinning prescriptions are designed to retain foraging habitat or where thinning occurs along ridges or on the periphery of the home range.

The construction of 1.03 miles of new temporary roads, disturbing 1.7 acres on ridgetops, under Alternative B would remove 0.60 acre of foraging habitat and 0.02 acre of habitat classified as nesting/roosting. However, based on the ridgetop location of the 0.02 acre of nesting/roosting habitat, it is presumed to function as foraging habitat for NSOs. None of the temporary roads occur in NSO core areas, and the roads will be closed (ripped and mulched, as needed) following treatment, so there would be no long-term effect on NSOs. No new landings are proposed, and existing landings will not be expanded under Alternatives B and C, thus no long-term effects on NSOs are expected.

Alternative C would be similar to Alternative B; however, 1.03 miles of temporary roads would not be constructed, resulting in 99 fewer acres being treated. This would result in no treatments or changes to 30 acres of foraging habitat outside of any NSO core area but within home ranges. These 30 acres would, however, be susceptible to a wildfire.

Effects of Treatments in Fuel Reduction Areas and Emergency Access Routes

Treatments along emergency access routes would be similar to the FRZ or Rx Unit the route passes through. These treatments would have little effect on canopy cover because burning would remove smaller trees that do not substantially contribute to canopy cover in the overstory. Fuel reduction treatments would cause changes in the amount and/or types of snags, CWD, understory vegetation (including small trees), and prey. Treatments would remove or consume existing snags and individual hazard trees along 16 miles of emergency access routes outside of FRZs or Rx Units, but effects on NSOs would be negligible because treated areas would generally avoid NSO nest stands; snag retention would follow Klamath LRMP guidelines in NSO nesting/roosting and foraging habitat treated mechanically or by hand; snag loss would be concentrated in ridgetop FRZs where NSOs are not likely to nest or roost. NSOs in KL1047, the only core area where roadside hazard fuel reductions are proposed, would be protected by resource protection measures designed to avoid disturbance effects on owls, and suitable habitat would be maintained by following Klamath LRMP guidelines and resource protection measures, and hazard trees are expected to be individual trees along only the road prisms and is not expected to affect canopy cover. Similarly, treatments would destroy or consume most of the smaller woody debris and some of the CWD, but CWD retention would follow Klamath LRMP Guidelines in NSO nesting/roosting/foraging habitat treated mechanically or by hand, and some CWD would also remain when burning in spring prescriptions. Most understory vegetation would also be removed in fuel reduction areas. Mastication would not remove trees greater than 10 inches dbh, and burning would not remove trees greater than 4 inches dbh. Removing small trees and brush would have no effect on existing foraging or nesting habitat.

Overall, snag, woody debris, and understory removal are not likely to directly affect NSOs, but fuel reduction activities could affect NSOs by affecting their prey, including woodrats (Wirtz et al. 1988; Lyon et al. 2000). However, treatments are designed to minimize effects on prey by limiting treatments to no more than 50 percent of the suitable habitat within a home range within a given year, and treatments in the Assessment Area would be spread over a 5-year period. Prescribed fire is also designed to leave a mosaic of burned and unburned areas so some shrubs, snags, and CWD would remain to provide cover or food for prey species (Lyon et al. 2000; Lehmkuhl et al. 2006b) and minimize effects on NSOs. NSOs may temporarily benefit from fuel reduction activities as rodent prey move to avoid disturbance or concentrate in remaining patches of habitat. A reduction in understory cover may also facilitate NSO foraging efficiency. After treatment, NSO prey species are likely to increase as understory vegetation and litter layers recover and down woody debris is recruited from the snag population (Waters et al. 1994; Carey and Wilson 2001; Suzuki and Hayes 2003; Gomez et al. 2005). Reduced vegetative competition would also accelerate tree growth in some areas (refer to Tables 3-6, 3-7, and 3-8 in Section 3.2 of the Eddy Gulch LSR draft EIS).

Effects of Treatments in Rx Units

Prescribed fire would cause changes in the amount and/or types of snags, CWD, understory vegetation, and prey. These treatments would have little effect on canopy cover because burning would remove smaller trees that do not substantially contribute to canopy cover in the overstory. Treatments would consume many existing snags but would also create many new snags. Prescribed fire would consume most of the smaller down woody debris and some of the CWD, but much of the CWD would likely remain when burning in spring prescriptions. Most understory vegetation would also be consumed. Prescribed fire is likely to kill, injure, or displace NSO prey, including woodrats (Wirtz et al. 1988; Lyon et al. 2000). However, treatments are designed to minimize effects on prey by limiting treatments to no more than 50 percent of the suitable habitat within a core area or home range within a given year. Burning may also provide a temporary benefit as prey move from burned areas to unburned areas, increasing their availability to NSO. Additionally, treatments in the

Assessment Area would be spread over the 11-year timeframe to complete treatments, thus reducing effects over time. Prescribed fire is also designed to leave a mosaic of burned and unburned areas (the total sum of all openings in any given burn unit would not exceed 10 percent) so some shrubs, snags, and CWD would remain to provide cover or food for prey species (Lyon et al. 2000; Lehmkuhl et al. 2006b) minimizing the effects on NSOs.

CWD and litter layers would begin to accumulate after treatment, and understory vegetation would regenerate in most areas. These changes are expected to benefit NSO prey (Waters et al. 1994; Carey and Wilson 2001; Suzuki and Hayes 2003; Gomez et al. 2005). Reduced vegetative competition would also accelerate tree growth in some areas (refer to Tables 3-6, 3-7, and 3-8 in Section 3.2 of the Eddy Gulch LSR draft EIS). Prescribed low intensity fire, as dictated in the EIS, is unlikely to affect activity center occupancy or reproduction (Bond et al. 2002; Jenness et al. 2004; Clark 2007).

Prescribed fire treatments would benefit NSOs and NSO habitat by reducing fuels to a level that would decrease the likelihood of a crown fire. Fire would still burn with sufficient intensity to create small openings in untreated areas. This type of pattern would be consistent with patterns under historic fire regimes and is consistent with the recommendations for maintaining habitat for northern flying squirrels (Lehmkuhl et al. 2006a; Lehmkuhl et al. 2006b) and woodrats in inland forests, while managing for fire and healthy forest ecosystems. Additionally, prescribed fires and under thinning would create a patchwork of small openings within the forest that support mature hardwoods and a variable understory of hardwoods and shrubs used by woodrats and other prey. Denser forest (at least 60 percent canopy cover), with numerous large snags and large CWD, would remain widespread and continue to provide habitat for flying squirrels.

Treatments under Alternative C would have the same effect, but 822 fewer acres would be treated because no temporary roads would be created for access to these acres.

Effects on NSO from Barred Owl Competition

It is unclear whether forest management has an effect on the outcome of interactions between barred owls and NSO (Gutiérrez et al. 2007). However, the proposed thinning and fuel reduction treatments are not likely to influence the outcome of such potential interactions because they would have limited effects on the factors most likely to be responsible for management-related outcomes: NSO habitat, habitat use, or prey species or prey availability. If barred owls were to out-compete NSOs in the LSR, it is very unlikely that the proposed fuel reduction activities would have influenced the outcome.

Effects on NSO Habitat and NSO in Areas Affected by Wildfire

Fire behavior modeling in the Eddy Gulch LSR Project Assessment Area showed a wildfire ignited in an Rx Unit would burn 62.5 acres with a low-intensity fire during a 3.5-day period. This would provide sufficient time for suppression forces to effectively contain and control that fire, leaving potential owl habitat with an underburn and creating minimal disturbance or effects on existing owl habitat. Wildfires ignited in FRZs would be controlled and contained at smaller sizes. Wildfires allowed to burn under an appropriate management response could be larger. It is unknown how much of the area affected by a crown fire would be NSO habitat. Under either scenario, 10 NSO core areas (5,000 acres) would not be adversely affected in treated areas but are more likely to experience more low- to moderate-intensity surface fires based on the fire model (refer to Table 4). Ten core areas (5,000 acres) may still be adversely affected in untreated areas and would continue to be susceptible to loss of habitat if affected by a crown fire.

Effects on NSO under Alternative C are very similar to Alternative B, except 1.03 miles of temporary roads would not be constructed, 99 acres of M Units and 822 acres in Rx Units would not be treated. Without temporary roads only two NSO core areas would be treated differently than under Alternative B. KL1028 would have fewer acres treated (less than 400 acres) with prescribed fire and thus would leave greater than 80 percent of the core area and nesting/roosting habitat at risk of a crown fire, as well as the activity center. If a wildfire were to occur, approximately 81 percent of the 400 acres that would not be treated would be subject to a crown fire, substantially removing that habitat. Under Alternative C, KL1032 approximately 10 percent of foraging habitat and 1 percent of nesting/roosting habitat, which is along or over a ridgetop from the activity center, would not be treated and could be subject to a crown fire. However, loss of such a small portion of the core area in KL1032 is not likely to affect a nesting pair or the status of the activity center. Fire brands from crown fires in untreated areas could land in other untreated areas, which could escape initial attack and adversely affect other NSO core areas or NSO Critical Habitat.

Effects on Northern Spotted Owl Critical Habitat

Approximately 16.2 additional acres of nesting/roosting Critical Habitat (outside of existing home ranges) would be downgraded to foraging habitat as a result of treatments in M Units (refer to Table 4); the total of 52.6 acres of nesting/roosting habitat downgraded within the entire Assessment Area represents less than 0.5 percent of existing nesting/roosting habitat within the entire CHU subunit 35. Treatments to all 52.6 acres of nesting/roosting habitat are scattered throughout 13 M Units and range in habitat patch size from 0.2 acre to 14.5 acres. These treatments will result in a decrease in basal area (trees greater than 10 inches dbh, ranging from 140 to 206), a decrease in canopy cover (ranging from 37 percent in mid-successional white fir habitats to 50 percent in late-successional Douglas fir and mixed-conifer habitats), and reducing the trees per acre over 24 inches dbh (ranging from 6 in mid-successional to 28 in late-successional habitat). The decreases in basal area, canopy cover, and trees per acre (over 24 inches dbh) are all relatively minor changes from existing conditions and are not considered habitat downgrading. Please refer to Table 6 in the Eddy Gulch LSR Silviculture Report (2009) for further details.

Approximately 200 additional acres of foraging Critical Habitat would be modified by the proposed treatments. The total of 319.5 acres of foraging habitat modified by thinning activities represents 3 percent of existing foraging habitat in the Assessment Area, and approximately 2 percent of the total foraging habitat within the CHU. However, silvicultural prescriptions are designed to retain habitat function in these stands post-treatment. Treatments in 91 acres of foraging habitat in mid-successional Douglas-fir stands would result in basal area of 140 square feet per acre, canopy cover of approximately 48 percent, and 6 trees per acre over 24 inches dbh. All other treatments would retain approximately 200 square feet basal area per acre, greater than 12 trees per acre over 24 inches dbh, and trees greater than 20 inches dbh. In addition, because the patches of foraging habitat to be modified are along ridgetops and are widely dispersed in less than 1-acre to 59-acre patches across the Assessment Area (refer to Table 4 above), fuel reduction activities are not expected to affect the ability of the LSR or the Scott and Salmon Mountains CHU subunit 35 to provide NSO foraging opportunities or create barriers to intra-provincial connectivity. Thinning in red fir and some other stands may target trees heavily infected by dwarf mistletoe, but mistletoe removal is not likely to affect NSO habitat use or prey densities because mistletoe would remain widespread on the landscape.

NSO dispersal is common and widespread throughout the Assessment Area and is not considered to be a limiting factor. All habitat that is currently classified as dispersal will remain dispersal habitat under the proposed treatments; no treatment will drop canopy cover to below 33 percent (in red fir stands) to 54 percent (in Douglas fir stands), and basal area will not drop below 183 square feet per acre for trees over 10 inches dbh.

Treated stands would be more resistant to large-scale fires but would burn with sufficient intensity to create small openings (less than 1 acre) in untreated patches. This type of pattern, which would create a mosaic of stands in different successional stages, would be consistent with patterns under historic fire regimes; such patterns would likely enhance Critical Habitat function by providing horizontal diversity of habitat across the landscape (Franklin et al. 2000; Irwin et al. 2007). Treated stands that may burn under future conditions are not expected to affect the overall suitability of existing habitat.

Effects would be the same as those under Alternative B, except approximately 30 acres of foraging that were treated in M Units under Alternative B are outside of any NSO core area and found only within home ranges that had an excess of foraging habitat and were never considered to be an effect on Critical Habitat.

Over time prescribed fires are expected to enhance the function of Critical Habitat within CHU25. Prescribed fire treatments would benefit Critical Habitat by reducing fuels to a level that would decrease the likelihood of a crown fire. Fire would still burn with sufficient intensity to create small openings in untreated areas. This type of pattern would be consistent with patterns under historic fire regimes and is consistent with the recommendations for maintaining habitat for northern flying squirrels (Lehmkuhl et al. 2006a; Lehmkuhl et al. 2006b) and woodrats in inland forests, while managing for fire and healthy forest ecosystems. Additionally, prescribed fires would create a patchwork of small openings within the forest that support mature hardwoods and a variable understory of hardwoods and shrubs used by woodrats and other prey. Denser forest (at least 60 percent canopy cover), with numerous large snags and large CWD, would remain widespread and continue to provide habitat for prey species.

Treatments under Alternative C would have the same effect; however, 822 fewer acres would be treated because no temporary roads would be created for access to these acres. These 822 acres of Critical Habitat that were treated under Alternative B would not be treated under Alternative C and would thus be subject to a higher fire danger and potential loss.

Effects on Critical Habitat from other proposed project activities, such as road construction, are expected to be minimal. Under Alternative B the construction of 1.03 miles of new temporary roads would create a loss of approximately 0.60 acre of foraging habitat and 0.02 acre of habitat classified as nesting/roosting. However, based on the physiographic features of the locations of the 0.62 acre, it is more likely to function as dispersal habitat. The roads will be closed (ripped and mulched, as needed) following treatment, so no long-term effects are expected on Critical Habitat. No new landings are proposed, and existing landings will not be expanded under Alternatives B and C, thus no long-term effects on Critical Habitat are expected.

Alternative C would be similar to Alternative B; however, the 1.03 miles of temporary roads would not be constructed—this will result in 30 fewer acres being treated. These 30 acres of Critical Habitat that were treated in M Units under Alternative B would not be treated under Alternative C and would thus be subject to a higher fire danger and potential loss.

Late-successional habitat will not be removed during project activities. Thinning and fuel reduction treatments have been designed to minimize the removal of trees greater than 20 inches dbh, and all prescriptions retain adequate canopy cover in existing NSO habitat, and LSRA recommendations for snag and CWD retention are followed. Thus, the project is not expected to affect connectivity of late-successional habitats or the ability of the Eddy Gulch LSR to provide a functional, interactive, late-successional forest.

Cumulative Effects on NSOs and Critical Habitat

Alternatives B and C, combined with local community fuel reduction projects, including the proposed fuelbreak system west of Black Bear Ranch, would further decrease the risk of high-intensity fire inside and near the Eddy Gulch LSR. The other proposed or anticipated actions include the installation of a fiber-optic line and road maintenance and, when combined with Alternative B or C, would cause no cumulative effects on NSOs, Critical Habitat, or NSO prey beyond the project's direct and indirect effects.

There are approximately 28,797 acres of suitable NSO habitat in the portion of the Scott and Salmon Mountains CHU subunit 35 contained in Eddy Gulch LSR. Cumulatively, the project would affect the Scott and Salmon Mountains CHU subunit 35 by removing less than 0.5 percent of the existing nesting/roosting habitat and modifying 2 percent of the existing foraging habitat in this subunit; all of these acres would continue to function as foraging habitat. Due to the limited effects on the PCEs, Alternatives B and C would not significantly increase the cumulative effects on the CHU regardless of other reasonably foreseeable future actions, including installation of a fiber optic line, North Fork road maintenance, and the fuelbreak system west of Black Bear Ranch. Reducing fuel levels would have long-term beneficial effects on Critical Habitat by reducing the risk of stand-replacing fire in the landscape.

The cumulative effects on NSOs under Alternative C are similar to Alternative B, except additional habitat could be burned during a wildfire if that fire occurred in one of the untreated areas.

Determination for the Northern Spotted Owl

Based on the above assessment of direct, indirect, and cumulative effects, it is my determination that implementation of the proposed project "may affect, but is not likely to adversely affect NSOs." This determination is based on the following factors:

1. No nesting/roosting or foraging habitat in 0.5-mile core areas will be removed or downgraded.

2. Less than 0.5 percent of existing nesting/roosting habitat within the Action Area will be downgraded to foraging habitat.

3. Three percent of foraging habitat will be modified within the Action Area, but it will retain its function as foraging habitat. The majority of foraging habitat to be modified occurs in the outer portion of estimated NSO home ranges, outside of the estimated breeding season home range.

4. Dispersal habitat is not likely to be limited, and dispersal habitat within the Action Area will not be downgraded or removed.

5. Effects on NSO prey species are expected to be minimal or of short duration.

6. Project design features minimize the likelihood that NSOs will be killed or injured during project implementation or that normal breeding behaviors will be disrupted by noise or smoke.

Determination for Northern Spotted Owl Critical Habitat

Based on the above assessment of direct, indirect, and cumulative effects, it is my determination that implementation of the proposed project "may affect, but is not likely to adversely affect NSO Critical Habitat." This determination is based on the following factors:

1. Less than 0.5 percent of nesting/roosting habitat within the CHU subunit 35 will be downgraded to foraging habitat.

2. Two percent of foraging habitat will be modified within the CHU subunit 35 but will retain its function as foraging habitat.

3. Dispersal habitat is not likely to be limited, and dispersal habitat within the CHU subunit 35 will not be downgraded or removed.

4. Effects on the PCEs of Critical Habitat are expected to be minimal and will not affect the nesting, roosting, foraging, and dispersal opportunities for NSOs within CHU subunit 35.

VIII. Forest Service Sensitive Species

Tehama Chaparral Snail

Tehama chaparral snails are closely associated with talus, rock outcrops, or caves with subsurface moisture (Weasma 1999; Duncan et al. 2003). When environmental conditions are favorable, they may emerge from their refugia and occur under leaf litter, particularly deciduous leaf litter, and woody debris in forested habitat (Weasma 1999; Duncan et al. 2003). The Tehama chaparral snail is known to occur in only four northern California counties (Siskiyou, Shasta, Tehama, and Butte). The Tehama chaparral is not known to occur in the Eddy Gulch LSR, but Duncan et al. (2003) lists the Salmon River Ranger District within the species' range.

Alternative A

Direct and Indirect Effects. There would be no measurable direct effects on Tehama chaparral in areas affected by wildfires because the species lives in moist talus, especially during the dry season when fires are most likely. Negligible to moderate indirect effects could be expected to occur, depending on the location and severity of wildfire. Their habitat is generally resistant to fire, but extensive loss of forest surrounding talus slopes and rocky areas could lead to conditions that are too dry and inhospitable for the species. There would be no direct or indirect effects on the Tehama chaparral in areas not affected by wildfire.

Cumulative Effects. There are no other proposed or anticipated actions that would combine with Alternative A to cause cumulative effects on the Tehama chaparral or its habitat beyond the project's direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating in the Assessment Area.

Alternatives B and C

Direct and Indirect Effects. The action alternatives would have similar effects on Tehama chaparral and are discussed together except where specifically stated otherwise.

No direct effects are anticipated to the Tehama chaparral or its habitat. The animals are likely to be subsurface during the burning season, and no fuel reduction activities are proposed that would significantly affect conditions on talus. Thinning and fuel reduction treatments are expected to have a beneficial indirect effect by substantially reducing the chances and extent of stand-replacing fires, which can remove riparian vegetation and lead to increased temperatures and desiccation. Large-diameter shade trees and CWD would increase over the long-term as a result of Alternatives B and C.

The construction of 1.03 miles of new temporary roads (disturbing 1.7 acres) is not expected to have any significant effect on the species because all temporary roads are on ridgetops or near-ridgetop locations, and the amount of disturbance is small at the landscape level. All of the temporary roads would be closed using normal erosion control measures (ripped and mulched, as needed). Implementation of hazard tree removal is not expected to have any effect on the overall amount of suitable habitat for these species because the removal of a few scattered trees will not affect canopy shade.

Cumulative Effects. The action alternatives, alone or combined with fuel reduction projects on private lands (detailed in Section 3.1.4 of the Eddy Gulch LSR EIS), which will not be removing habitat, would decrease the risk of high-intensity fire in and near the Assessment Area. No other ongoing or reasonably foreseeable future actions within the Assessment Area would combine to create any significant cumulative effects on the Tehama chaparral or its habitat.

Determination. Based on the above assessment of direct, indirect effects, it is our determination that implementation of the proposed project "may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability" for the Tehama chaparral or its habitat. This determination is based upon the following:

1. No fuel reduction activities are proposed that would affect talus or rocky refugia.
2. Prescribed fire could affect shading or litter layers near talus, although these effects are not expected to be significant.
3. Fuel reduction activities are expected to protect tree canopy that shades rocky refugia.

Southern Torrent Salamander

The southern torrent salamander is known to occur from Point Arena, Mendocino County, to the Oregon border (Jennings and Hayes 1994). It is restricted to seeps, small streams, and waterfalls in wet or mesic coastal old-growth habitats; adults are extremely sensitive to desiccation (to remove moisture from). Its known elevational range extends from near sea level to about 5,000 feet (Stebbins 2003). Currently, this salamander is restricted to five counties (Siskiyou, Del Norte, Trinity, Humboldt, and Mendocino) in northwestern California, including the lower Salmon River watershed (NatureServe 2008).

Aquatic or mesic habitat suitable for southern torrent salamanders is widely distributed in the Assessment Area's Riparian Reserves. The status of the salamander in the Assessment Area is unknown, but the west end of the Eddy Gulch LSR is near the eastern limit of the species' known range.

Alternative A

Direct and Indirect Effects. Wildfire is not likely to directly affect individuals because southern torrent salamanders are rarely found away from aquatic habitat. However, fire could consume forest canopy that is an important component of the salamander's habitat. The loss of forest canopy would result in indirect effects that would vary with fire intensity. Areas that burn with high intensity are likely to contribute sediment to streams. This sediment could fill interstitial spaces in coarse substrate that are used for cover by this species. Loss of vegetation that results in reduced shading may adversely affect the salamander, and perhaps small populations, because adults prefer cold, clear streams and are known to have a narrow range of preferred water temperatures (Welsh and Lind 1996). The loss of CWD and litter layer would reduce available cover for any individuals that may move out of aquatic habitat.

In the absence of wildfire there would be no direct effects on salamanders. Over the long term, however, indirect effects could result as succession continues and the amount of late-successional habitat increases, providing benefits to the southern torrent salamander's preferred habitat. Large diameter shade trees, CWD, and the litter layer would continue to slowly increase as a result of the Alternative A.

Cumulative Effects. There are no other proposed or anticipated actions that would combine with Alternative A to cause cumulative effects on the southern torrent salamander or its habitat beyond the project's direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating in the Assessment Area.

Alternative B and C

Direct and Indirect Effects. The action alternatives would have similar effects on southern torrent salamander and will be discussed together.

Thinning and mastication would not have any direct effects on the southern torrent salamander because its habitat is protected by design standards and resource protection measures designed to minimize effects on aquatic habitats and Riparian Reserves. Prescribed fires that burn in Riparian

Reserves may reduce vegetative cover, but limited low-intensity fire in Riparian Reserves is not likely to affect individuals because they are not likely to occur in terrestrial habitats that would be affected by fire. Direct effects from road-related activities are highly unlikely because all temporary roads are on ridgetops or near-ridgetop locations. No proposed roads are near Riparian Reserves, none require any stream crossing structures, none traverse unstable slopes, and none are proposed on granitic or similarly noncohesive soils. All of the temporary roads would be closed using normal erosion control measures (ripped and mulched, as needed).

Thinning and fuel reduction treatments are expected to have a beneficial indirect effect in the long-term on southern torrent salamander by reducing the chances and extent of stand-replacing fires (to approximately 10 percent of existing conditions), which can remove riparian vegetation and lead to increases in stream temperature and sedimentation. Large-diameter shade trees and CWD would increase over the long term.

The indirect effects on the southern torrent salamander from temporary road construction and fuel reduction activities would be negligible because any sedimentation would be minimized by the retention of buffers around all Riparian Reserves. These buffers, as well as Best Management Practices (BMPs), would minimize the sediment load that could reach stream channels.

Cumulative Effects. The action alternatives, alone or combined with local community fuel reduction projects, would decrease the risk of high-intensity fire in and near the Assessment Area. No other ongoing or reasonably foreseeable future actions within the Assessment Area would combine to create any significant cumulative effects on the southern torrent salamander or its habitat.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project “may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability” for the southern torrent salamander or its habitat. This determination is based upon the following:

1. Fuel reduction activities are designed to avoid effects on aquatic habitats.
2. Siltation of aquatic habitat is not expected but may occur locally in the short-term.
3. Fuel reduction treatments are expected to protect suitable aquatic habitats by prevent stand-replacing fires in Riparian Reserves.

Cascades Frog

Cascades frogs are associated with still or slow-moving montane aquatic habitats to over 7,000 feet elevation (Jennings and Hayes 1994; Stebbins 2003). Cascade frogs are closely restricted to water, which may include marshes, ponds, lakes, ephemeral pools, potholes in meadows, and along small creeks (Stebbins 2003). They are most often found in meadows or in open coniferous forests (Leonard et al. 1993; Stebbins 2003), and sites used for reproduction appear to require direct sunlight for several hours a day (Leonard et al. 1993; Jennings and Hayes 1994). Cascades frogs are particularly vulnerable to population reductions by predatory fish, including salmonids (Jennings and Hayes 1994; Welsh and Pope 2004).

Aquatic habitat suitable for Cascades frogs in the Assessment Area is absent or very limited. No mapped or unmapped ponds, lakes, or marshes have been found on federal land, and there is only one known pond on private land. Almost all streams are characterized by steep gradients or, in low-gradient reaches, have dense shade or contain salmonids. It is unlikely that the Cascade frog occurs in the Assessment Area, but its presence cannot be ruled out. Suitable habitat can be found in still waters adjacent to the Assessment Area, and populations are known to occur in the Trinity Alps, Marble Mountain, and Russian wilderness areas near or adjoining the Eddy Gulch LSR (Jennings and Hayes 1994; Welsh and Pope 2004). However, due to the limited habitat available for this species, there is only a low potential for it to occur in the Assessment Area.

Alternative A

Direct and Indirect Effects. Wildfire is not likely to directly affect individuals because the Cascades frog is rarely found away from aquatic habitat during the fire season. Fire would not directly affect aquatic habitats used by these species, but it could remove shoreline vegetation, which is sometimes used by frogs fire. The indirect effects of fire would vary with fire intensity. Areas that burn with high intensity are likely to contribute sediment to aquatic habitats that could suffocate egg masses and/or tadpoles or reduce the macro-invertebrate prey base. This is generally more likely in low-gradient reaches where sediment may accumulate. Sedimentation could also reduce pond longevity. Loss of vegetation that results in reduced stream shading, especially in areas that are now densely shaded, may benefit the Cascades frog because adults require basking sites for thermoregulation, and increased stream temperatures may benefit larval or juvenile development.

In the absence of wildfire, and with no fuel reduction activities under the no-action alternative, there would be no direct or indirect effects on the Cascades frog or its habitat.

Cumulative Effects. There are no other proposed or anticipated actions in upland areas that would combine with Alternative A to cause cumulative effects on the Cascades frog or its habitat beyond the project's direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating in the Assessment Area.

Alternative B and C

Direct and Indirect Effects. The action alternatives would have similar effects on the Cascades frog and will be discussed together.

Thinning and mastication would not have any direct effects on the Cascades frog because its habitat is protected by design standards and resource protection measures designed to minimize effects on aquatic habitats and Riparian Reserves. Prescribed fires that burn in Riparian Reserves may reduce vegetative cover, but limited low-intensity prescribed fire in Riparian Reserves is not likely to affect frogs because they are not likely to occur in terrestrial habitats that would be affected by fire. Direct effects from road-related activities are highly unlikely because effects are similar to those described for southern torrent salamander.

Fuel reduction activities are not expected to affect the amount of habitat along the edge of the Salmon Rivers or along the edge of private ponds. It is expected that underburning would not have a significant effect on shade within Riparian Reserves. The construction of temporary roads, followed by subsequent closure following thinning, may have negligible, short-term indirect effects on stream habitat as a result of the potential for sediment delivery to streams within the Assessment Area.

Implementation of BMPs and protection measures for fish would eliminate any potential downstream effects (in the Salmon Rivers) of sedimentation from roadwork. There would be no indirect effects on Cascades frog habitat as a result of sedimentation.

Reduced fire frequency promoted by the proposed treatments may reduce fire-return intervals below historical intervals and reduce habitat available for species such as the Cascades frog that benefits from sunlight on aquatic habitats.

Cumulative Effects. The action alternatives, alone or combined with local community fuel reduction projects, would decrease the risk of high-intensity fire in and near the Assessment Area. No other ongoing or reasonably foreseeable future actions within the Assessment Area would combine to create any significant cumulative effects on the Cascades frog or its habitat.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project “may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability” for the Cascades frog or its habitat. This determination is based upon the following:

1. Fuel reduction activities are designed to avoid effects on aquatic habitats.
2. Siltation of aquatic habitat is not expected but may occur locally in the short-term.
3. Reduced fire frequency in riparian habitats may limit sunlit areas favored by frogs.

Foothill Yellow-legged Frog

Foothill yellow-legged frogs occur in streams and rivers with shallow riffle areas, pools, and at least some cobble-sized substrate (Nussbaum et al. 1983; Jennings and Hayes 1994) generally below 4,000 feet in elevation in northwestern California. Breeding occurs in shallow, slow-flowing water with at least some pebble and cobble substrate after high flows have receded (Fuller and Lind 1992; Leonard et al. 1993). Occupied streams typically have very low to moderate amounts of canopy cover, but sub-adults and adults usually occur where shading is at least 20 percent (Ashton et al. 1998).

Habitat that is structurally suitable for foothill yellow-legged frogs occurs in some of the Assessment Area’s streams, but the frog’s status there is unknown. Much of the Assessment Area is too high in elevation for foothill yellow-legged frogs, but lower-elevation perennial streams provide potential habitat. Streams in densely forested areas are unlikely to provide suitable habitat.

Alternative A

Direct and Indirect Effects. In the absence of wildfire, and with no fuel reduction activities under the no-action alternative, there would be no direct or indirect effects on the foothill yellow-legged frog or its habitat.

Wildfire is not likely to directly affect individuals because foothill yellow-legged frogs are rarely found away from aquatic habitat during the fire season. Fire would not directly affect aquatic habitats used by the species, but it could remove shoreline vegetation, which is occasionally used by foothill yellow-legged frogs. The indirect effects of fire would vary with fire intensity. Areas that burn with high intensity are likely to contribute sediment to aquatic habitats that could suffocate egg masses and/or tadpoles or reduce the macro-invertebrate prey base. This is generally more likely in low-gradient reaches where sediment may accumulate. Loss of vegetation that results in reduced stream shading, especially in areas that are now densely shaded, may benefit the species because adults require basking sites for thermoregulation, and increased stream temperatures would likely benefit larval or juvenile development, especially near the species' upper elevational limit.

Cumulative Effects. There are no other proposed or anticipated actions in upland areas that would combine with Alternative A to cause cumulative effects on the foothill yellow-legged frog or its habitat beyond the project's direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating in the Assessment Area.

Alternative B and C

Direct and Indirect Effects. The action alternatives would have similar effects on the foothill yellow-legged frog and will be discussed together.

Thinning and mastication would not have any direct effects on the foothill yellow-legged frog because its habitat is protected by design standards and resource protection measures designed to minimize effects on aquatic habitats and Riparian Reserves. Limited low-intensity prescribed fire in Riparian Reserves is not likely to affect foothill yellow-legged frogs because they are not likely to occur in terrestrial habitats that would be affected by fire. Direct effects from road-related activities are highly unlikely because effects would be similar to those described for southern torrent salamander.

Fuel reduction activities are not expected to affect the amount of suitable aquatic habitat. The construction of temporary roads, followed by subsequent closure following thinning, may have negligible, short-term indirect effects on stream habitat as a result of the potential for sediment delivery to streams within the Assessment Area. Implementation of BMPs and resource protection measures for fish would eliminate any potential downstream effects of sedimentation from roadwork. Limited low-intensity prescribed fire in Riparian Reserves is not likely to affect habitat for foothill yellow-legged frogs because such fires are not likely to affect aquatic habitat or substantially affect stream shading.

Thinning and fuel reduction treatments may have a minor beneficial indirect effect on foothill yellow-legged frogs by reducing the chances and effects of sedimentation from stand-replacing fires. However, reduced fire frequency resulting from proposed treatments may reduce fire-return intervals below historical intervals and reduce habitat available for species such as the foothill yellow-legged frog that benefit from sunlight on aquatic habitats.

Cumulative Effects. The action alternatives, alone or combined with local community fuel reduction projects, would decrease the risk of high-intensity fire in and near the Assessment Area. No other ongoing or reasonably foreseeable future actions within the Assessment Area would combine to create any significant cumulative effects on the foothill yellow-legged frog or its habitat.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project "may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability" for the foothill yellow-legged frog or its habitat. This determination is based upon the following:

1. Fuel reduction activities are designed to avoid effects on aquatic habitats.
2. Siltation of breeding habitat is not expected but may occur locally in the short-term.
3. Reduced fire frequency in riparian habitats may limit sunlit areas favored by frogs.

Western Pond Turtle

Western pond turtles occur in many low-gradient aquatic habitats up to about 5,000 feet in northern California. They typically select ponds or slow-moving water with many basking sites and aquatic vegetation. Upland nest sites typically have clay or silt substrate and a south-facing aspect. The pond turtle is known to nest up to 1,320 feet from aquatic habitat (Jennings and Hayes 1994) but usually nests much closer (within 600 feet). Reese and Welsh (1997) reported that individuals moved an average of approximately 600 feet from water to their over-wintering sites. Western pond turtles have also been reported to hibernate in mud.

Aquatic habitat suitable for pond turtles is very limited in the Assessment Area. No mapped or unmapped ponds, lakes, or marshes have been found, and most streams are characterized by steep gradients or, in low-gradient reaches, by dense shade; neither condition is suitable for pond turtles. The most likely habitat for pond turtles in the Assessment Area is along the North and South Forks of the Salmon River (approximately 4 miles) and in ponds on private property (only one has been identified on private property in the Assessment Area).

Alternative A

Direct and Indirect Effects. In the absence of wildfire, and with no fuel reduction activities under the no-action alternative, there would be no direct or indirect effects on the western pond turtle or its habitat.

Wildfire is not likely to directly affect individuals because the western pond turtle is rarely found away from aquatic habitat during the fire season; however, depending on the timing of the fire, a wildfire could harm turtles near upland nest sites. Fire would not directly affect aquatic habitats used by the species. The indirect effects of fire would vary with fire intensity. Areas that burn with high intensity are likely to contribute sediment to aquatic habitats that could reduce the prey base. Sedimentation could also reduce pond longevity. Loss of vegetation that results in reduced stream shading may benefit the western pond turtle because adults require basking sites for thermoregulation, and increased stream temperatures would likely benefit juvenile development, especially near the species' upper elevational limit. The loss of habitat components (such as large CWD) could remove basking sites, but recruitment of CWD and reduced vegetation would potentially create more basking sites and upland nest sites, especially in areas that are now densely shaded.

Cumulative Effects. There are no other proposed or anticipated actions in upland areas that would combine with Alternative A to cause cumulative effects on these species or their habitat beyond the project's direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating in the Assessment Area.

Alternatives B and C

Direct and Indirect Effects. The action alternatives would have similar effects on the western pond turtle and will be discussed together.

Thinning and mastication would not have any direct effects on the western pond turtle because its habitat is protected by design standards and resource protection measures designed to minimize effects on aquatic habitats and Riparian Reserves. Prescribed fires that burn in Riparian Reserves may reduce vegetative cover, but limited low-intensity prescribed fire in Riparian Reserves is not likely to affect turtles because they are not likely to occur in terrestrial habitats that would be affected by fire. Treatments on land adjacent to Riparian Reserves may affect upland turtle nest sites, although these effects should be rare events because turtles select open areas dominated by grasses and herbaceous annual plants, and fuel reduction activities would be focused on forest or shrub habitats on forested ridges. Direct effects from road-related activities are highly unlikely because effects are similar to those described for southern torrent salamander.

Fuel reduction activities are not expected to affect the amount of habitat along the edge of the Salmon Rivers or along the edge of private ponds. Underburns would not be expected to have a significant effect on shade within Riparian Reserves but, depending on the season, may affect upland nesting habitat in the short term. The construction of temporary roads, followed by subsequent closure following thinning, may have negligible, short-term indirect effects on stream habitat as a result of the potential for sediment delivery to streams within the Assessment Area. Implementation of BMPs and protection measures for fish would eliminate any potential downstream effects (in the Salmon Rivers) of sedimentation from roadwork. However, sedimentation of riverine habitats is not likely to be harmful to turtles.

Alternatives B and C support habitat components of late-successional forests that would provide for increased CWD and thus potential basking structure for the pond turtle over the long-term. However, reduced fire frequency promoted by the proposed treatments may reduce fire-return intervals below historical intervals and reduce habitat available for species such as the western pond turtle that benefits from sunlight on aquatic habitats.

Cumulative Effects. The action alternatives, alone or combined with local community fuel reduction projects, would decrease the risk of high-intensity fire in and near the Assessment Area. No other ongoing or reasonably foreseeable future actions within the Assessment Area would combine to create any significant cumulative effects on the western pond turtle or its habitat.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project “may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability” for the western pond turtle or its habitat. This determination is based upon the following:

1. Fuel reduction activities are designed to avoid effects on aquatic habitats.
2. Upland nest sites could be harmed by fuels reduction activities.
3. Siltation of aquatic habitats is not likely to be harmful.
4. Reduced fire frequency may reduce the availability of upland and aquatic habitat.

Bald Eagle

Bald eagles breed near large, open bodies of water that provide a dependable supply of fish and other prey, such as water birds. Most nests are in large trees less than 0.5 mile from the main water body, and almost all nest sites are less than 2.0 miles (Lehman 1979), provide commanding views, and are buffered from human activities. Migrant and wintering bald eagles are also usually found near water but may occur any place there is relatively little human activity and available prey—primarily injured waterfowl, carrion (including dead cattle), and fish. Wintering bald eagles may roost communally in sheltered stands of large trees.

The nearest reported nest sites are along the Klamath and Trinity rivers (CNDDB 2008), and there are bald eagle management areas in the Happy Camp and Oak Knoll Ranger Districts along the Klamath River. There are no known nest or roost sites in or near the Assessment Area. Bald eagles could potentially nest within 2 miles of the lowest reaches of the South and North Forks of the Salmon River because the upper reaches of the rivers are too small to support breeding eagles, but the wider and deeper lower reaches may provide a dependable prey base. Potential nest sites are abundant in the Assessment Area; however, the distance to foraging habitat reduces the likelihood of occurrence to low.

Alternative A

Direct and Indirect Effects. Direct effects would result if wildfire were to kill young eagles unable to escape the nest or roost area. Fire could also consume large nest trees or nesting habitat. Areas that burn with high intensity could lead to increased sedimentation and, in turn, affect prey (fish) adversely; however, this indirect effect would be a short-term and negligible. In the absence of wildfire, and with no fuel reduction activities under the no-action alternative, there would be no direct or indirect effects on the bald eagle or bald eagle habitat.

Cumulative Effects. The no-action alternative would not provide for the long-term protection of nesting habitat from stand-replacing fire. Large-scale changes in stream conditions that could reduce prey availability are possible but unlikely. No other effects are expected as a result of ongoing or future projects.

Alternatives B and C

Direct and Indirect Effects. The action alternatives would have similar effects on the Bald eagle and will be discussed together except where specifically stated otherwise.

No direct effects are expected to occur from implementation of Alternative B or C. Fuel reduction activities could potentially affect bald eagles through the production of fire, smoke, and visual and noise disturbance near their nests. There are no known nests, but if a new nest is discovered, a seasonal restriction of January 1 to August 31 would protect eagles from all activities that that modify habitat within 0.5 mile, or that create smoke or noise above ambient levels within 0.25 mile of any nest sites that are discovered within the Assessment Area.

Thinning and other fuel reduction treatments are not likely to directly affect bald eagle habitat because there is only one FRZ (FRZ 7) within 2 miles of potential foraging habitat, and no M Units or other overstory thinning would occur in FRZ 7. Understory treatments would not be expected to affect bald eagle habitat.

Thinning and fuel reduction treatments may have beneficial indirect effect by reducing the potential loss of nest trees or nest stands from higher-intensity fires and by reducing potential sedimentation effects on foraging habitat from stand-replacing fires. Thinning and mastication would not cause sedimentation of the Salmon River because Klamath LRMP Standards and Guidelines would be followed, including Riparian Reserve buffers and implementation of BMPs.

Cumulative Effects. The action alternatives, alone or in concert with other ongoing or reasonably foreseeable future actions in or near the Assessment Area, are not expected to cause any cumulative effects on bald eagles, their habitat, or prey. Combined with local community fuel reduction projects, which will not be removing habitat, Alternative B and C would decrease the risk of high-intensity fire in and near the Assessment Area. No other actions would combine to create any significant effects.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project “may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability” for the bald eagle or its habitat. This determination is based upon the following:

1. No bald eagles are currently known or suspected of nesting in the Assessment Area.
2. If found, nesting eagles would be protected by project design criteria.
3. Fuel reduction activities are not likely to affect the bald eagle prey base.

Northern Goshawk

Northern goshawks are found in mid- to late-successional conifer forests; nest stands are usually characterized by a canopy cover that exceeds 50 percent, level terrain or “benches” of gentle slope, northerly aspects, proximity to water (usually less than one-third mile away), patches of larger trees, and proximity to meadows or forest openings. Telemetry studies suggest that foraging individuals avoid dense young forest stands and brush but use a wide variety of stand conditions, showing some preference for relatively mature stands with moderate canopy closure (Austin 1993; Hargis et al. 1994; Beier and Drennan 1997; Drennan and Beier 2003).

There are approximately 28,797 acres of suitable nesting habitat in the Assessment Area and five Goshawk Management Areas (GOMAs) with 1.0-mile home ranges that overlap the Assessment Area (Table 6). Two new goshawk territories were found in 2008 during the first large-area, protocol-level goshawk surveys in the Assessment Area (Herrera 2008). Klamath LRMP Standards and Guidelines specify that these GOMAs and active territories maintain 300 acres of dense mature forest within a 0.5-mile Primary Nest Zone and 900 acres in a mosaic of mid- to late-successional forest conditions in a 1.0-mile Foraging Habitat Zone.

Table 6. Northern goshawks in the Eddy Gulch LSR Project Assessment Area.

Territory	GOMA Established	Latest Survey/Status[a]	Prior Occurrence/ Reproduction	Home Range Overlaps Assessment Area	Home Range Overlaps an FRZ
Eddy Gulch	Yes-SAR1	2008/U	1991/1991	Yes	No
Matthews	Yes-SAR8	2008/U	1987/1987	Yes	No
Sixmile	Yes-SAR11	2008/U	1987/R	Yes	Yes
West Fork Whites	Yes-SAR14	1989/R	None	Yes	Yes
Blue Ridge Ranch	No	1994/R	1993/1993	No	No
Callahan Creek	No	1994/R	None	No	No
Russian River	Yes-SAR 13	2008/U	Unknown	Yes	No
Lower Shadow Creek	No	2008/R	2007/R	Yes	Yes
Lower Butcher Creek	No	2008/U	None	Yes	No

Notes:

a. R = reproducing (including number of fledged if known); U = unknown.

Alternative A

Direct and Indirect Effects. The modeled fire would have various effects on northern goshawks, northern goshawk habitat, and prey depending on the location, season, intensity, and pattern of the fire. Fire or smoke may injure or kill northern goshawks, most likely during the nesting season when young birds may be unable to escape the nest or roost area. Direct effects would result if moderate- to high-intensity wildfire could reduce suitability of northern goshawk nesting, roosting, or foraging habitat, and extensive loss of snags, CWD understory, and litter and duff layers reduces prey abundance. Based on the modeled wildfire of 7,200 acres, up to 5,832 acres (81 percent) of the forested habitat could be removed or adversely affected. Depending on the exact location of the fire, this habitat loss would most likely cause adverse effects on or abandonment of one or more activity centers.

The modeled fire would cause various indirect effects. Excessive habitat loss in a core area and/or home range would most likely cause abandonment of one or more activity centers during or shortly following fire (although changes in goshawk occupancy may be delayed if some habitat remains following fire or if tree mortality is delayed; delayed mortality is common in low- to moderate-severity fire). Moderate- to high-intensity fire would initiate successional changes that could increase the probability of future stand-replacing fire as forest is replaced with brush fields and dense young forest. Low- to moderate-intensity fire could benefit northern goshawks by reducing the likelihood of future stand-replacing fire and by creating a mosaic of openings that would invigorate forest understory and create prey habitat.

In the absence of wildfire, and with no fuel reduction activities under the no-action alternative, there would be no actions that would directly affect northern goshawks or their habitat. The amount or quality of northern goshawk habitat in the Assessment Area would change slowly in areas not affected by wildfire. The continued forest growth could result in either beneficial or adverse indirect effects, depending on local conditions. In relatively young or open stands, continued forest growth would benefit nesting habitat for northern goshawks by allowing for a slow increase in tree size, basal area, and canopy cover. It could also decrease fire risk as maturing stands develop a moister microclimate. In most other stands, continued growth would increase stand density, density-related tree mortality, fuel hazards, and the probability of a stand-replacing fire. Continued growth could also make some stands too dense for northern goshawks and reduce overall stand diversity.

Cumulative Effects. There are no proposed or anticipated actions that would combine with Alternative A to cause cumulative effects on the northern goshawk or its habitat beyond the project's direct and indirect effects discussed above. Continued forest growth may increase northern goshawk habitat in some areas, but fire hazard would increase in proportionally larger areas. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating in the Assessment Area.

Alternatives B and C

Direct and Indirect Effects. The action alternatives would have similar effects on northern goshawks and will be discussed together except where specifically stated otherwise.

Fuel reduction activities are generally designed to avoid downgrading existing habitat. However, thinning in M Units, and, to a much lesser extent, prescribed burning and mastication, would reduce canopy cover below 50-60 percent. This is likely to remove 931 acres (3 percent) of potential nesting habitat under Alternative B (832 acres under Alternative C), although stands on ridges, where M Units are located, are less likely to be selected by breeding goshawks than more favorable locations on the landscape such as near streams. Limited thinning outside of nest areas is also unlikely to affect goshawk occupancy of historic nest stands. All treated stands would retain their function as foraging habitat.

The construction of 1.03 miles of temporary roads under Alternative B would create a loss of less than one acre of forested habitat; additionally, these roads are scattered, thus habitat losses are small and dispersed and the roads would be closed (ripped and mulched, as needed) following thinning and thus become available as habitat over the long term. No temporary roads are proposed in or near known goshawk activity centers.

The 1.0-mile home ranges of two GOMAs (Sixmile and West Fork Whites) and another activity center located during 2008 surveys (Shadow) lie within proposed FRZs. The proposed treatments would not harm any of these protected areas because thinning or other fuel reduction activities would retain foraging habitat and because nesting habitat would not be reduced to less than 300 acres in the one activity center for which mechanical treatments are proposed (approximately 37 acres within the Primary Nest Zone of the Shadow Creek territory). No overstory thinning is proposed for the West Fork Whites GOMA, with the exception of the removal of individual roadside hazard trees, which would not affect the number of acres of suitable habitat. Thinning prescriptions in the Sixmile GOMA ensure that thinned stands in the Foraging Habitat Zone would retain at least 40 percent canopy and all trees greater than 20 inches dbh, meeting KNF LRMP standards for goshawk FHZ.

Fuel reduction activities, primarily fire and mastication, may kill, injure, or displace prey. Although prey densities may be reduced in affected areas, treatments are designed to minimize effects on prey by limiting treatments to no more than 50 percent of the suitable NSO habitat within a year. Prescribed fire is also designed to leave a mosaic of burned and unburned areas so some shrubs and snags would remain to provide cover for prey species and minimize effects on goshawks.

Thinning and fuel reduction treatments are expected to benefit goshawk habitat by substantially reducing the forest's susceptibility to stand-replacing crown fires. Fire would still burn with sufficient intensity to create small openings within forested habitat. This type of pattern, which would create a mosaic of stands in different successional stages, would be consistent with patterns under historic fire regimes. This pattern would likely benefit goshawks by providing horizontal diversity of habitat across the landscape.

Fuel reduction treatments would cause changes in the amount and/or types of snags, CWD, understory vegetation including small trees, and prey. Treatments would remove or consume many existing snags and hazard trees, but effects on northern goshawks would be negligible because prescribed burning would create some new snags and seasonal restrictions would apply to all treated areas within historic or additional sites within the Assessment Area (please refer to the resource protection measures in Section 2.9.1.2 in Chapter 2 of the Eddy Gulch LSR EIS). Most understory vegetation would also be removed in fuel reduction areas. Fuel reduction activities would have little effect on canopy cover because burning would remove smaller trees that do not substantially contribute to canopy cover in the overstory. Mastication will not remove trees greater than 10 inches dbh, and burning will not remove trees greater than 4 inches dbh. Emergency Access Routes are hand treatments along sides of roads, and hazard tree removal would follow pre-approved Forest guidelines. Removing small trees will have no effect on existing foraging or nesting habitat.

Fuel reduction treatments would initiate successional changes in forest understory, including snags and CWD. The CWD would accumulate from fallen snags and understory vegetation would regenerate in most areas. Reduced vegetative competition would also accelerate tree growth in some areas. Northern goshawk prey species are likely to increase as understory vegetation and litter layers recover, CWD is recruited from the snag population, and additional snags are recruited. Thus, effects on goshawk prey species abundance and distribution are expected to be minimal.

Thinning and fuel reduction activities have the potential to affect northern goshawks through the production of fire, smoke, visual, and noise disturbance. Northern goshawks are sensitive to noise disturbances during nesting and will often exhibit defensive territorial behavior around nest sites when disturbed (CDFG 1990). Noise produced during fuel reduction activities may alter nesting behavior.

Disturbance may also occur from fire, smoke, or other activities associated with prescribed fire. Heavy smoke at ground level and in forested stands may have adverse effects, but light to moderate smoke that is mixing or venting well is probably of little consequence to northern goshawks. It is expected that adults are sufficiently mobile to avoid direct injury by fire. To ensure that breeding goshawks are not disturbed by activities that create noise above ambient levels or smoke near nest stands, seasonal restrictions will be in place from March 1 to August 31 that apply to all activities that modify habitat within 0.5 mile, or create smoke or noise above ambient levels within 0.25 mile of historic sites or any additional nest sites that are discovered within the Assessment Area. Dates for seasonal restrictions cover the time period from which adult goshawks typically initiate breeding activity to the point where juveniles are physically capable of moving away from such disturbances.

Cumulative Effects. Alternatives B and C, combined with local community fuel reduction projects including the proposed fuelbreak system west of Black Bear Ranch, would further decrease the risk of high-intensity fire both inside and near the Eddy Gulch LSR. There are no other proposed or anticipated actions that would combine with either alternative to cause cumulative effects on goshawks, goshawk habitat, or goshawk prey beyond the project’s direct and indirect effects.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project "may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability" for the northern goshawk or its habitat. This determination is based upon the following:

1. No overstory thinning is planned within GOMAs.
2. Treatments in M Units may remove 3 percent of the suitable nesting habitat in the Assessment Area, but most M Units are on ridges less likely to be selected by breeding goshawks.
3. All treated acres would continue to function as foraging habitat.
4. Effects on goshawk prey species are expected to be minimal or of short duration.
5. Project design features minimize the likelihood that goshawks will be killed or injured during project implementation or that normal breeding behaviors will be disrupted by noise or smoke.

Peregrine Falcon

Breeding peregrine falcons require prominent cliffs or other precipitous features with ledges or other platforms that are essentially inaccessible to mammalian predators and that provide protection from the weather (White et al. 2002). Nest sites are often near rivers, lakes, marshes, or ocean waters, which help provide an adequate prey base of small- to medium-sized birds, but peregrines can travel long distances, and nests may be several miles from any significant water feature.

Peregrines are widely distributed on the Klamath National Forest, and there are two known nest sites on the Forks of Salmon and Cecilville quadrangles that overlap the Assessment Area (CNDDB 2008). There are no known peregrine nest sites in the Assessment Area, but the rocky cliffs just northwest of the Eddy Lookout have the potential to support a breeding pair. Field and aerial photo reviews did not reveal any other suitable habitat in the Assessment Area.

Alternative A

Direct and Indirect Effects. Wildfire would likely not result in direct effects on peregrine falcons because nest sites are in rocky cliffs, and heavy smoke is not likely to persist around an eyrie. Areas that burn with high intensity may create patches of reduced vegetation, which can reduce prey availability; however, this is expected to be a negligible indirect effect. In the absence of wildfire, and with no fuel reduction activities under the no-action alternative, there would be no direct or indirect effects on the peregrine falcon.

Cumulative Effects. There are no other proposed or anticipated actions that would combine with Alternative A to cause cumulative effects on the peregrine falcon or its habitat beyond the project's direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating in the Assessment Area.

Alternatives B and C

Direct and Indirect Effects. The action alternatives would have similar effects on peregrine falcons and will be discussed together.

Peregrine falcon nesting/roosting habitat would not be directly or indirectly affected by the proposed fuels reduction activities. Peregrine falcons are known to be susceptible to disturbance near their nests. There are no known nests in the vicinity; if a new nest is discovered, a seasonal restriction of February 1 to July 31 would protect peregrines from all activities that create noise above ambient levels within 0.25 to 0.5 mile (dependent on topographic features) of active eyries.

Cumulative Effects. The action alternatives, alone or in concert with other ongoing or reasonably foreseeable future actions in or near the Assessment Area, are not expected to cause any cumulative effects on peregrine falcons, their habitat, or prey. Combined with local community fuel reduction projects, which will not be removing habitat, Alternative B and C would decrease the risk of high-intensity fire in and near the Assessment Area. No other actions would combine to create any significant effects.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project will have “no effect” on peregrine falcons. This determination is based upon the following:

1. No fuel reduction activities are proposed near nest sites.
2. Project design features minimize the likelihood that peregrines will be disrupted by noise or smoke.
3. Fuel reduction activities are not likely to affect the peregrine’s prey base.

Willow Flycatcher

Willow flycatchers inhabit riparian deciduous scrub, primarily willows, in or along wet meadows, streams, lakes, or other moist habitats. Occasional overstory trees may be present in a territory, but they avoid forest canopy (Bombay et al. 2003). Optimum habitat in northern California is typically moist meadows with perennial streams, lowland riparian woodlands dominated by willows (primarily in tree form) and cottonwoods, or smaller spring-fed or boggy areas with willow or alders (Harris et al. 1987; CDFG 2005). In the Pacific Northwest, willow flycatchers will sometimes colonize clearcuts post-harvest if patches of deciduous scrub have been retained or resprouted (Altman et al. 2003; Harris 2006).

Field reconnaissance and review of aerial photos did not identify any riparian habitat that is likely to support breeding flycatchers. Streams in the Assessment Area tend to be either high-gradient streams dominated by mountain alder or lower-gradient streams with a forest overstory, and both types are avoided by breeding willow flycatchers (Bombay et al. 2003).

Alternative A

Direct and Indirect Effects. In areas affected by wildfire, those areas that burn with high intensity are more likely to benefit willow flycatchers by removing most, or all, of the forest canopy, allowing for extensive growth of a riparian shrub layer and nesting habitat for approximately 10–

12 years. Vigorous brush fields created by stand-replacing fires could potentially provide suitable breeding habitat, just as clearcuts have sometimes led to the creation of suitable breeding habitat elsewhere in northwestern California (Harris 2006) and Oregon (Altman et al. 2003). Those areas that burn with low intensity would not benefit flycatchers because the overstory layer would remain intact.

In the absence of wildfire, and with no fuel reduction activities under the no-action alternative, individual flycatchers in the Assessment Area and Riparian Reserve would not be disturbed, so there would be no direct or indirect effects on individual flycatchers. No suitable habitat is currently known to occur in the Assessment Area, so there would be no direct or indirect effects on habitat.

Cumulative Effects. There are no other proposed or anticipated actions that would combine with Alternative A to cause cumulative effects on the willow flycatcher or its habitat beyond the project's direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating in the Assessment Area.

Alternatives B and C

Direct and Indirect Effects. The action alternatives would have similar effects on the willow flycatcher and will be discussed together except where specifically stated otherwise.

Thinning and fuel reduction treatments are not expected to have any direct or indirect effects on willow flycatchers. However, the prevention of stand-replacing fire—the only process that would likely create mostly treeless riparian scrub required by the flycatcher—would likely preclude use of the Assessment Area by willow flycatchers. Limited low-intensity prescribed fire in Riparian Reserves could affect individuals if suitable patches of riparian scrub (not known from the Assessment Area, but possible) were burned.

Cumulative Effects. The action alternatives, alone or in concert with other ongoing or reasonably foreseeable future actions in or near the Assessment Area, are not expected to cause any cumulative effects on willow flycatchers or their habitat. Combined with local community fuel reduction projects, Alternatives B and C would decrease the risk of high-intensity fire in and near the Assessment Area, reducing the probability for the creation of suitable willow flycatcher habitat. No other actions would combine to create any significant effects.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project "may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability" for the willow flycatcher or its habitat. This determination is based upon the following:

1. No willow flycatchers are known or suspected of breeding in the Assessment Area.
2. Potential habitat, if present, is not likely to be significantly affected by project activities.
3. Fuel reduction activities may prevent future creation of suitable riparian scrub or chaparral.

Pallid Bat

The pallid bat is typically a colonial, resident bat occurring up to approximately 7,000 feet elevation in California. Pallid bats will use a variety of habitats, including grasslands, shrublands, woodlands, and mixed-conifer forests but are most common in open dry habitats with rocky areas for roosting (CDFG 1990; Sherwin and Rambaldini 2005). Day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, trees, and various human structures such as bridges (especially wooden and concrete girder designs) and buildings. Habitat suitable for pallid bats is widespread, and suitable roost sites in the form of large trees and snags are scattered throughout the Eddy Gulch LSR. There have been no surveys in the Assessment Area, but pallid bats are expected to be fairly common in the Assessment Area.

Alternative A

Direct and Indirect Effects. In areas affected by the modeled wildfire, direct effects would occur if bats (especially juvenile bats or maternal colonies) are killed or harmed by fire or smoke, depending on the timing of fire. Fire could also consume snags and large hollow trees used as maternal colonies or roost sites, but fire would also create snags and cavities. Short-term loss of vegetation would reduce the abundance of aerial and terrestrial insect prey.

The modeled fire would have various indirect effects. Moderate- to high-intensity fire would initiate successional changes that could increase the probability of future stand-replacing fire (and the loss of large trees and snags) as forest is replaced with brush fields and dense young forest. Low- to moderate-intensity fire could benefit bats by creating snags and cavities and by creating a mosaic of openings that would invigorate forest understory and increase the abundance of insect prey.

In the absence of wildfire, and with no fuel reduction activities under the no-action alternative, there would be no effect on habitat or disturbance to roosting bats in the Assessment Area and, therefore, there would be no direct effects on the pallid bat. Indirectly, the amount or quality of habitat would change slowly in areas not affected by wildfire. The continued forest growth could have either beneficial or adverse effects, depending on local conditions. In relatively young or open stands, continued forest growth would benefit bats by allowing for a slow increase in snags. This could hypothetically lead to an increase in the number of maternal colonies, although it seems unlikely that pallid bats in the Assessment Area are limited by suitable roost sites. It could also decrease fire risk as maturing stands develop a moister microclimate. In other areas, continued growth would increase stand density, density-related tree mortality, fuel loads, and the probability of a stand-replacing fire. Continued growth could also make some stands too dense for foraging bats and reduce overall stand diversity.

Cumulative Effects. There are no proposed or anticipated actions that would combine with Alternative A to cause cumulative effects on the bats or their habitat beyond the project’s direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating in the Assessment Area.

Alternatives B and C

Direct and Indirect Effects. The action alternatives would have similar effects on the pallid bat and will be discussed together.

Fuel reduction treatments and temporary road construction are expected to have short-term minor adverse direct effects on pallid bats. Project activities may remove individual trees or snags that may be used for roosting, especially by the pallid bat which occurs widely in many forest types. Destruction of active roosts through felling and/or removal of trees or snags may kill or harm individual bats, especially during the breeding season when young may be unable to escape. However, effects on roosting habitat are expected to be minimized by the lack of thinning in NSO core areas, by employing the Klamath LRMP Standards and Guidelines for snag and large-diameter tree retention in most of the FRZs, and by implementing limited operating periods for the NSO and northern goshawk that overlap the period when bats rear their young. Noise from project activities could disturb bats and cause temporary roost abandonment. Abandonment of maternity roosts could result in lowered reproductive success or death of the young of the year. However, disturbance at any specific roost would be short term and occur only during the year of project implementation.

Prescribed fires may affect prey availability, either positively or adversely, as vegetation and litter layers are consumed. Thinning and other fuel-reduction treatments are expected to have long-term beneficial effects by promoting the development of large-diameter trees, which may provide suitable roosting sites. Reintroduction of fire would also be likely to create basal hollows and other cavities used by bats. Additionally, these activities would change expected fire behavior over time, resulting in fires of less intensity, thus reducing the potential that existing habitat would be removed.

Prey availability would most likely increase over time because prescribed fire promotes vigorous growth of understory vegetation and insect production. Felling of snags and removal of logs may reduce the amount of microhabitat available for some insects, but new fire-killed snags would also provide a new resource for some insects such as wood-boring beetles.

Cumulative Effects. Alternatives B and C, combined with local community fuel reduction projects including the proposed fuelbreak system west of Black Bear Ranch, would further decrease the risk of high-intensity fire both inside and near the Eddy Gulch LSR. There are no other proposed or anticipated actions that would combine with either alternative to cause cumulative effects on pallid bats, or their habitat, beyond the project’s direct and indirect effects.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project “may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability” for the pallid bat or its habitat. This determination is based upon the following:

1. Roosting bats are sensitive to disturbance and could be displaced or harmed by project activities.
2. Large trees and snags with suitable roost sites may be removed.
3. Most treated habitat will remain suitable for roosting, and new roost sites will be created.
4. All treated habitat will remain suitable for foraging.

Townsend’s Big-eared Bat

The Townsend’s big-eared bat is a colonial bat that uses many habitat types, ranging from low-elevation deserts to mid-elevation montane habitats throughout California. Its distribution is strongly correlated with the availability of caves and cave-like roosting habitat, including abandoned mines and buildings with cave-like spaces (Maser 1998; Pierson and Rainey 1998; Fellers and Pierson 2002; Sherwin and Piaggio 2005). Large-diameter trees have also been shown to be used for roosting in California coastal forests (Fellers and Pierson 2002; Mazurek 2004). Foraging associations include edge habitats along streams and areas adjacent to and within a variety of wooded habitats (Fellers and Pierson 2002).

Roosting Townsend's bats have been documented in the Cecilville Caves just southeast of the Assessment Area (Pierson and Rainey 1998), and they may also occur in other caves, mines, or buildings in the Assessment Area. Large hollow trees, although less likely to be used than caves or mines, are also widely scattered over the Assessment Area.

Alternative A

Direct and Indirect Effects. In areas affected by the modeled wildfire, direct effects would occur if Townsend's big-eared bats (especially juvenile bats or maternal colonies) are killed or harmed by fire or smoke. Fire could also consume snags and large hollow trees used as maternal colonies or roost sites, but fire would also create snags and cavities. Short-term loss of vegetation would reduce the abundance of insect prey.

The modeled fire would have various indirect effects. Moderate- to high-intensity fire would initiate successional changes that could increase the probability of future stand-replacing fire (and the loss of large trees and snags) as forest is replaced with brush fields and dense young forest. Low- to moderate-intensity fire could benefit bats by creating cavities and by creating a mosaic of openings that would invigorate forest understory and increase the abundance of insect prey.

In the absence of wildfire, and with no fuel reduction activities under the no-action alternative, there would be no direct effects on the Townsend's big-eared bat. Indirectly, the amount or quality of habitat would change slowly in areas not affected by wildfire. The continued forest growth could have either beneficial or adverse effects, depending on local conditions. In relatively young or open stands, continued forest growth would benefit bats by allowing for a slow increase in snags. This could eventually lead to an increase in the number of maternal colonies. It could also decrease fire risk as maturing stands develop a moister microclimate. In other areas, continued growth would increase stand density, density-related tree mortality, fuel loads, and the probability of a stand-replacing fire. Continued growth could also make some stands too dense for foraging bats and reduce overall stand diversity.

Cumulative Effects. There are no proposed or anticipated actions that would combine with Alternative A to cause cumulative effects on Townsend's big-eared bats or their habitat beyond the project's direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating in the Assessment Area.

Alternatives B and C

Direct and Indirect Effects. The action alternatives would have similar effects on Townsend's big-eared bats and will be discussed together except where specifically stated otherwise.

Fuel reduction treatments and temporary road construction are expected to have short-term minor adverse direct effects on Townsend's big-eared bats. Project activities may remove individual trees or snags that may be used for roosting. Destruction of active roosts through felling and/or removal of trees or snags may kill or harm individual bats, especially during the breeding season when young may be unable to escape. However, effects on roosting habitat are expected to be minimized by the lack of thinning in NSO core areas, by employing the Klamath LRMP Standards and Guidelines for snag and large-diameter tree retention in most of the FRZs, and by implementing limited operating periods for the NSO and northern goshawk that overlap the period when bats rear their young. Noise from project activities could disturb bats and cause temporary roost abandonment. Abandonment of maternity roosts could result in lowered reproductive success or death of the young of the year. However, disturbance at any specific roost would be short term and occur only during the year of project implementation.

Prescribed fires may affect prey availability, either positively or adversely, as vegetation and litter layers are consumed. Thinning and other fuel-reduction treatments are expected to have long-term beneficial effects by promoting the development of large-diameter trees, which may provide suitable roosting sites. Reintroduction of fire would also be likely to create basal hollows and other cavities used by Townsend's big-eared bats. Additionally, these activities would change expected fire behavior over time, resulting in fires of less intensity, thus reducing the potential that existing habitat would be removed.

Prey availability would most likely increase over time because prescribed fire promotes vigorous growth of understory vegetation and insect production. Felling of snags and removal of logs may reduce the amount of microhabitat available for some insects, but new fire-killed snags would also provide a new resource for some insects such as wood-boring beetles.

Cumulative Effects. Alternatives B and C, combined with local community fuel reduction projects including the proposed fuelbreak system west of Black Bear Ranch, would further decrease the risk of high-intensity fire both inside and near the Eddy Gulch LSR. There are no other proposed or anticipated actions that would combine with either alternative to cause cumulative effects on Townsend's big-eared bats, or their habitat, beyond the project's direct and indirect effects.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project "may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability" for the Townsend's big-eared bat or its habitat. This determination is based upon the following:

1. No project activities are planned near the openings of caves or mines.
2. Roosting bats are sensitive to disturbance and could be displaced or harmed by project activities.
3. Large trees and snags with suitable roost sites may be removed.
4. Most treated habitat will remain suitable for roosting, and new roost sites may be created.
5. All treated habitat will remain suitable for foraging.

American Pine Marten

American martens prefer large blocks of dense (more than 50 percent canopy cover), multistoried, multispecies, late-successional coniferous forests, typically higher than 3,000 feet in the northern Sierra Nevada (Zielinski et al. 2005) and northwest California. Occupied areas usually include CWD with a high number of large (over 24 inches dbh) snags and downed logs; dense riparian corridors (Buskirk and Powell 1994; Ruggiero et al. 1994), and an interspersion of small (less than 1 acre) openings with good ground cover. Forests with a lack of structure near the ground are used little or not at all. The preference and apparent need for structure near the ground (for example, downed logs, large slash piles) is important because it creates subnivean spaces for protection from the weather and larger predators and also provides access to prey (Ruggiero et al. 1994).

Suitable habitat is widely distributed in the Klamath Ranges, but martens appear to be rare. Extensive surveys for forest carnivores in the Klamath National Forest began in 1992 (for example, Kucera et al. 1995) but did not detect any martens on the Salmon River and Scott River Ranger Districts until the 2005–2006 surveys, when they were detected in the Marble Mountain Wilderness Area north of the Eddy Gulch LSR (S. Yaeger, pers. comm. 2008). Incidental sightings have been recorded on four districts (excluding Oak Knoll), but this cannot be confirmed. Habitat suitable for martens is found throughout the upper elevations of the Assessment Area.

The rare Humboldt marten (*M. a. humboldtensis*) was reportedly detected at least as close as the Blue Creek drainage of the Klamath River in the Orleans Ranger District, but it is not known or suspected from the Salmon River and Scott River Ranger Districts based on its current distribution (Zielinski et al. 2001).

Alternative A

Direct and Indirect Effects. The modeled wildfire could have various direct effects on martens, their habitat, and their prey, depending on the wildfire's location, season, intensity, and pattern. Fire or smoke may injure or kill individuals, most likely during the breeding season when young animals may be unable to escape. Fire may also increase the risk of predation as individuals move into more open habitats. Any type of fire could reduce the amount of resting, denning, and subnivean access habitat, and extensive consumption of snags, CWD, understory, and litter and duff layers would reduce prey abundance in the short-term. Beneficial direct effects would include the creation of snags that could be used as resting or denning sites. Fire could also increase prey availability by removing cover and/or concentrating prey into remaining patches of habitat.

Areas that burn with moderate to high intensity would reduce the overall number of available acres over the long term. Based on the modeled fire of 7,200 acres, up to 5,832 acres (81 percent) of forested habitat could be removed or adversely affected. Depending on the exact location of the fire, this habitat loss would likely cause adverse effects on or abandonment of one or potentially two territories.

The modeled wildfire would have various indirect effects. Low- to moderate-intensity fire could benefit habitat by reducing the likelihood of future stand-replacing fire and by creating a mosaic of openings that would invigorate forest understory and increase recruitment of snags and CWD used as denning and resting sites as well as by prey (and as subnivean access). Moderate- to high-intensity fire would initiate successional changes that could increase the probability of future stand-replacing fire as forest is replaced with brush fields and dense young forest.

In the absence of wildfire, there would be no actions that would directly affect martens or their habitat. However, over the long term, the amount or quality of habitat in the Assessment Area would change slowly in areas not affected by wildfire. The continued forest growth could result in either beneficial or adverse indirect effects, depending on local conditions. In some young or open stands, continued forest growth would benefit these species by allowing for a slow increase in tree size, basal area, canopy cover, snags, and CWD. This could lead to an increase in denning and resting habitat or foraging habitat. It could also decrease fire risk as maturing stands develop a moister microclimate. In other areas, however, continued growth would increase stand density, density-related tree mortality, fuel hazards, and the probability and extent of stand-replacing fire.

Cumulative Effects. There are no proposed or anticipated actions that would combine with Alternative A to cause cumulative effects on the marten or its habitat beyond the project's direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating inside the Assessment Area.

Alternatives B and C

Direct and Indirect Effects. The action alternatives would have similar effects on the marten and will be discussed together except where specifically stated otherwise.

All proposed activities, including road-related activities, in the vicinity of suitable habitat could disrupt marten use and movement in the area and create short-term adverse direct effects on individuals. Thinning and fuel reduction activities have the potential to affect martens through the production of fire, smoke, and noise disturbance. Noise produced during fuel reduction activities may alter marten behavior, but preliminary studies have not found martens to be particularly sensitive to noise (Zielinski et al. 2004c). Underburning in the vicinity of den sites could cause mortality of young if dens are above ground or are not well ventilated. It is expected that adult animals are sufficiently mobile to avoid direct injury by fire.

Thinning of 931 acres in FRZs (approximately 3.8 percent of the mid- and late-successional habitat in the Assessment Area) (832 acres in Alternative C), and, to a much lesser extent, prescribed burning and mastication, would reduce canopy cover, basal area, and the number of large-diameter trees. All thinned stands in FRZs would have canopy cover reduced below 60 percent, but many stands would still function as habitat because they would retain large trees and at least 40 percent canopy cover. Fuel reduction treatments, primarily prescribed fire but also mastication and thinning, would also cause changes in the amount and/or types of snags, CWD, and understory vegetation, but would have little effect on canopy cover because burning would remove smaller trees that do not substantially contribute to canopy cover in the overstory. Thinning would remove snags, but the effects on martens would most likely be negligible because the treated areas would be limited in extent (approximately 11 percent of the FRZ area) and would also avoid NSO core areas and Riparian Reserves.

Mastication would destroy small down woody debris, and some snags but would retain large snags and large-diameter down woody debris according to Klamath LRMP Guidelines. Prescribed fire would consume much of the smaller down woody debris and some snags but would create many new snags. Much of the large down woody debris would likely remain when burning in spring-like conditions, and this would help ensure that subnivean access is available in winter. Temporary displacement of individuals may occur; however, no long-term adverse effects on the species are expected from the loss of smaller CWD and occasional snags.

Fuel reduction activities, primarily fire and mastication, may also kill, injure, or displace prey. Although prey densities may be reduced in affected areas, treatments are designed to minimize effects on prey by limiting treatments to no more than 50 percent of the NSO suitable habitat within a year. Prescribed fire is also designed to leave a mosaic of burned and unburned areas so some shrubs, snags, and CWD would remain to provide cover for prey species and minimize effects on martens. Martens may temporarily benefit from fuel reduction activities as rodent prey move to avoid disturbance or concentrate in remaining patches of habitat.

Thinning, mastication, and prescribed burning activities may result in short-term reductions in available prey as CWD and understory vegetation are reduced. However, fuel reduction treatments are expected to benefit martens by substantially reducing the forest's susceptibility to stand-replacing crown fires. As the habitat develops over time, it is expected that there would be an increase in denning and resting sites (with an increase in CWD), as well as complex structure near the forest floor that would provide prey habitat and marten direct access to the subnivean zone for marten.

Cumulative Effects. Alternatives B and C, combined with local community fuel reduction projects including the proposed fuelbreak system west of Black Bear Ranch, would further decrease the risk of high-intensity fire both inside and near the Eddy Gulch LSR. There are no other proposed or anticipated actions that would combine with either alternative to cause cumulative effects on martens, marten habitat, or marten prey, beyond the project's direct and indirect effects.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project "may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability" for the American pine marten or its habitat. This determination is based upon the following:

1. Martens could be displaced or harmed by project activities.
2. Structural components of marten habitat such as snags and CWD may be removed.
3. Effects on marten prey species are expected to be minimal or of short duration.
4. Most treated habitat will remain suitable for denning/resting and foraging.
5. Fuel reduction treatments are designed to protect marten habitat from loss to stand-replacing crown fires.

Pacific Fisher

The Pacific fisher is a Federal Candidate for listing under the ESA. The Pacific fisher was petitioned for listing in November 2000. After a 12-month review, the USFWS found Pacific fisher to be a distinct population segment and gave a "warranted but precluded" decision to the petition. As a result of that decision, the West Coast distinct population has become a Federal Candidate species under the ESA (USFWS 2004) and will be reviewed annually for its status and may be listed at a later date.

The Pacific fisher typically occurs in mid- to late-successional coniferous forest and deciduous riparian habitats. They prefer large blocks of dense multistoried (greater than 60 percent canopy closure), multispecies, mid- to late-successional coniferous forests with a high number of large (over 30 inches dbh) snags and downed logs and a hardwood component (Ruggiero et al. 1994; Krohn et al. 1997; Zielinski et al. 2004a). This complex forest structure supports prey, provides individuals access to prey during winter, and provides typical fisher resting and denning sites. Habitat usually also contains small openings with understory vegetation and woody debris that support an abundance of diverse prey (such as voles, hares, porcupines, squirrels, mice, chipmunks, carrion, and fruit). Their preferred habitats are often connected by riparian corridors, saddles, or other linkages that serve as movement corridors. Fishers will den in brush piles, logs, snags, rocky areas, upturned trees, or in other protected cavities; hollow logs and snags are particularly important for denning. Young are typically born in February through May and remain with the female until late autumn.

The most influential variables affecting rest site selection in California fisher populations include maximum tree sizes and dense canopy closure, but other features are important to rest site choice as well, such as large-diameter hardwoods, large conifer snags, and steep slopes near water (Zielinski et al. 2004a). Across home ranges in a northern California study area, fishers selected sites made up of stands with large-diameter trees and dense canopy cover that were generally situated within drainage-bottoms (Yaeger 2005). Fishers select areas as rest sites where structural features are most variable but where canopy cover is least variable, suggesting that resting fishers place a premium on continuous overhead cover but prefer resting locations that also have a diversity of sizes and types of structural elements (Zielinski et al. 2004a, 2004b). Rest-site structures used by fishers include cavities in live trees, snags, hollow logs, fallen trees, canopies of live trees, mistletoe clumps, or large or deformed branches and to a lesser extent stick nests, rocks, ground cavities, and slash and brush piles (Heinemeyer and Jones 1994; Higley et al. 1998; Mazzoni 2002; Zielinski et al. 2004a, 2004b).

The Pacific fisher is an uncommon permanent resident in the Klamath National Forest. Although no den sites have been located in the Assessment Area, suitable denning, resting, and foraging habitat for fisher is widespread in the Assessment Area, especially below 5,000 feet. Fishers have been detected on numerous occasions at data stations in the Eddy Gulch LSR (S. Yaeger, pers. comm. 2008; Zielinski et al. 2000). Additionally, camera stations have detected individuals near Etna Summit, on the south side of Etna Mill Creek, and in the Russian River Wilderness Area. The Eddy Gulch LSR is expected to support over 34,000 acres of suitable habitat (USFS 1999).

Alternative A

Direct and Indirect Effects. The modeled wildfire could have various direct effects on fishers, their habitat, and their prey, depending on the wildfire’s location, season, intensity, and pattern. Fire or smoke may injure or kill individuals, most likely during the breeding season when young animals may be unable to escape. Fire may also increase the risk of predation as individuals move into more open habitats. Any type of fire could reduce the amount of resting, denning, and subnivean access habitat, and extensive consumption of snags, CWD, understory, and litter and duff layers would reduce prey abundance in the short-term. Beneficial direct effects would include the creation of snags that could be used as resting or denning sites. Fire could also increase prey availability by removing cover and/or concentrating prey into remaining patches of habitat.

Areas that burn with moderate to high intensity would reduce the overall number of available acres over the long term. Based on the modeled fire of 7,200 acres, up to 5,832 acres (81 percent) of forested habitat could be removed or adversely affected. Depending on the exact location of the fire, this habitat loss would likely cause adverse effects on or abandonment of one or potentially two territories.

The modeled wildfire would have various indirect effects. Low- to moderate-intensity fire could benefit habitat by reducing the likelihood of future stand-replacing fire and by creating a mosaic of openings that would invigorate forest understory and increase recruitment of snags and CWD used as denning and resting sites as well as by prey (and as subnivean access). Moderate- to high-intensity fire would initiate successional changes that could increase the probability of future stand-replacing fire as forest is replaced with brush fields and dense young forest.

In the absence of wildfire, there would be no actions that would directly affect fishers or their habitat. However, over the long term, the amount or quality of habitat in the Assessment Area would change slowly in areas not affected by wildfire. The continued forest growth could result in either beneficial or adverse indirect effects, depending on local conditions. In some young or open stands, continued forest growth would benefit these species by allowing for a slow increase in tree size, basal area, canopy cover, snags, and CWD. This could lead to an increase in denning and resting habitat or foraging habitat. It could also decrease fire risk as maturing stands develop a moister microclimate. In other areas, however, continued growth would increase stand density, density-related tree mortality, fuel hazards, and the probability and extent of stand-replacing fire.

Cumulative Effects. There are no proposed or anticipated actions that would combine with Alternative A to cause cumulative effects on the fisher or its habitat beyond the project's direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating inside the Assessment Area.

Alternatives B and C

Direct and Indirect Effects. The action alternatives would have similar effects on the fisher and will be discussed together except where specifically stated otherwise.

The potential direct effects on Pacific fishers from vegetation management activities under Alternative B consist of modification or loss of habitat or habitat components, especially with regard to denning and resting habitat and foraging and movement habitat. Direct effects would also include behavioral disturbance to denning from thinning, road construction, prescribed fire, or other associated activities.

Direct effects from noise and prescribed fires can lead to the displacement of individuals or the disruption of foraging and breeding activities. Denning effects are expected to be negligible because resource protection measures put in place to protect the NSO during the breeding season would indirectly protect denning individual fishers. Fishers are also a highly mobile species such that effects on foraging individuals would be minor, as areas with human disturbance would likely be avoided by foraging individuals. Temporary displacement of individuals may occur as a result of the proposed treatments; however, the resource protection measures put in place to protect 50 percent of all suitable NSO habitat, over the course of any one season, would minimize disturbance to any fisher sharing similar habitat. Additionally, by ensuring that breeding NSOs are not disturbed by activities that create noise above ambient levels or have an intrusion of smoke at the nest, the seasonal restriction within owl habitat would indirectly reduce disturbance likelihood on fishers.

Thinning in FRZs and, to a much lesser extent, prescribed burning and mastication, would reduce four features that are used to define suitable resting, denning, and foraging habitat: canopy cover, basal area, CWD, and the number of large-diameter trees. However, because fisher denning and resting habitat is considered a subset of suitable NSO habitat, thinning and other fuel reduction activities would downgrade 47 acres and thus is unlikely to affect individuals or overall habitat in size and scope of the landscape and total available habitat that remains. Additionally, the prescriptions modifying 323 additional acres of suitable habitat will adhere to the NSO standards and thus would indirectly protect features preferred by the Pacific fisher.

All thinned stands in FRZs would have canopy cover reduced below 60 percent (no less than 48 percent in Douglas-fir or mixed-conifer stands), but stands that retain at least 40 percent canopy cover would still function as movement habitat and as foraging habitat because they would retain large trees (132 to 230 square feet per acre), and thinning would generally proceed from below so that the larger trees would remain, including all trees larger than 28 inches (except hazard trees). Thinning would reduce canopy cover below 40 percent (to no less than 32 percent) in some white and red fir stands, but preferred habitat is common and widespread in the Assessment Area, so a small reduction in ridgetop movement habitat would not create any dispersal barriers for individuals. Additionally, resource protection measures for Riparian Reserves would ensure habitat connectivity and movement patterns for individuals.

Fuel reduction treatments, primarily prescribed fire but also mastication and thinning, would cause changes in the amount and/or types of snags, CWD, and understory vegetation, but would have little effect on canopy cover because burning would remove smaller trees that do not substantially contribute to canopy cover in the overstory. Thinning would remove snags but the effects on individuals would most likely be negligible because the treated areas would be limited in extent (approximately 11 percent of the FRZ area), and would be located along ridges, which are used less frequently by resting individuals. Mastication would destroy small down woody debris and some snags but would retain large snags and large-diameter down woody debris. Prescribed fire would consume much of the smaller down woody debris and some snags but would create many new snags. Much of the large down woody debris is likely to remain when burning in spring-like conditions. Effects on fisher would also be minimized by retaining unburned habitat (at least 10 percent) in the ridgetop FRZs.

Fuel reduction activities, primarily prescribed burning and mastication, may kill, injure, or displace preferred prey. Although prey densities may be reduced in the short term in treated areas, prey may be more available when they moved to untreated areas. Additionally, treatments are designed to minimize effects on prey by limiting treatments to no more than 50 percent of the NSO suitable habitat within a year and spreading the treatments out over an 11-year period. Prescribed fire is also designed to leave a mosaic of burned and unburned areas so some shrubs, snags, and CWD would remain to provide cover for prey species and minimize effects on the Pacific fisher.

The construction of 1.03 miles of temporary roads under Alternative B would create a loss of approximately 0.62 acre of suitable fisher habitat; the habitat loss is small and widely scattered and includes only 0.5 acre of late-successional habitat. Additionally, the roads would be closed (ripped and mulched, as needed) following thinning, and those areas would become available as habitat over the long term.

Approximately 47.3 acres of resting / denning would be downgraded within the entire Assessment Area, but large-diameter trees, snags, and CWD would be retained on the landscape. Because the patches of habitat to be removed are along ridges and are dispersed across the Assessment Area, fuel reduction activities are not expected to affect the ability of remaining habitat to provide foraging opportunities or create barriers to movement. Therefore, the action alternatives are not expected to affect the ability of the habitat to provide resting, foraging, and dispersal abilities for the Pacific fisher.

The prescriptions for thinning and fuels treatments are consistent for maintaining habitat for small mammals in northern interior forests while managing for fire and healthy forest ecosystems. Fuel reduction treatments would initiate successional changes in forest understory, including snags and CWD. Prey species are likely to increase as understory vegetation and litter layers recover and CWD is recruited from the snag population. Reduced vegetative competition would also accelerate tree growth in some areas (see Tables 3-6, 3-7, and 3-8 in Section 3.2 of the Eddy Gulch LSR EIS 2009). Thus, effects on Pacific fisher prey species abundance and distribution are expected to be minimal.

Thinning and fuel reduction treatments are expected to benefit fisher habitat by reducing the forest's susceptibility to stand-replacing crown fires to approximately 10 percent of current conditions. Fire would still burn with sufficient intensity to create small openings within forested habitat. This type of pattern, which would create a mosaic of stands in different successional stages, would be consistent with patterns under historic fire regimes. This pattern would likely benefit fisher and their prey by providing horizontal diversity of habitat across the landscape.

The protection of NSO activity centers, northern goshawk habitat, and Riparian Reserves would provide connectivity between large blocks of suitable habitat. Implementation of either action alternative would not increase any large-scale, high-contrast fragmentation above current levels. Riparian zones (used as movement corridors) would not be altered by the proposed treatments; therefore, indirect effects that could result from implementation of either action alternative would have minimal effects on the movement patterns of Pacific fishers. Implementation of Alternative B should have little effect on the suitable denning and foraging habitat. Additionally, design features of FRZs would retain habitat elements within the range of those used by fisher for foraging and dispersal, such that the FRZs would likely not create large barriers to further expansion and connectivity to fisher habitat. Temporary roads under Alternative B would be closed (ripped and mulched, as needed) following thinning, and those areas would become available as habitat over the long term.

The risk for potential stand-replacing fires would be considerably higher under the no-action alternative than Alternative B, which could mean a loss of many more acres of potentially suitable denning, foraging, roosting, and travel habitat in the long term. The Pacific fisher may be affected by project activities, but the activities are not expected to result in significant indirect effects.

Cumulative Effects. Alternatives B and C, combined with local community fuel reduction projects including the proposed fuelbreak system west of Black Bear Ranch, would further decrease the risk of high-intensity fire both inside and near the Eddy Gulch LSR. There are no other proposed or anticipated actions that would combine with either alternative to cause cumulative effects on fishers, fisher habitat, or fisher prey, beyond the project's direct and indirect effects.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project "may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability" for the fisher or its habitat. This determination is based upon the following:

1. Fishers could be displaced or harmed by project activities.
2. Structural components of fisher habitat such as snags and CWD may be removed.
3. Effects on fisher prey species are expected to be minimal or of short duration.
4. Most treated habitat will remain suitable for denning/resting and foraging.
5. Large areas of high-quality habitat in Riparian Reserves and NSO core areas will remain untreated.
6. Fuel reduction treatments are designed to protect fisher habitat from loss to stand-replacing crown fires.

California Wolverine

The California wolverine is a montane (mountainous) species that can occur from 1,600 to 14,000 feet in elevation in Douglas-fir and mixed-conifer habitats, and probably also use red fir, lodgepole, wet meadow, and montane riparian habitats (Schempf and White 1977; Zeiner et al. 1990). The wolverine has a large home range (from 39 to 347 square miles [Ruggiero et al. 1994; CDGF 1990]); and will roam over hundreds of miles through a variety of habitats.

Structurally suitable habitat exists in the Assessment Area, although it is unlikely that wolverines currently use the Eddy Gulch LSR. There are several reported sightings from in and near the Assessment Area prior to the 1990s (USFS 1995; CNDDB 2008), but those sightings cannot be verified, and there have been no confirmed detections in the Coastal Ranges for over 80 years despite extensive survey efforts (for example, Zielinski et al. 2005), and most authorities consider the California wolverine to be extinct (Aubry et al. 2007; Schwartz et al. 2007). A single wolverine was observed near Truckee, California in 2008; however, it was determined to be a transient individual with genetic make up that does not match that of the California wolverine (USFS 2008).

Alternative A

Direct and Indirect Effects. In the absence of wildfire, it is unlikely that the amount of potential habitat available for the wolverine in the Assessment Area would change in the short term. Over the long term, however, continued forest growth would increase stand density, density-related tree mortality, fuel loads, and the probability of a stand-replacing fire. Currently, there would be no direct or indirect effects on the wolverine because none are known to occur in the Assessment Area.

The modeled fire could have various direct effects on wolverines, wolverine habitat, and wolverine prey depending on its location, season, intensity, and pattern. Fire or smoke may injure or kill wolverines, most likely during the breeding season when young animals may be unable to escape. Moderate- to high-intensity fire could consume wolverine habitat, but the effect from a fire the size of the modeled fire may be minor with respect to a wolverine's large home range. Extensive consumption of snags, CWD, understory, and litter and duff layers would reduce prey abundance in the short-term, but fire could increase prey availability by removing cover, by concentrating prey into remaining patches of habitat, or by killing or injuring animals and thus providing a source of carrion.

The amount or quality of wolverine habitat in the Assessment Area would change slowly in areas not directly affected by wildfire, but the modeled fire would have various indirect effects. Moderate- to high-intensity fire would initiate successional changes that could increase the probability of future stand-replacing fire as forest is replaced with brush fields and dense young forest. However, this could benefit wolverines if the early successional habitats increase the availability of large prey and if large prey, such as deer, are limiting to wolverines in the region. Low- to moderate-intensity fire would reduce the likelihood of future stand-replacing fire and create a mosaic of openings that would invigorate forest understory used by prey species. This would also create a more variable landscape that is closer to the historical landscape condition when wolverines regularly occurred in California.

Cumulative Effects. There are no proposed or anticipated actions that would combine with Alternative A to cause cumulative effects on the wolverine or its habitat beyond the project's direct and indirect effects discussed above. Local community fuel reduction projects would decrease the risk of fire in the Assessment Area, but those areas represent a small fraction of the area surrounding the Assessment Area and would not affect fire behavior originating inside the Assessment Area.

Alternatives B and C

Direct and Indirect Effects. The action alternatives would have similar effects on the wolverine and will be discussed together except where specifically stated otherwise.

The effects of the proposed treatments on wolverine habitat would be similar to the effects on fisher and marten habitat, except that wolverines are most likely less dependent on closed-canopy forest and more susceptible to disturbance. Thinning, mastication, and road-related activities would employ heavy machinery and may require repeated visits to a site. Because wolverines are sensitive to human disturbance, these activities would likely prevent wolverines from using portions of the Assessment Area during project implementation. Short-term disturbance effects on movement and foraging activities are possible, but these effects would be localized and would not affect the population's viability over time given the species' low likelihood of presence in the region.

Fuel reduction treatments, primarily prescribed fire but also mastication and thinning, would cause changes in the amount and/or types of snags, CWD, and understory vegetation. Thinning would remove snags, but the effects on individuals would most likely be negligible because the treated areas would be limited in extent (approximately 11 percent of the FRZ area). Mastication would destroy small down woody debris and some snags but would retain large snags and large-diameter down woody debris. Prescribed fire would consume much of the smaller down woody debris and some snags but would create many new snags. Much of the large down woody debris is likely to remain when burning in spring-like conditions. Effects on wolverine would also be minimized by retaining unburned habitat (at least 10 percent) in the ridgetop FRZs.

Fuel reduction activities, primarily fire and mastication, may kill, injure, or displace preferred prey. Although prey densities may be reduced in affected areas, treatments are designed to minimize effects on NSO prey and therefore indirectly to some wolverine prey, by limiting treatments to no more than 50 percent of the suitable habitat within a year. Prescribed fire is also designed to leave a mosaic of burned and unburned areas so some shrubs, snags, and CWD would remain to provide cover for prey species and minimize effects on the wolverine.

The construction of 1.03 miles of temporary roads under Alternative B would create a short-term loss of approximately 0.62 acre of habitat; however, the habitat loss is small and scattered, and includes only 0.5 acre of late-successional habitat. Additionally, the roads would be closed (ripped and mulched, as needed) following thinning, and those areas would become available as habitat over the long term.

Over time, thinning and fuel reduction treatments are expected to benefit wolverines by reducing fuels to a level that would decrease the likelihood of extensive, high-intensity fire. Fire would still burn with sufficient intensity to create small openings within forested habitat. This type of pattern, which would create a mosaic of stands in different successional stages, would be consistent with patterns under historic fire regimes. This pattern would likely benefit wolverines by providing horizontal diversity of habitat across the landscape, including habitat conditions favored by prey such as deer and elk.

Cumulative Effects. Alternatives B and C, combined with local community fuel reduction projects including the proposed fuelbreak system west of Black Bear Ranch, would further decrease the risk of high-intensity fire both inside and near the Eddy Gulch LSR. There are no other proposed or anticipated actions that would combine with either alternative to cause cumulative effects on wolverines, wolverine habitat, or wolverine prey, beyond the project's direct and indirect effects.

Determination. Based on the above assessment of direct, indirect, and cumulative effects, it is our determination that implementation of the proposed project "may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability" for the wolverine or its habitat. This determination is based upon the following:

1. Wolverines are not known or suspected of breeding in the Assessment Area.
2. Wolverines could be disturbed or harmed by project activities.
3. Structural components of wolverine habitat such as CWD may be removed.
4. Effects on wolverine prey species are expected to be minimal or of short duration, and treatments may benefit favored prey in the long-term.
5. Most treated habitat will remain suitable for denning/resting and foraging.
6. Fuel reduction treatments are designed to protect forested habitat from loss to stand-replacing crown fires.

IX. Summary of Determinations

Northern spotted owl: It is my determination that the proposed project may affect, but is not likely to adversely affect NSOs and NSO Critical Habitat.

Tehama chaparral snail: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the Tehama chaparral or its habitat.

Southern torrent salamander: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the southern torrent salamander or its habitat.

Cascades frog: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the Cascades frog or its habitat.

Foothill yellow-legged frog: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the foothill yellow-legged frog or its habitat.

Western pond turtle: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the western pond turtle or its habitat.

Peregrine falcon: It is my determination that implementation of the proposed project will have "no effect" on peregrine falcons.

Bald eagle: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for the bald eagle or its habitat.

Northern goshawk: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the northern goshawk or its habitat.

Willow flycatcher: It is my determination that implementation of the proposed project "may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability" for the willow flycatcher or its habitat.

Pallid bat: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the pallid bat or its habitat.

Townsend's big-eared bat: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the Townsend's big-eared bat or its habitat.

American pine marten: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for the American pine marten or its habitat.

Pacific fisher: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the Pacific fisher or its habitat.

Wolverine: It is my determination that the proposed project may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability for the wolverine or its habitat.

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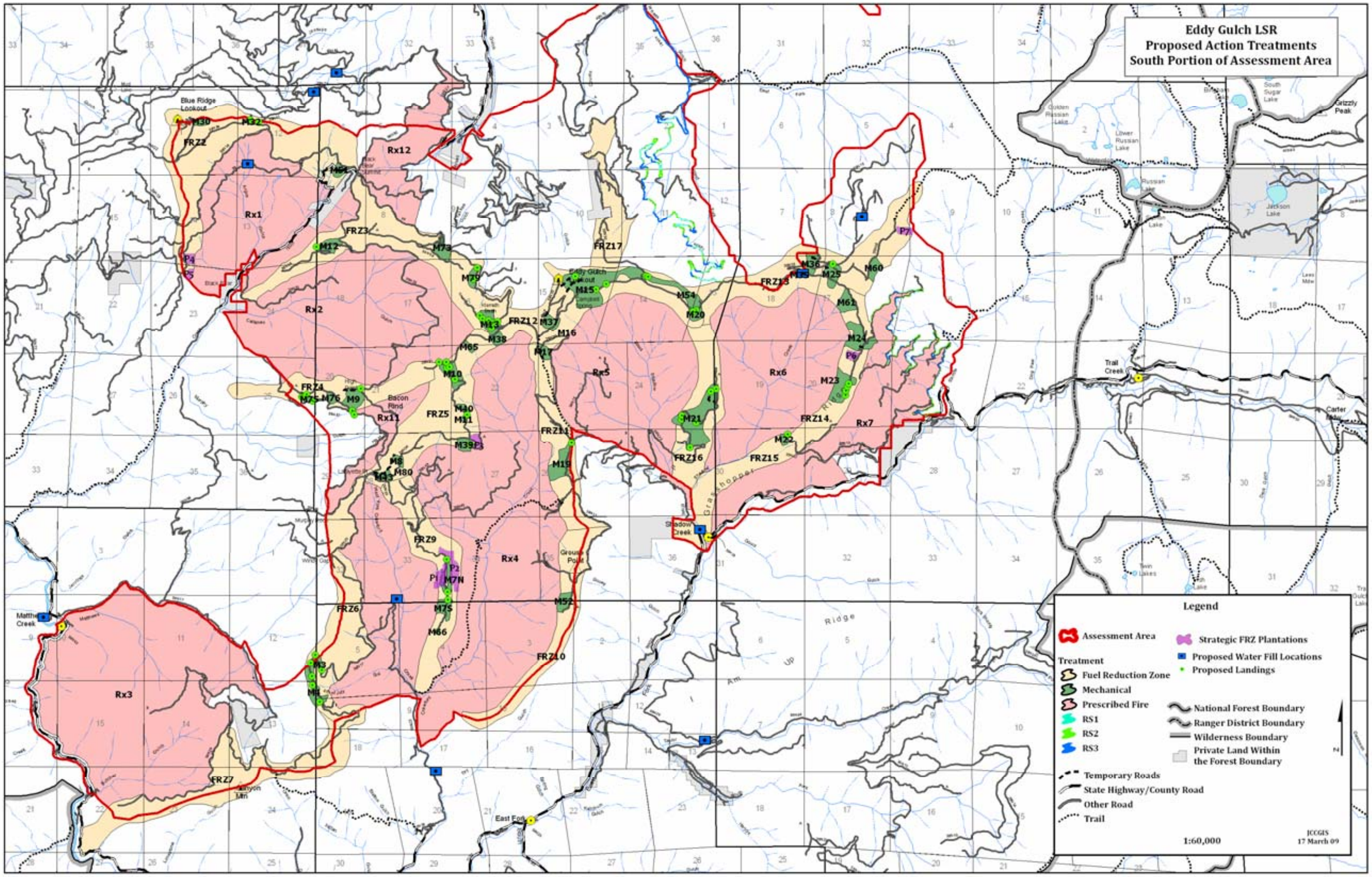
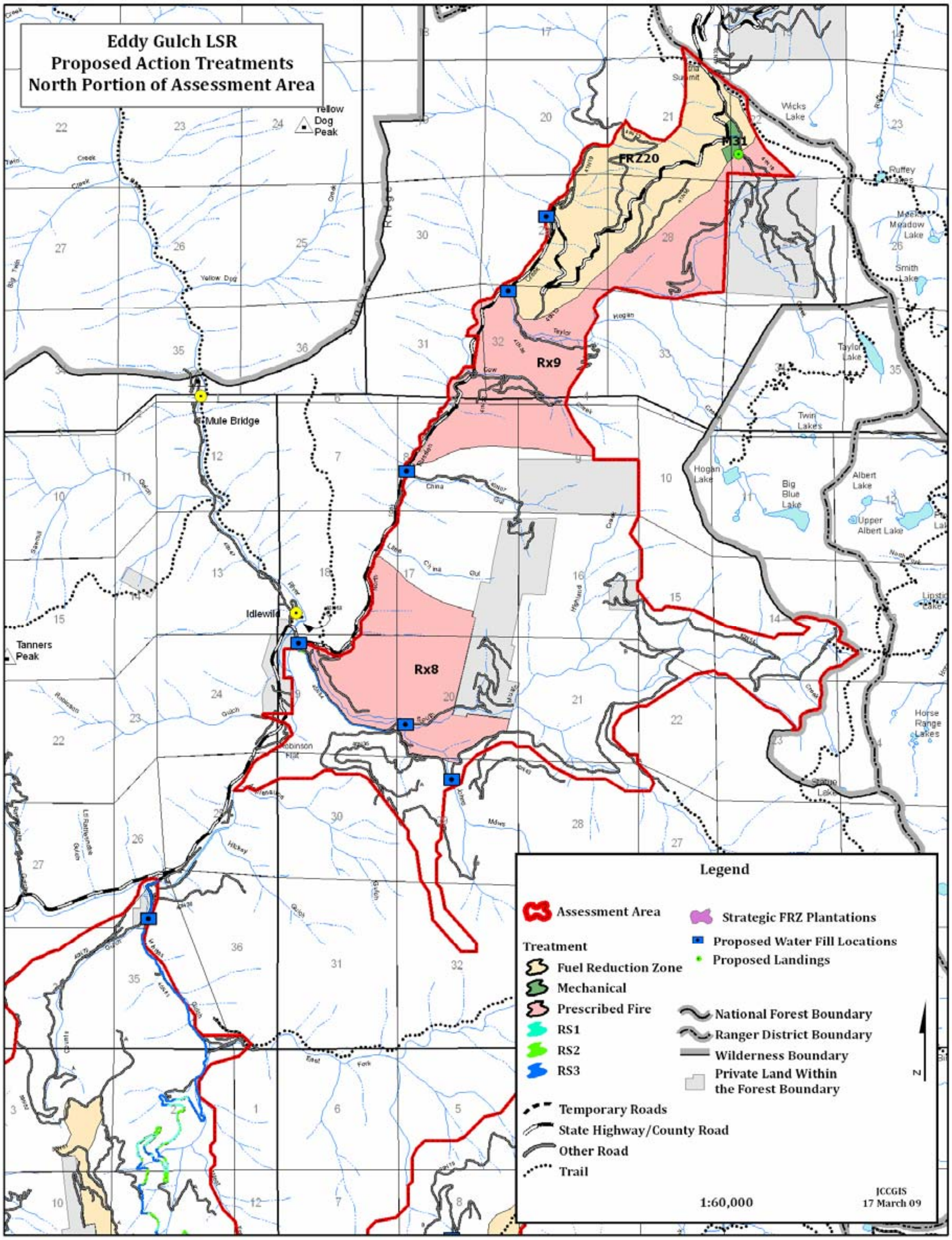
Appendix A

Maps

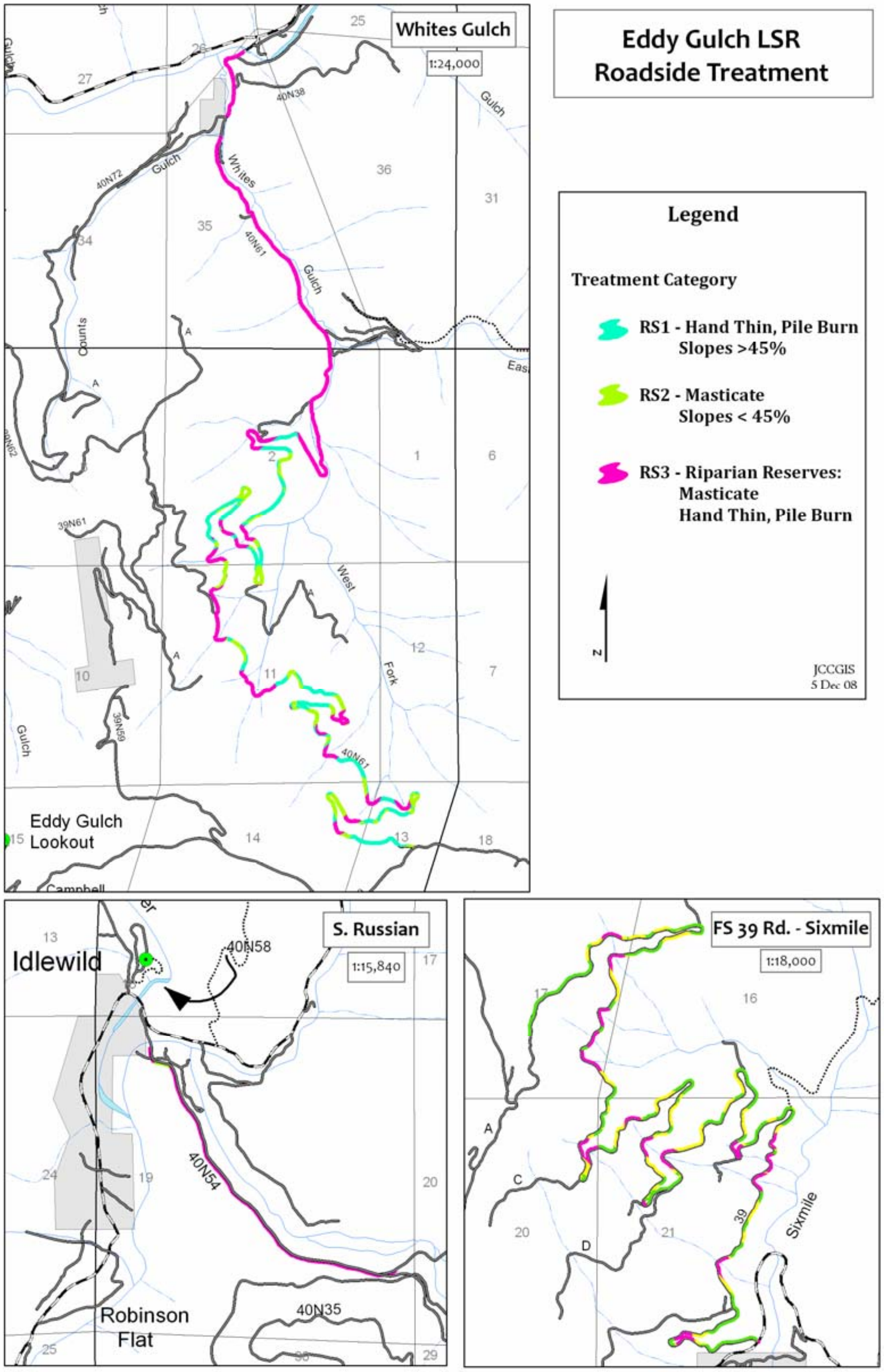
Map A-1a. Proposed treatment units in the south portion of the Eddy Gulch LSR Project Assessment Area.



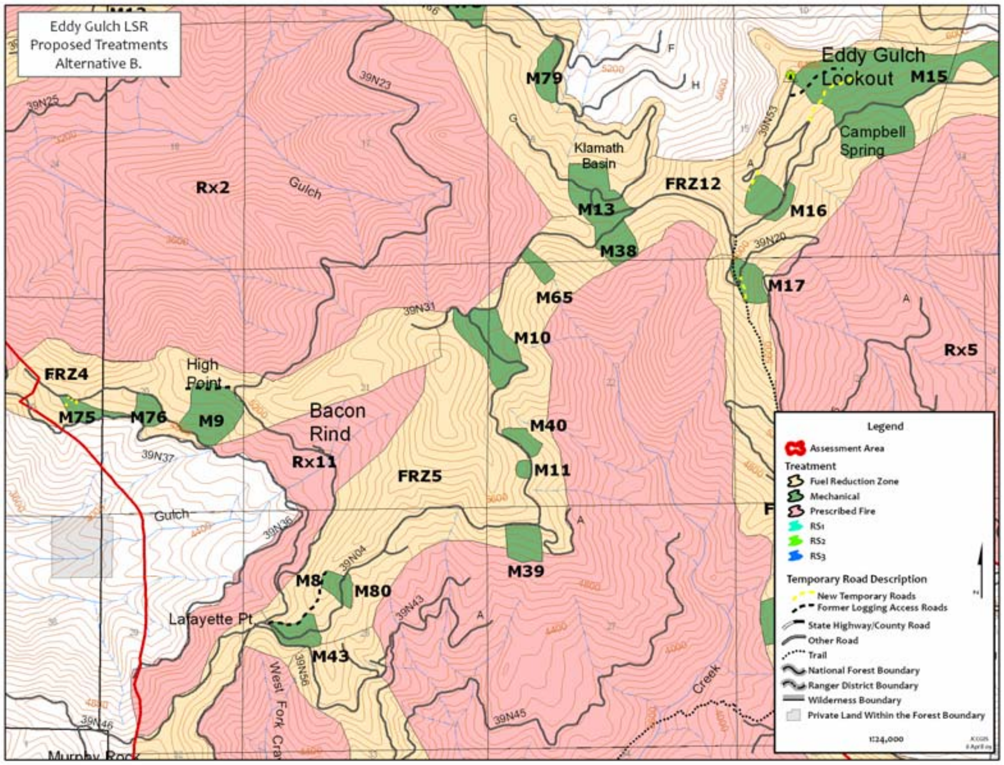
Map A-1b. Proposed treatment units in the north portion of the Eddy Gulch LSR Project Assessment Area.

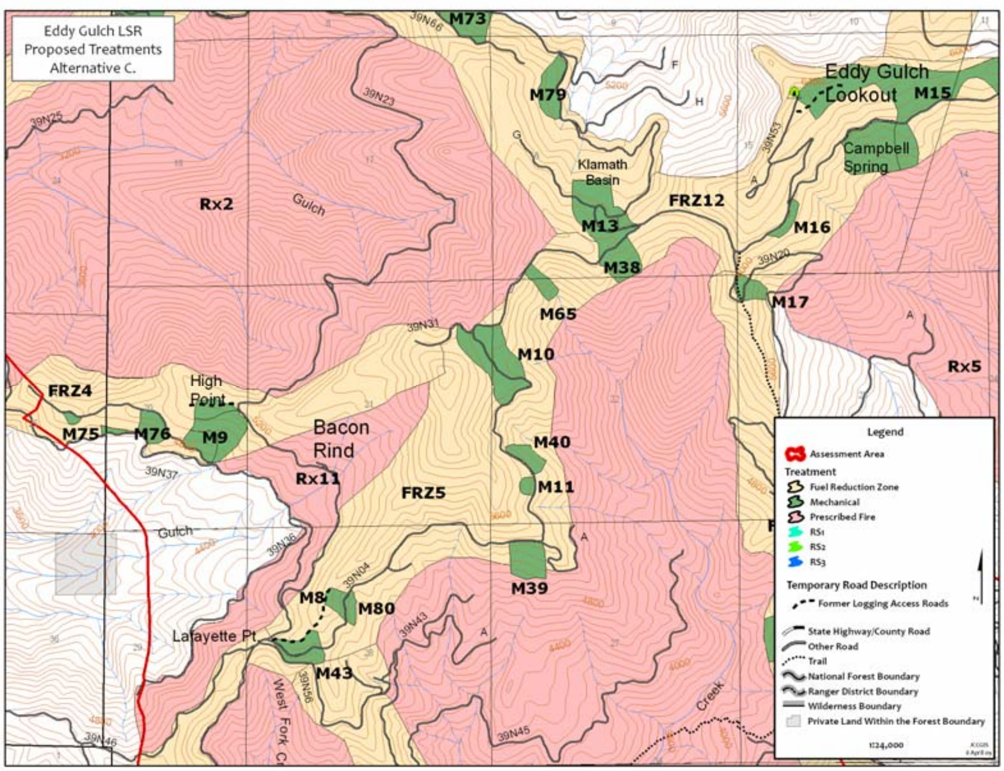


Map A-2. Roadside treatments along emergency access routes that do not pass through an FRZ or Rx Unit.

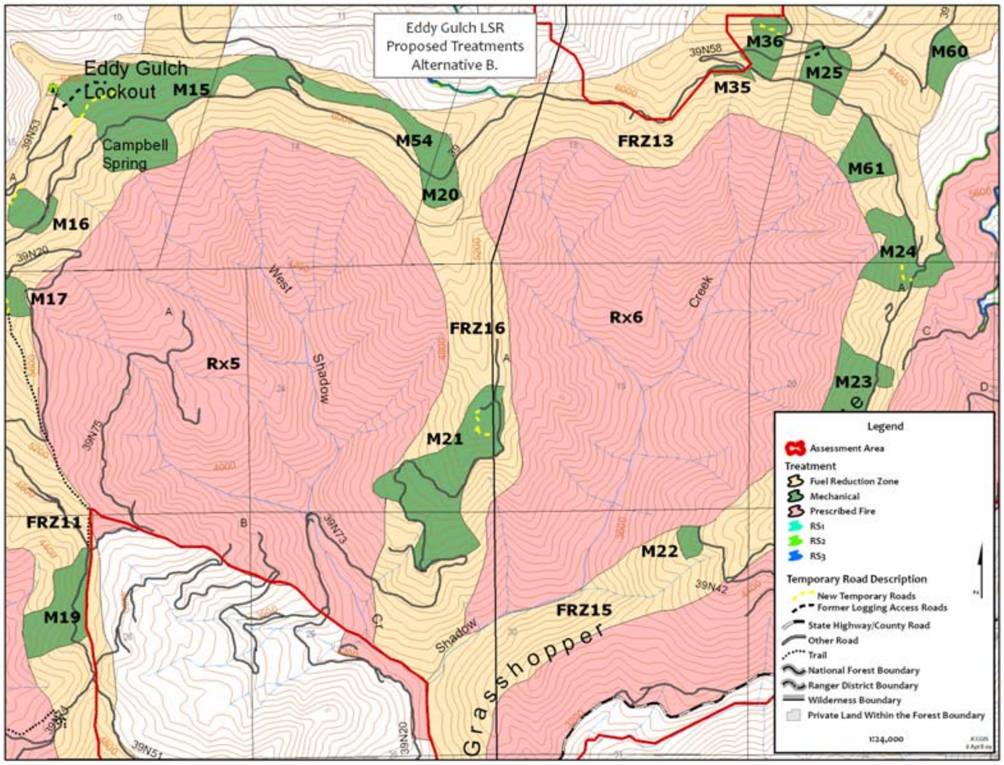


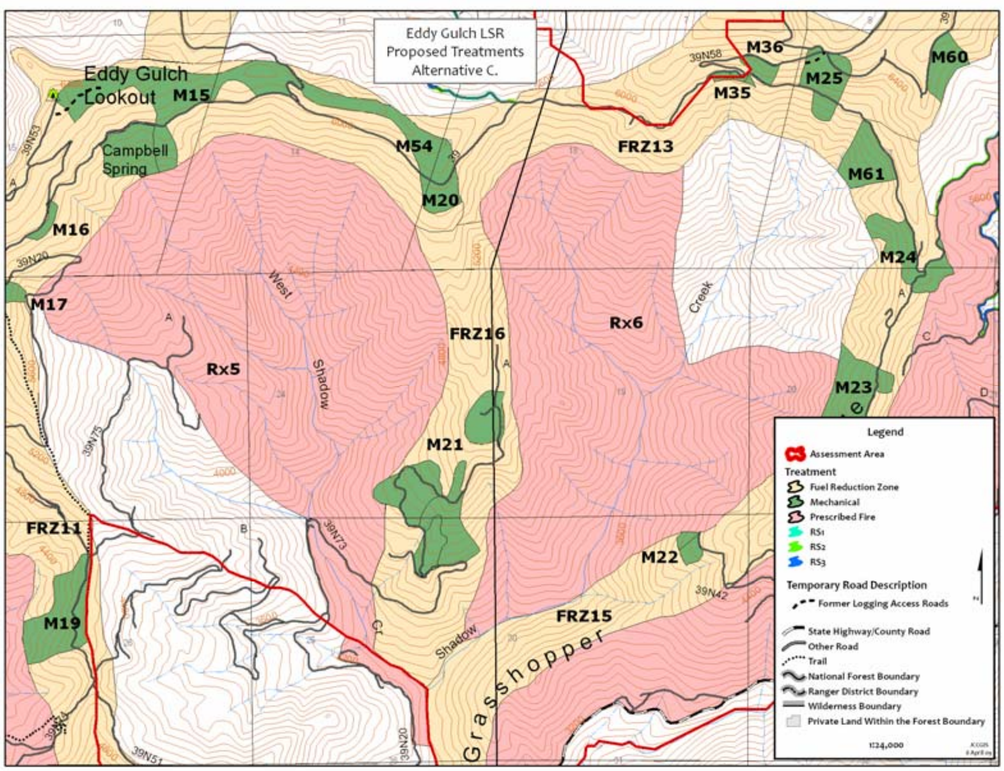
Map A-3a. View 1: Alternative B–configuration of treatment units *with construction* of 1.03 miles of new temporary roads and Alternative C–configuration of treatment units *without construction* of 1.03 miles of new temporary roads.



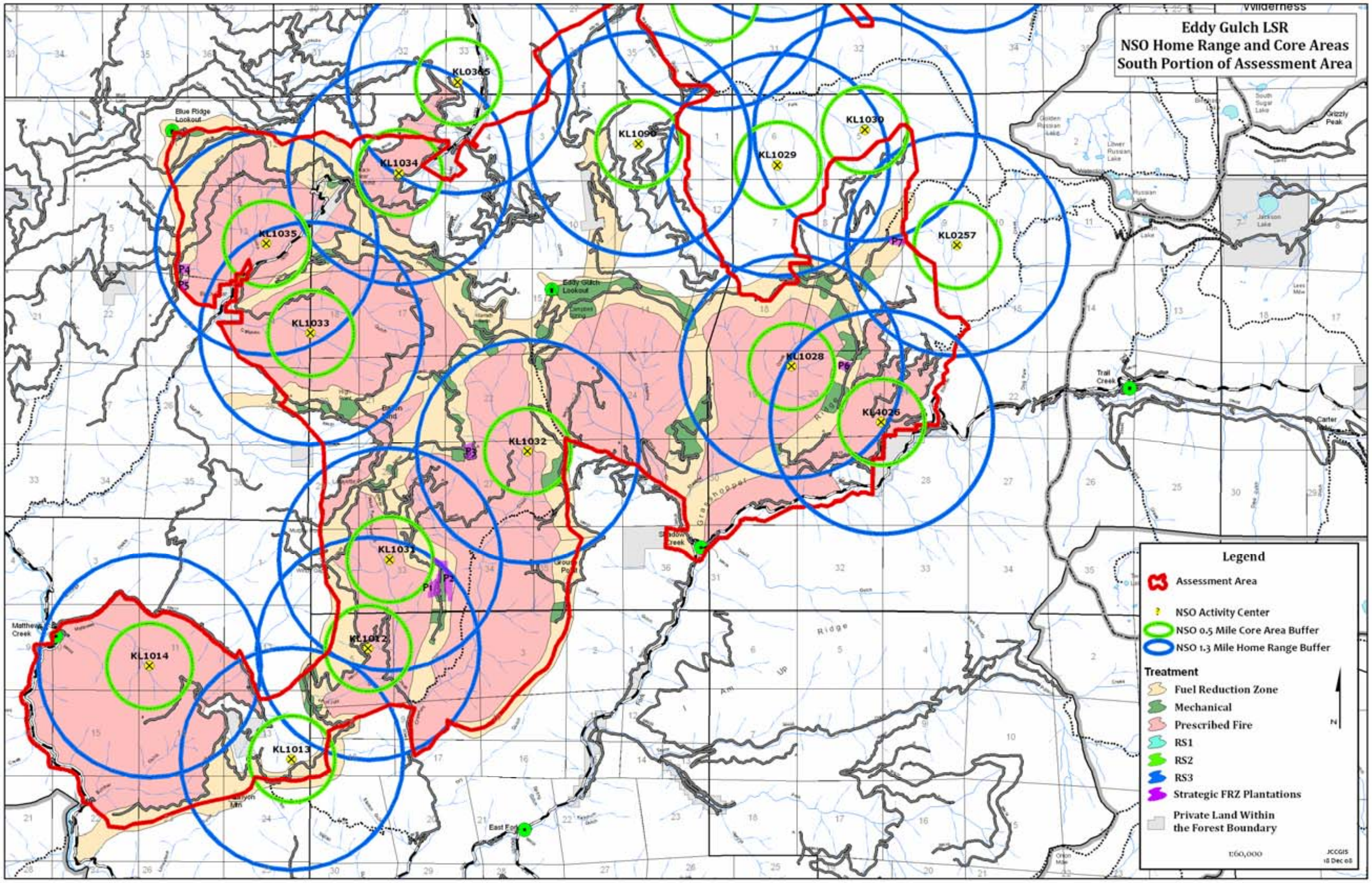


Map A-3b. View 2: Alternative B–configuration of treatment units *with construction* of 1.03 miles of new temporary roads and Alternative C–configuration of treatment units *without construction* of 1.03 miles of new temporary roads.





Map A-4a. NSO activity centers, core areas, and home range buffers in the south portion of the Assessment Area.



Map A-4b. NSO activity centers, core areas, and home range buffers in the north portion of the Assessment Area.