Biological Evaluation for Wildlife Sensitive Species

Eshom Area Fuel Break Maintenance Project

HUME LAKE RANGER DISTRICT
SEQUOIA NATIONAL FOREST and GIANT SEQUOIA NATIONAL MONUMENT

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SUMMARY

This Biological Evaluation analyzes the potential effects of the Eshom Area Fuel Break Maintenance Project on Forest Service Region 5 sensitive animal species. It is prepared in compliance with the requirements of the FSM 2672.4 and 36 CFR 219.19. The purpose of the project is the removal of snags and brush from established fuel breaks in the Eshom area. The fuel break system is intended to allow firefighters access to strategic locations to slow or stop a wildland fire.

Region 5 Forest Service sensitive species with documented or potential occurrence (based on habitat) near the project area include: Northern goshawks (*Accipiter gentilis*), California spotted owls (*Strix occidentalis occidentalis*), fishers (*Pekania pennanti*), pallid bats (*Antrozous pallidus*), Fringed myotis *(Myotis thysanodes),* Western pond turtles (*Actinemys marmorata*), and California legless lizards (*Anniella pulchra).* For these sensitive species the determination of "**May affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability**" was made based on the effects analysis of the proposed project activities. That determination was based, in part, on the implementation of mitigations, including limited operating periods designed to prevent disturbance during critical denning/nesting seasons.

I. INTRODUCTION

The purpose of this Biological Evaluation (BE) is to review the potential impacts associated with the Eshom Area Fuel Break Maintenance Project (Eshom Fuel Break Project) to determine its effect on Forest Service sensitive species. The BE will determine whether the proposed action would contribute to a trend toward any Forest Service sensitive animal species becoming federally listed. This BE was prepared in accordance with the standards established under Forest Service Manual direction (FSM 2672.42).

Hume Lake Ranger District wildlife records, NRIS Wildlife records, the Sequoia National Forest Reptile and Amphibian Data Base, the California Natural Diversity Data Base, species habitat requirements, and species range information from the California Wildlife Habitat Relationships database were used to develop the list of species likely to be found in or near the project area.

Species considered in depth are listed in Table 1. Appendix A contains a detailed listing of other sensitive species that have the potential to occur within Sequoia National Forest but were eliminated from the need for detailed analysis under this document based on various criteria related to habitat requirements, geographic range or potential effects.

Table 1. Species considered in detail for the Eshom Fuel Break Project.

Common Name	Scientific Name	Status
Northern Goshawk	*Accipiter gentilis*	FS
California Spotted Owl	*Strix occidentalis occidentalis*	FS
Fisher	*Pekania pennanti*	FS
Pallid Bat	*Antrozous pallidus*	FS
Fringed Myotis	*Myotis thysanodes*	FS
Western Pond Turtle	*Actinemys marmorata*	FS
California Legless Lizard	*Anniella pulchra*	FS

FS = Forest Service Sensitive Species in Region 5

II. CURRENT MANAGEMENT DIRECTION

Direction for sensitive species management is provided in the Forest Service Manual (FSM 2672.1), and the Sequoia Forest Land and Resource Management Plan (LRMP) (USDA 1988) as amended by the 2012 Giant Sequoia National Monument Management Plan (USDA 2012). Forest Service manual direction ensures through the Biological Evaluation (BE) process that all sensitive species receive full consideration in relation to proposed activities.

Direction to maintain the viability of Region 5 sensitive species is provided by the National Forest Management Act, the Code of Federal Regulations (CFR 219.19), the Forest Service Manual (FSM 2672), and the Sequoia LRMP as amended by the 2012 Giant Sequoia National Monument Management Plan. The LRMP provides general direction to utilize administrative measures to protect and improve the status of sensitive wildlife species.

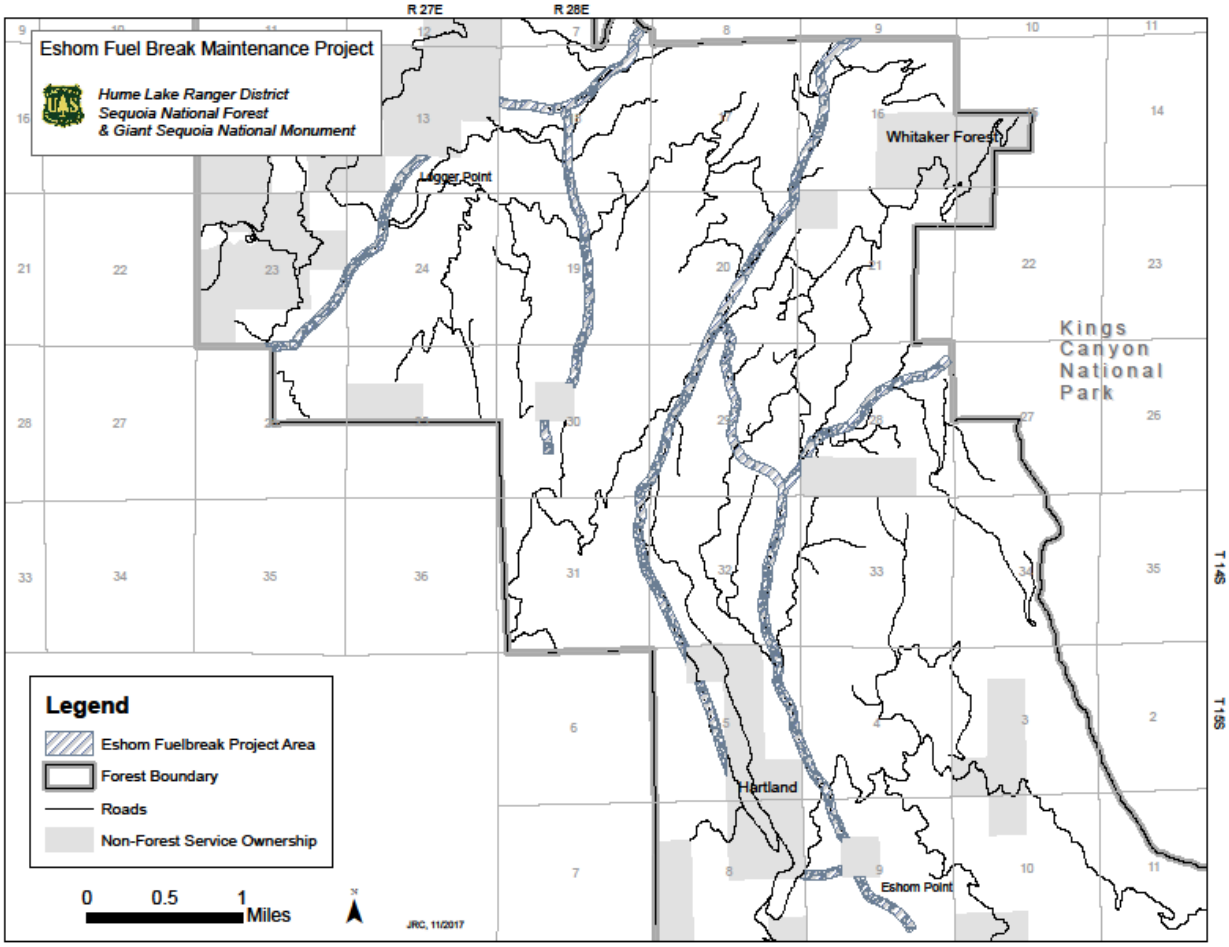
The project area is also within Giant Sequoia National Monument and subject to standards and guidelines from the 2012 Giant Sequoia National Monument Management Plan (Monument Plan). The entire project area is within either Wildland Urban Interface (WUI) defense or threat

zones. The entire project area is also within the Southern Sierra Fisher Conservation Area which has specific direction to manage to support fisher habitat requirements. A portion of the project also overlaps riparian conservation areas.

III. DESCRIPTION OF THE PROPOSED PROJECT

The Eshom Fuel Break Project is located on the Hume Lake Ranger District of Sequoia National Forest and Giant Sequoia National Monument, within Townships 14 and 15 South, and Ranges 27 and 28, East (Map 1).

Map 1. Project Area



PROJECT DESCRIPTION

Maintenance on portions of five fuelbreaks in the Eshom area through use of mechanical and hand treatments. Treatment is proposed on approximately 565 acres of the fuelbreaks where they cross National Forest System lands, and do not include treatment of the private inholdings. The treatments are felling all the snags and other trees that pose a safety hazard to fuel break operability, and masticating or piling the smaller material (up to 10 inch diameter) that creates ladder fuels or a contiguous fuel bed over 18 inches deep along the fuel break. Mechanical

equipment such as a dozer or excavator with a masticator or feller/buncher head would cut and pile material on slopes less than 35 percent, which will be the majority of the fuelbreaks. Areas where the mechanical equipment cannot feasibly treat (steeper areas on fuel break edges, rock outcrops, etc.) will be treated by hand and may include cutting, piling, and burning of brush and small trees or hazard trees of any size using chainsaws and other hand tools. Portions of the fuelbreaks may be understory burned if feasible. Small live trees would be protected from damage to restore the fuelbreaks to the open canopy stand conditions with limited fuel ladders.

Some of the proposed maintenance activities will occur within Riparian Conservation Areas (RCAs). In general, no mechanized equipment will be used within Stream Management Zones (SMZs) of RCAs. Mechanical treatments and burning will be allowed outside of SMZs but will follow general RCA guidelines within RCA zones. Specifically, where Sawmill Fuelbreak crosses the RCA of Eshom Creek, only hand treatments will be used to reduce ladder fuel and remove snags within 100 feet of the creek. Any piling and burning of fuels should occur outside of the 100 foot SMZ area.

Heavy equipment would be washed prior to entry onto National Forest land to prevent the introduction of invasive plants. All applicable Best Management Practices would be adhered to for the protection of soil and water quality.

Applicable Standards:

- Retain felled trees on the ground where needed to achieve down woody material standards of 10 to 20 tons per acre in logs greater than 12 inches in diameter. (*Giant Sequoia National Monument Management Plan, p. 87*)

IV. EXISTING ENVIRONMENT

These fuelbreaks are located mainly on fairly narrow ridges and managed for a width of up to 300 feet. The vegetative community is pine and mixed conifer stands (composed of ponderosa and sugar pine, white fir, incense cedar and black oak), and mixed chaparral (mainly manzanita). Surface fuels are predominantly bear clover with high concentrations of large down woody material and duff due to the recent drought and insect mortality.

This area suffered from a severe drought from 2012 through 2016, and subsequent explosion of the bark beetle population which killed between 30 and 90 percent of the trees in the vicinity, especially the pines. The result is several thousand acres of standing and down dead material of all sizes across the landscape. Portions of Eshom and Worden fuelbreaks have had most of the dead trees felled where they threatened adjacent roadways. The material is all still on the ground, with tops and limbs in the process of being piled. The extensive fuels off all sizes (10,100 and 1000 hour fuels; from ¼ inch branches to logs 40 inches in diameter) has compromised the effectiveness of these fuelbreaks at this time.

Species and Habitat Accounts:
A detailed life history account for most species is provided in the Sierra Nevada Forest Plan Amendment FEIS and ROD (USDA 2001), hereby incorporated by Reference. Much of this

information is summarized in the section below, but also incorporates localized data on habitat condition, habitat use and surveys completed.

Habitat acres for each species within the project area were calculated by using existing geographic information system (GIS) vegetation data (EVEG based on data collected in July 2016). All acres are approximate.

Northern Goshawk *(Accipiter gentilis)*

Habitat Preferences and Biology

Preferred habitat for goshawks consists of older-age coniferous, mixed, and deciduous forest habitat. The habitat includes large trees for nesting, a closed canopy for protection and thermal cover, and open spaces allowing maneuverability below the canopy (Hargis et al. 1994; Squires and Kennedy 2006). Snags, downed logs, and high canopy cover appear to be preferred habitat features although many east side Sierran territories are relatively open and have fewer snags. Snags and down logs are an important component used by numerous prey species. In addition, many of the species that provide the prey base for northern goshawks are associated with open stands of trees or natural openings containing an understory of native shrubs and grass (Fowler 1988). Northern goshawk demography is strongly influenced by prey availability (Squires and Kennedy 2006).

Northern goshawk nesting habitat is characterized by dense canopy closure (50 to 90 percent) in mature forest with open flight paths under the canopy (McGrath et al. 2003). Nest trees for this species are commonly located on benches or basins surrounded by much steeper slopes (Hargis et al. 1994). Mature trees serve as nest and perch sites, while plucking posts are frequently located in denser portions of the secondary canopy. The same nest may be used for several seasons, but alternate nests are common within a single territory. The chronology of nesting activity varies annually and by elevation. In general, nesting activities are initiated in February with nest construction, egg laying, and incubation occurring through May and June (Dewey et al. 2003). Young birds hatch and begin fledging in late June and early July and are independent by mid-September.

Habitat models based on best professional opinion contained in the California Wildlife Habitat Relationships (CWHR) database rate the following vegetation types and strata as providing high nesting and feeding habitat capability for northern goshawks: structure classes 4M, 4D, 5M, 5D and 6 in Sierran mixed conifer, white fir, ponderosa pine, montane hardwood-conifer, montane riparian, red fir, Jeffrey pine, lodgepole pine, subalpine conifer, and montane hardwood (California Department of Fish and Game 2005). CWHR assigns habitat values according to expert panel ratings. Using the CWHR model, there are 352 acres of moderate and high suitability nesting and foraging habitat for northern goshawks in the Eshom Fuel Break project area.

Distribution

While northern goshawks are year-round residents in many higher elevation areas of California, population trends for this species in the state are poorly known (Keane 2008). Surveys for

nesting northern goshawks have occurred intermittently in relation to projects or based on reported sightings in portions of Sequoia National Forest. Eight territories have been identified on the Hume Lake Ranger District based on nest location or location of an adult and juvenile.

Historically, a nesting site was found in Whitaker Forest, which which is adjacent to the project area. Additional goshawks have been detected near Eshom Campground and around Pierce Valley, but no nests have been located in these areas. The area north of Eshom Campground has been recently used by goshawks in the post-fledging period.

Risk Factors

Habitat loss and degradation are the primary known threats to northern Goshawks (Squires and Kennedy 2006). Collection, habitat fragmentation, disturbance at a specific site, and edge effects were described by Gaines et al. (2003) as factors that potentially affect northern goshawks. Human disturbance has the potential to cause northern goshawks to abandon nest sites during the nesting (Boal and Mannan 1994) and post-fledging period (February 15 through September 15).

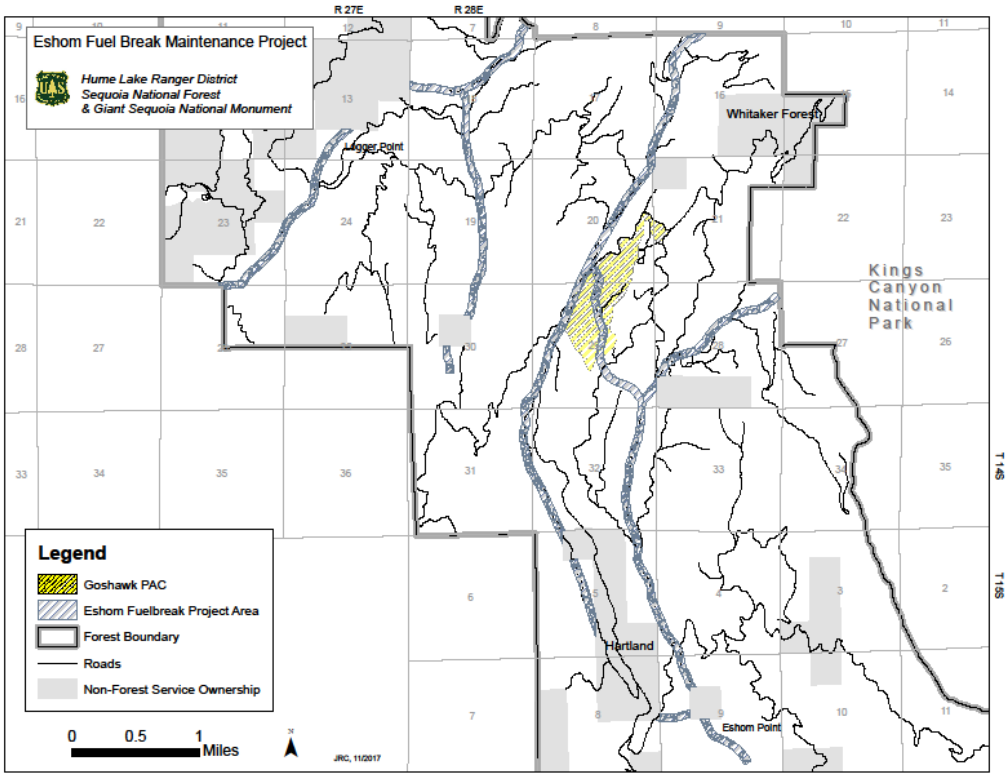
Management and Status

Management direction in the 2012 Monument Plan for northern goshawks includes delineating a 200-acre protected activity center (PAC) around the most recent nest site and alternate nest sites containing the best available suitable forested habitat in the largest contiguous patch as possible (USDA 2012). The California Department of Fish and Game has designated northern goshawks as a California species of special concern.

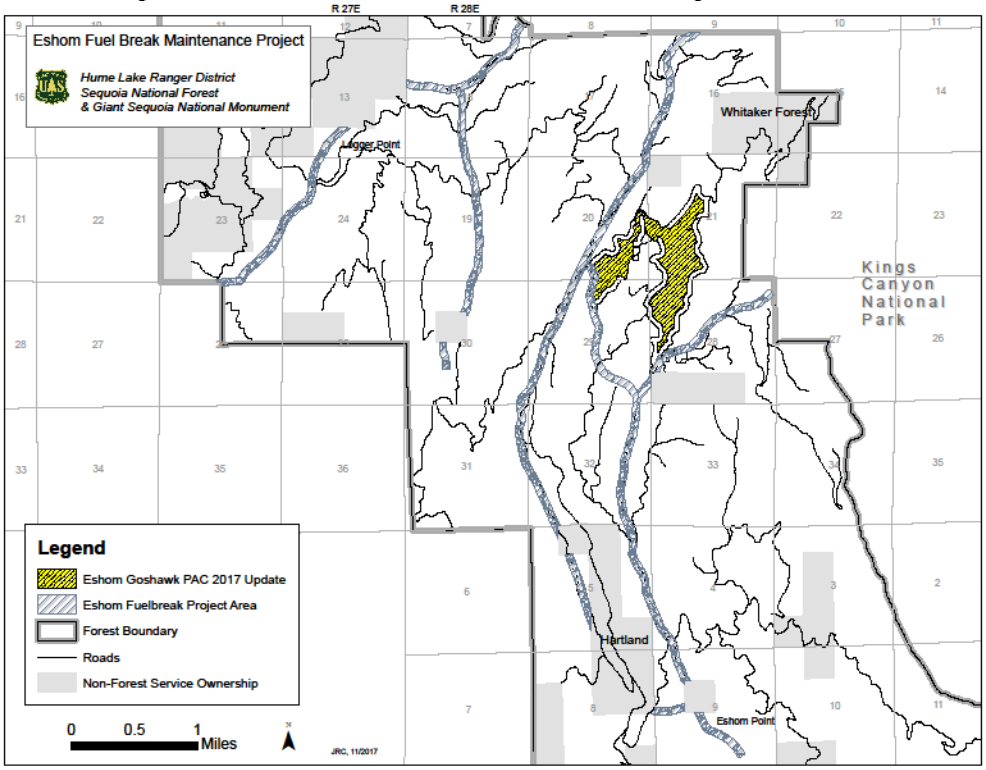
There is one goshawk PAC (#R5F13D51T09) that previously overlaped with the project area. Whitaker Forest Road (Mt. Rd. 465) forms the western boundary of this PAC (Map 2). This PAC was established in 2010 based on the location of post-fledging chicks. Based on monitoring, goshawks chicks in this area fledge prior to June 30.

Recent tree mortality has changed the habitat quality in and around the Eshom goshawk PAC. Using updated vegetation data (2016 EVEG), the boundary of the PAC was re-drawn to encompass the best available, least fragmented habitat in the area. The new location (Map 3) would not be bisected by a fuel break and excludes most areas near roads.

Map 2. Location of Eshom Goshawk PAC



Map 3. Location of Eshom Goshawk PAC Updated in 2017



California Spotted Owl *(Strix occidentalis occidentalis)*

Habitat Preferences and Biology

California spotted owls are one of three recognized subspecies of spotted owls, including the northern spotted owl, (*Strix occidentalis caurina*) and the Mexican spotted owl (*Strix occidentalis lucida*) (American Ornithologists' Union 1957). California spotted owls are considered prey specialists (Verner et al. 1992) because they select a few key species among the variety of taxa on which they prey, which includes mammals, birds, and insects (Barrows 1980, Hedlund 1996, Smith et al. 1999, Thrailkill and Bias 1989). In the upper elevations of the Sierra Nevada, the primary prey is the northern flying squirrel (*Glaucomys sabrinus*) (Verner et al. 1992). In lower elevations of the Sierra Nevada and in Southern California, the primary prey is the dusky-footed woodrat (*Neotoma fuscipes*) (Thrailkill and Bias 1989). Both flying squirrels and woodrats occur in the diets of owls in the central Sierra Nevada (Verner et al. 1992).

Spotted owls are primarily territorial; however non-territorial owls ("floaters") may also exist in populations and occupy territories after they are vacated (Gutiérrez 1994, LaHaye et al. 1994). Estimates of California spotted owl home range size are extremely variable. Based on an analysis of data from telemetry studies of California spotted owls, mean breeding season, pair home range sizes have been estimated (using 100 percent minimum convex polygon method): 9,000 acres on the Lassen National Forest, true fir type; 4,700 acres on the Tahoe and El Dorado National Forests, mixed conifer type; and 2,500 acres on the Sierra National Forest, mixed conifer type. All available data indicate that home ranges are smallest in habitats at relatively low elevations that are dominated by hardwoods, intermediate in size in conifer forests in the central Sierra Nevada, and largest in the true fir forests in the northern Sierra Nevada (Verner et al. 1992). Home ranges of owls in areas where the primary prey is northern flying squirrels are consistently larger than those where the primary prey is dusky-footed woodrats presumably because woodrats occur in greater densities and weigh more than flying squirrels (Zabel et al. 1992). As of 1992, approximately 25 percent of known owl sites were found where woodrats are the primary prey species and 75 percent of sites were found where flying squirrels are the primary prey species (Verner et al. 1992).

The spotted owl breeding cycle extends from about mid-February to mid- to late September. Egg laying through incubation, when the female spotted owl must remain at the nest, extends from early April through mid to late May. California spotted owls nest in a variety of tree/snag species in pre-existing structures such as cavities, broken top trees, and platforms such as mistletoe brooms, debris platforms and old raptor or squirrel nests (Gutiérrez et al. 1992, 1995). Young owls typically fledge from the nest in mid to late June. In the weeks after fledging, the young are very weak fliers and remain near the nest tree. Adults continue to bring food to the fledglings until mid to late September when the young disperse. Information on the dispersal abilities of California spotted owls is scant. Verner et al. (1992) indicates that two-thirds of the juveniles would be expected to disperse at least eight miles.

Not all pairs of California spotted owls nest every year. In fact, over a ten year period of demographic studies in the Sierra Nevada, 1992 was the only year when nearly all study owls nested. It is not unusual for owls in an established activity center to skip several years between one nesting and the next. Sites may be vacant for several consecutive years when the population

is in decline, but then be reoccupied to support breeding pairs during a population upswing. Spotted owls as a species have apparently evolved high adult survival rates associated with irregular and unpredictable reproduction (Noon and Biles 1990) their long life span allows eventual recruitment of offspring even if recruitment does not occur each year (Franklin et al. 2000).

Spotted owls are long-lived (owls in the wild have been known to be 17 years old) and adult survival rates in the Sierra Nevada are relatively high (greater than 0.80; Noon et al. 1992, Blakesley and Noon 1999, Steger et al. 1999), indicating the species may be able to persist over the short-term even with extensive reduction in the amount of its suitable habitat (Noon et al. 1992).

In the Sierra Nevada, 80 percent of spotted owl sites have been found in mixed conifer forests (sugar and ponderosa pine, white fir, Douglas-fir, giant sequoia, incense-cedar, black oak, and red fir), 10 percent in red fir forests (red and white fir, lodgepole pine, and quaking aspen) seven percent in ponderosa pine/hardwood forests (ponderosa pine, interior and canyon live oak, black oak, incense-cedar, white fir, tanoak, and Pacific madrone), and three percent in other forest types such as east-side pine, and foothill riparian/hardwood (cottonwood, California sycamore, interior live oak, Oregon ash, and California buckeye) (Verner et al. 1992).

Six major studies (Gutiérrez et al. 1992) described habitat relations of the owl in four general areas spanning the length of the Sierra Nevada. These studies examined spotted owl habitat use at three scales: landscape; home range; and nest, roost, or foraging stand. By comparing the amount of time owls spend in various habitat types to amount of habitat available, researchers determined that owls preferentially used areas with at least 70 percent canopy cover, used habitats with 40 to 69 percent canopy cover in proportion to its availability, and spent less time in areas with less than 40 percent canopy cover than might be expected.

In studies referenced by Gutiérrez et al. (1992), spotted owls preferred stands with significantly greater canopy cover, total live tree basal area, basal area of hardwoods and conifers, and snag basal area for nesting and roosting. In general, stands suitable for nesting and roosting have (1) two or more canopy layers, (2) dominant and codominant trees in the canopy averaging at least 24 inches in dbh, (3) at least 70 percent total canopy cover (including the hardwood component), (4) higher than average levels of very large, old trees, and (5) higher than average levels of snags and downed woody material.

Habitat models based on best professional opinion contained in the California Wildlife Habitat Relationships (CWHR) database rate the following types as providing high capability nesting and feeding habitat for spotted owls: structure classes 4M, 4D, 5M, 5D and 6. Using the CWHR model there are 352 acres of moderate and high suitability habitat in the project area.

Distribution

California spotted owl populations have two major geographic groups, one inhabiting the Sierra Nevada Province and the other in the Southern California Province, with Tehachapi Pass as the dividing line between the two populations. These regions are distinct geographically. In the Sierra Nevada, California spotted owls are mostly continuously and uniformly distributed, with

several breaks in distribution where habitat appears limited due to natural or human caused factors (Beck and Gould 1992).

Sequoia National Forest has conducted surveys for spotted owls across the forest since the early 1980's. Based on those survey results, there area an estimated 120+ spotted owl territories on the Forest. Twenty of these territories are located on the Hume Lake Ranger District in a variety of locations and habitat types. There have been a number of historic spotted owl detections in the vicinity pf the project area. However, there are no known nest stands within ½ mile of the project area.

Population Trends

Four demographic studies of California spotted owls have been ongoing for a number of years within the Sierra Nevada: (1) Eldorado National Forest (since 1986); (2) Lassen National Forest (since 1990); (3) Sierra National Forest (since 1990); and (4) Sequoia-Kings Canyon National Park (since 1990). In 2007, the Sierra Nevada Adaptive Management Project (SNAMP) initiated an additional California spotted owl study on the Tahoe National Forest. The initial study area for this SNAMP study had so few California spotted owls that it was expanded to incorporate the long-term Eldorado National Forest demographic study area.

One of the primary objectives of demographic studies is to monitor rate of change (lambda (λ)) in owl populations (i.e., the number of owls present in a given year divided by the number of owls present the year before). For these demographic models, a lambda of 1 indicates a stable population; less than one indicates the population is decreasing and greater than 1 indicates an increasing population. Lambda is estimated from models and is typically presented as an estimate of the rate of population change, along with a standard error (SE) or a 95% confidence interval (CI). The 95% confidence interval represents the reliability of the estimate of lambda. Managers typically view a population as stable if the 95% confidence interval overlaps a lambda of 1.

For the California spotted owl demographic studies, lambda is estimated individually for each study area at five-year intervals (Franklin et al. 2004, Blakesley et al. 2010). The most recent analysis, using data collected between 1990 and 2005, provided estimates of lambda for all four Sierra Nevada demography study areas (Blakesley et al. 2010):

> **Lassen:** mean estimated lambda is 0.973, with a 95% CI ranging from 0.946 to 1.001
>
> **Eldorado:** mean estimated lambda is 1.007, with a 95% CI ranging from 0.952 to 1.066
>
> **Sierra:** mean estimated lambda is 0.992, with a 95% CI ranging from 0.966 to 1.018
>
> **Sequoia-Kings Canyon:** mean estimated lambda is 1.006, with a 95% confidence interval ranging from 0.947 to 1.068

Blakesley et al. (2010) conducted a "meta-analysis" of the data from all four sites, but did not report a mean estimated lambda for the collective data. Researchers update these estimates annually in unpublished reports, but the greater sample sizes of the multi-year analyses result in more significant and meaningful estimates.

The 2010 meta-analysis concluded that, with the exception of the Lassen study area, owl populations were stable, with adult survival rate highest at the Sequoia-Kings Canyon study site. The 95% confidence limit for lambda in the Lassen study area ranged from 0.946 to 1.001 (estimated value 0.973), which barely includes 1, and the analysis estimated a steady annual decline of 2 – 3% in the Lassen study population between 1990 and 2005.

There has been no recent population monitoring within the Hume Lake Ranger District. The Sequoia-Kings Canyon study site is adjacent to the project area and may best represent the population trend of spotted owls in this location.

Risk Factors

General threats to spotted owls include: the range expansion of barred owls, catastrophic large wildfires, disease (West Nile Virus and parasites), insect and pathogen issues (loss of trees), and loss of habitat (urbanization, industrial timber harvest).

Management and Status

The USFWS has conducted several significant status reviews of the California spotted owl in response to listing petitions (published 12 month findings: USFWS 2003, USFWS 2006). In their review, dated May 15, 2006, the USFWS found that the listing of the California spotted owl was not warranted. They concluded that "impacts from fires, fuels treatments, timber harvest, and other activities are not at a scale, magnitude, or intensity that warrants listing, and that the overall magnitude of threats to the California spotted owl does not rise to the level that requires the protections of the Act" at this time.

The USFWS received another petition for listing in 2015, which is currently under review (Federal Register, Vol. 80, No. 181). The California spotted owl is listed as a species of special concern by the California Department of Fish and Game.

Management direction from the 2012 Monument Plan includes delineation of 300 acre protected activity centers (PACs) with associated 300 acre Home Range Core Areas (HRCAs) that have specific restrictions on activity. There are currently 20 spotted owl PACs located on the Hume Lake Ranger District. No spotted owl PACs or their associated HRCAs overlap with the project area.

Pallid bat *(Antrozous pallidus)*

Habitat Preferences and Biology

Pallid bats are usually found in low to middle elevation habitats below 6000 ft. (Philpott 1997); however, the species has been found up to 10,000 ft. in the Sierra Nevada. A variety of habitats are used, including grasslands, shrublands, woodlands, and coniferous forests (Philpott 1997). At Yosemite National Park, reproductive populations have been detected in giant sequoia groves (Pierson et al. 2006). It was one of the species most commonly encountered in giant sequoias in Giant Forest, Sequoia National Park (Pierson and Heady 1996). They are yearlong residents in most of their range and hibernate in winter near their summer roost (Zeiner et al.1990).

Occasional forays may be made in winter for food and water (Philpott 1997).

Day roosts may vary but are commonly found in rock crevices, tree hollows, mines, caves and a variety of human-made structures. Tree roosting has been documented in large conifer snags, inside basal hollows of giant sequoias, and bole cavities in oaks. Cavities in broken branches of black oak are very important and there is a strong association with black oak for roosting (Pierson et al. 2006). Roosting sites are usually selected near the entrance to the roost in twilight rather than total darkness. The site must protect pallid bats from high temperatures as this species is intolerant of roosts in excess of 104 degrees Fahrenheit. Pallid bats are also very sensitive to roost site disturbance (Zeiner et al. 1990, Philpott 1997). Night roosts are usually more open sites and may include open buildings, porches, mines, caves, and under bridges (Philpott 1997, Pierson et al. 1996).

Pallid bats are nocturnal and emerge after sunset from day roosts to forage. Pallid bats feed primarily on large, ground-dwelling arthropods, particularly Jerusalem crickets and scorpions (Pierson et al. 2006).

Historic and Current Distribution

There have been few bat surveys on the Hume Lake Ranger District but pallid bats are presumed to be present within their elevation range. A study conducted in the Giant Forest area of Sequoia National Park found the pallid bat to be one of the species most commonly associated with giant sequoias (Pierson and Heady 1996). The entire project area is within the mapped CWHR range for this species.

Risk factors

Pallid bats are very sensitive to disturbance of roosting sites. The loss of large trees or snags may reduce the availability of roost structures. Some researchers believe livestock grazing may reduce the quality of foraging habitat (Chapman et al. 1994).The emergence and spread of the pathogenic fungus (*Geomyces destructans*) that infects hibernating bats has the potential to spread to California. Pallid bats may be at risk in the future from white-nose syndrome.

Management and Status

Pallid bats are listed as Sensitive Species in Region 5. There is no specific management direction for this species. Pallid bats are listed as a California species of special concern by the California Department of Fish and Game.

Fringed myotis *(Myotis thysanodes)*

Habitat Preferences and Biology

The fringed myotis occurs throughout California, except for the Central Valley and Colorado and Mohave deserts, however the species is patchily distributed showing irregular patterns of abundance (Bradley, et al. 2005, California Department of Fish and Game 2005). Optimal habitats are pinyon-juniper, valley foothill hardwood, and hardwood-conifer habitats, but it is found in a wide variety of habitats (Bradley, et al. 2005, California Department of Fish and

Game 2005, O'Farrell and Studier 1980).

The fringed myotis is known to roost in caves, mines, buildings, crevices in rocks, and snags (O'Farrell and Studier 1980, Bradley et al. 2005, Weller and Zabel 2001, Stephenson and Calcarone 1999). This species has only been found hibernating in mines and buildings (Stephenson and Calcarone 1999). Maternity colonies range from 10 to 2000 individuals, but large colonies are rarely encountered (Bradley, et al. 2005). Males are thought to roost singly or in small groups.

In Douglas fir forests of northern California, fringed myotis day roosts were found exclusively in snags of early to medium stages of decay (Weller and Zabel 2001). Roost sites were characterized by having more snags ≥12 inches diameter at breast height, less canopy cover, and were closer to streams than random sites. Roost snags were taller and larger in diameter, than random snags and other snags near the roost (Weller and Zabel 2001).

The fringed myotis feeds primarily on beetles and moths, but may also capture non flying prey by gleaning it off of vegetation (Bradley, et al. 2005).

Historic and Current Distribution

The California Natural Diversity Database has recorded occurrences of the fringed myotis on the southern part of Sequoia National Forest and at Case Mountain near Sequoia National Park (California Department of Fish and Game 2003). The entire Sequoia National Forest is within the mapped CWHR range for this species, although there have been no known detections on the Hume Lake Ranger District.

Risk factors

Bradley, et al. (2005) state that the major threat identified for the fringed myotis is loss or modification of roosting habitat. They listed closure or renewed activity at abandoned mines, recreational caving and mine exploration, loss of current and future large, decadent trees and replacement of buildings and bridges with non-bat friendly structures as possible causes of roost loss or abandonment.

Pesticides may affect fringed myotis by reducing the quantity of prey or be consumed and accumulated in the fatty tissues of bats (McCracken 1986). Pesticides in fatty tissues are released during hibernation, migration, or periods of stress and may be passed to nursing young.

The emergence and spread of the pathogenic fungus (*Geomyces destructans*) that infects hibernating bats has the potential to spread to California. Fringed myotis may be at risk in the future from white-nose syndrome.

Management and Status

Fringed myotis are listed as Sensitive Species in Region 5. There is no specific Forest Service management direction for this species. Fringed myotis are listed as a “high priority” species by the Western Bat Working Group.

Fisher *(Pekania pennanti)*

A complete discussion of fisher biology and status is available in "Southern Sierra Nevada Fisher Conservation Assessment" (Spencer, et al. 2015). Below is a summary with information specific to the analysis area.

Habitat Preferences and Biology

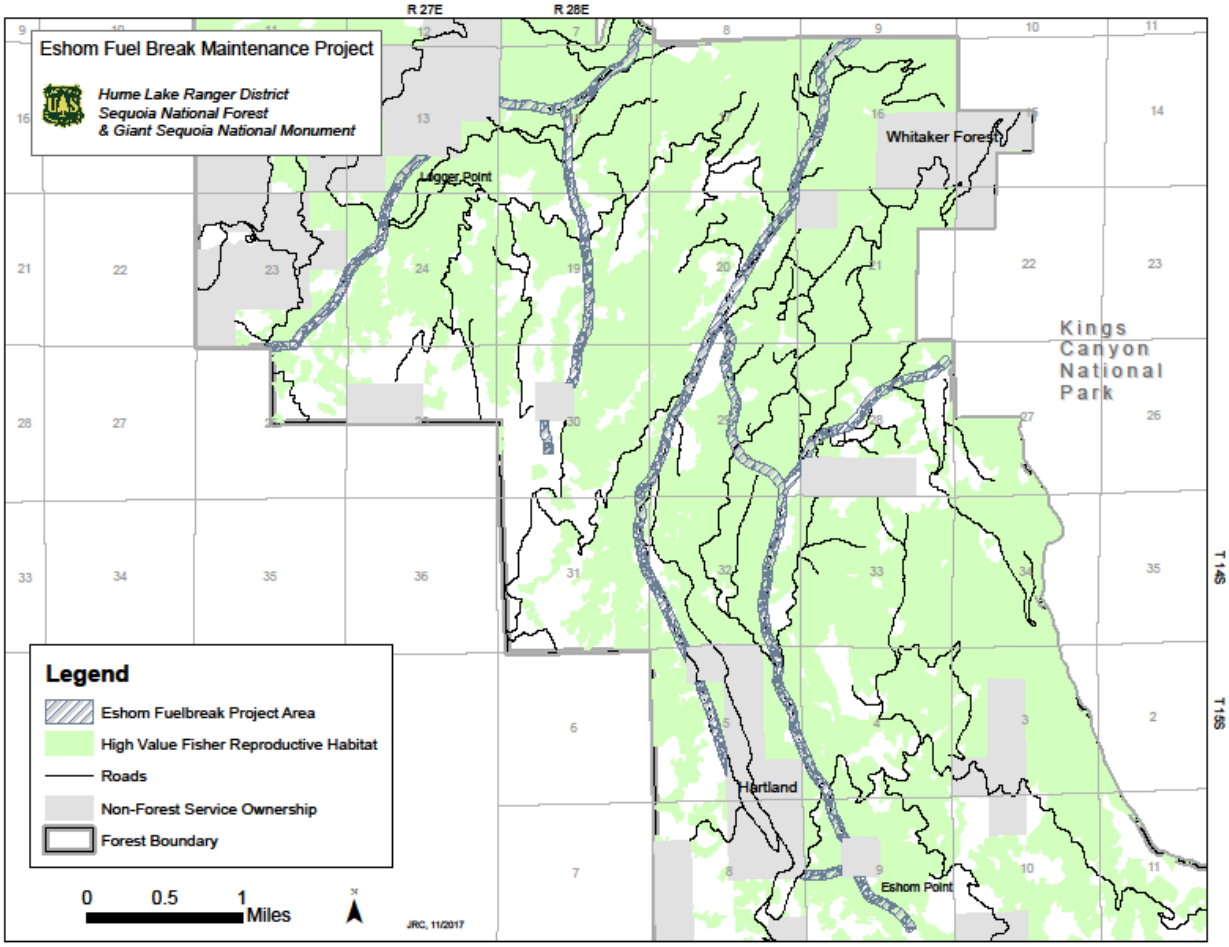
In the Sierra Nevada, fisher habitat occurs in mid-elevation forests (Grinnell et al. 1937). In the southern Sierra Nevada, fishers occur sympatrically with martens (*Martes americana*) at elevations of 5,000 to 8,500 feet in mixed conifer forests (Zielinski et al. 1995). The Sierra Nevada status and trend monitoring project (USDA 2006) has detected fishers as low as 3,110 feet and as high as 9,000 feet in the southern Sierra Nevada, which are considered to be extremes of the elevation range.

In the southern Sierra Nevada, the preferred habitats include mixed conifer, ponderosa pine and montane hardwoods. Oaks, particularly black oak (*Quercus kelloggii*) appear to be a key component of the habitat (Carroll et al. 1999, Zielinski et al. 2004a). Forest structural characteristics within fisher home ranges are strongly skewed toward mid- to late-seral stands with high canopy cover; large, cavity-forming trees are required for resting and denning habitat (Seglund 1995, Zielinski et al. 2004b, Yaeger 2005). Geographic conditions correlated with core fisher habitat in California include complex topography, steep slopes, and proximity to water (particularly in the southern Sierra Nevada) (Zielinski et al. 2004b, Carroll 2005).

Purcell, et al. (2009), studied resting structures used by fishers on an area of Sierra National Forest. They determined that canopy cover was the most important variable distinguishing areas used as rest sites by fishers. Large live trees and large snags made up the majority of the rest structures. Trees used as resting sites were often the largest available in the area. Resting sites were on steeper slopes, closer to streams and with smaller and more variable trees than random sites. Habitat suitable for resting and denning sites is thought to be most limiting to the population; therefore, these habitats should be given more weight than foraging habitats when planning or assessing habitat management (Powell and Zielinski 1994, Zielinski et al. 2004a).

The Southern Sierra Fisher Conservation Strategy (Spencer et al. 2016) identifies high value fisher reproductive habitat as vegetation types: Douglas Fir, Eastside Pine, Jeffrey Pine, Lodgepole Pine, Montane Hardwood-Conifer, Montane Hardwood, Montane Riparian, Ponderosa Pine, Red Fir, Subalpine Conifer, Sierran Mixed Conifer, or White Fir in CWHR size and density classes: 4D, 5M, 5D, and 6. Using this model and current vegetation information, there are 288 acres of high value fisher reproductive habitat in the project area.

Map 4. Distribution of High Value Fisher Reproductive Habitat near Eshom Fuel Breaks



Population Genetics

Several studies have revealed low genetic diversity in the southern Sierra Nevada fisher population (Drew et al. 2003, Wisely et al. 2004, Tucker et al. 2012, 2014). The southern Sierra population became isolated from other populations thousands of years ago. Genetics also indicate that the southern Sierra Nevada (including what is now Sequoia National Forest) may have provided a refuge for fisher during the era of European settlement.

Three genetic subpopulations in the southern Sierras have been identified, separated at the Kings River and Tule River watersheds, in or near the Mountain Home Demonstration State Forest (Tucker et al. 2012, 2014). The subpopulation in the Hume Lake Ranger District and Sequoia National Park is labeled Core Area 3 by the Southern Sierra Fisher Conservation Strategy (Spencer et al. 2016). None of the linkage areas identified in Spencer et al. (2016) would be affected by this project.

Historic and Current Distribution

Grinnell et al. (1937) described the distribution of fishers in California as a continuous arc from the northern Coast Range eastward to the southern Cascades, and then south through the western

slope of the Sierra Nevada. As of 1995, Zielinski et al. determined that fishers remain extant in just two areas comprising less than half of the historic distribution: northwestern California and the southern Sierra Nevada from Yosemite National Park southward, separated by a distance of approximately 250 miles.

Trends

Status and trend monitoring for fishers in the Sierra Nevada was initiated in 2002; the monitoring objective was to be able to detect a 20 percent decline in population abundance and habitat (USDA 2006). This monitoring includes intensive sampling to detect population trends on the Sierra and Sequoia national forests, where fishers currently are found, and was supplemented by less intensive sampling in suitable habitat in the central and northern Sierra Nevada specifically designed to detect population expansion.

Results indicate that fishers are well-distributed in portions of the Sequoia and Sierra National Forests; but occupancy rates are consistently higher on the Sequoia than the Sierra (USDA 2005). Carnivore surveys on the Hume Lake Ranger District have resulted in numerous detections of fishers near the project area.

A recent analysis of the SNFPA Long Term Monitoring data was completed which analyzed a core of 243 sample units from 2002 through 2009 (Zielinski et. al 2013). Findings suggest that over the 8-year period, there was no trend or statistically significant variations in fisher occupancy rates in the southern Sierra populations. The small population of fishers in the southern Sierra does not appear to be decreasing.

Threats to Fishers in the Southern Sierra Nevada Population

The Southern Sierra Nevada Fisher Conservation Assessment (Spencer et al. 2015) identified the primary threats to this fisher population as: habitat loss and fragmentation; rodenticides and other poisons; predation; disease and infections; roads and other human structures; and climate change.

Habitat connectivity is a key to maintaining fisher within a landscape. Activities that result in habitat fragmentation or population isolation pose a risk to the persistence of fishers. Timber harvest, fuels reduction treatments, road presence and construction, and recreational activities may result in the loss of habitat connectivity resulting in a negative impact on fisher distribution and abundance.

The level of road and trail density and associated noise disturbance may influence how fishers utilize available habitat. Dark (1997) for example studied fishers in a well-roaded study area (i.e. areas without roads did not exist) on the Shasta-Trinity National Forest. The results suggested that fishers were detected more frequently at sites where roads were closed by the use of gates or otherwise designed to discourage vehicular traffic. Fishers used habitats with a greater density of low-use roads, and favored landscapes with more contiguous, unfrequented forests and less human activity. Campbell (2004, In USFWS 2004) noted that sample units examined within the central and southern Sierra Nevada region occupied by fishers were negatively associated with road density.

Vehicular collisions resulting in fisher mortality have been reported in a number of studies.

Heinemeyer (1993), for example, noted vehicular collision as a source of fisher mortality. Along a portion of Highway 41 in Sierra National Forest and Yosemite National Park, nine road-killed fishers were found from 2008-2012 (O'Brien et al. 2013). Instances of fisher mortality on the Hume Lake Ranger District have also occurred. Most were associated with long paved stretches of road where vehicles tended to maintain higher speeds (e.g. Highway 180).

In addition to the risk of vehicular collisions, forest roads may increase predation on fishers by mountain lions, bobcats, and coyotes using these routes as travel and hunting corridors (Naney et al. 2012). Predation sites tend to be closer to roads, on average, and bobcat and fisher interactions are more likely to occur near roads and other open areas (Wengert 2013).

Management and Status

The Forest Service has considered fishers to be a Sensitive Species in the Pacific Southwest Region since 1984. In 2004, the U. S. Fish and Wildlife Service determined that the West Coast population of fisher was warranted for listing under the Endangered Species Act, but precluded due to heavy agency workloads (69 FR 18770), and included it on the list of "Candidate" species. In March 2013, the USFWS opened an information gathering period regarding the status of the fisher throughout the range of its West Coast distinct population segment (DPS).

The fisher of the Pacific states, or the West Coast DPS, was proposed for listing on December 23, 2014 as a threatened species under the federal Endangered Species Act (79 FR 76950). The West Coast Fisher DPS includes all potential fisher habitat in Washington, Oregon and California from the east side of the Cascade Mountains and Sierra Nevada to the Pacific coast. That proposal was withdrawn in April 2016 (81 FR 22710).

In March 2009, the California Fish and Game Commission recommended that the fisher be assessed for listing as threatened or endangered under the California State Endangered Species Act. This recommendation initiated a 12-month status review by the California Department of Fish and Game (CDFG) culminating in a determination by the Commission on June 23, 2010, that the listing was not warranted. A status review was reinitiated in March 2013, making fishers a candidate species under the California Endangered Species Act. The status review found the Southern Sierra Nevada fisher population to be warranted for listing as threatened (CDFW 2015). The California Fish and Game Commission Notice of Findings stated that the Pacific fisher southern Sierra ESU (defined as California south of the Merced River) is determined to be listed as threatened. The final date of legislation is pending.

The 2012 Monument Plan requires the establishment of fisher den site buffers that consist of 700 acres of the highest quality habitat in a compact arrangement surrounding verified birthing and kit rearing dens. Fisher den site buffers have a limited operating period of March 1-June 30 for all new projects. No den site buffers have been established in or near the project area. The entire project area is within the Southern Sierra Fisher Conservation Area, which requires the retention of habitat structures important to fishers, including canopy cover and large trees (Monument Plan, p. 87, S&G #1).

Western (Pacific) Pond Turtle *(Actinemys marmorata)**

*Formerly this species was labled *Clemmys marmorata and Emys marmorata*

Habitat Preferences and Biology

Western pond turtles historically occurred in a wide variety of permanent and intermittent aquatic habitats; generally slow-moving waters below 5,000 feet elevation. Populations have been found in rivers, streams, lakes, ponds and other seasonal and permanent wetlands. In intermittent streams, pond turtles can use permanent pools that persist after the main stream course dries (Holland 1991). Pond turtles require basking sites such as partially submerged logs, rocks, mud banks or emergent vegetation. The presence of suitable refugia, such as spaces under rocks, downed logs, holes in banks and undercut banks may be a critical factor in the ability of populations to maintain themselves in small streams. Pond turtles eat aquatic plants, invertebrates, worms, frog and salamander eggs and larvae, crayfish, carrion, and occasionally frogs and fish. Hatchlings eat aquatic zooplankton.

Nests are generally located in open areas dominated by grasses or herbaceous annuals, primarily on south or southwest aspects under 25 percent slope and with friable soils. A good supply of litter and duff is important for nest site selection (Holland 1994). Nest distance from water varies considerably. The known range is 55-1,300 feet but most are within 650 feet of water (Ibid).

Historic and Current Distribution

Historically found from San Francisco Bay south into northern Baja California, from sea level to over 5,900 feet (1,800 m) in elevation. The Western pond turtle has disappeared from 30-40 percent of its historic range in California (Holland 1991).

Turtle specific surveys have not been recently conducted on the Hume Lake Ranger District. Pond turtle observations have been made during aquatic surveys or other forest activity surveys and specific surveys for aquatic amphibians and reptiles by Cal Academy under forest Service agreements. Pond turtles have been observed at multiple locations on the Hume Lake Ranger District, including within the North Fork Kaweah subwatershed. Pond turtles may occur in low gradient stretches of water near the project area. Map 5 displays the streams near the project area, including the location where a fuel break crosses Eshom Creek. There are no ponds within 0.3 mile of the project area.

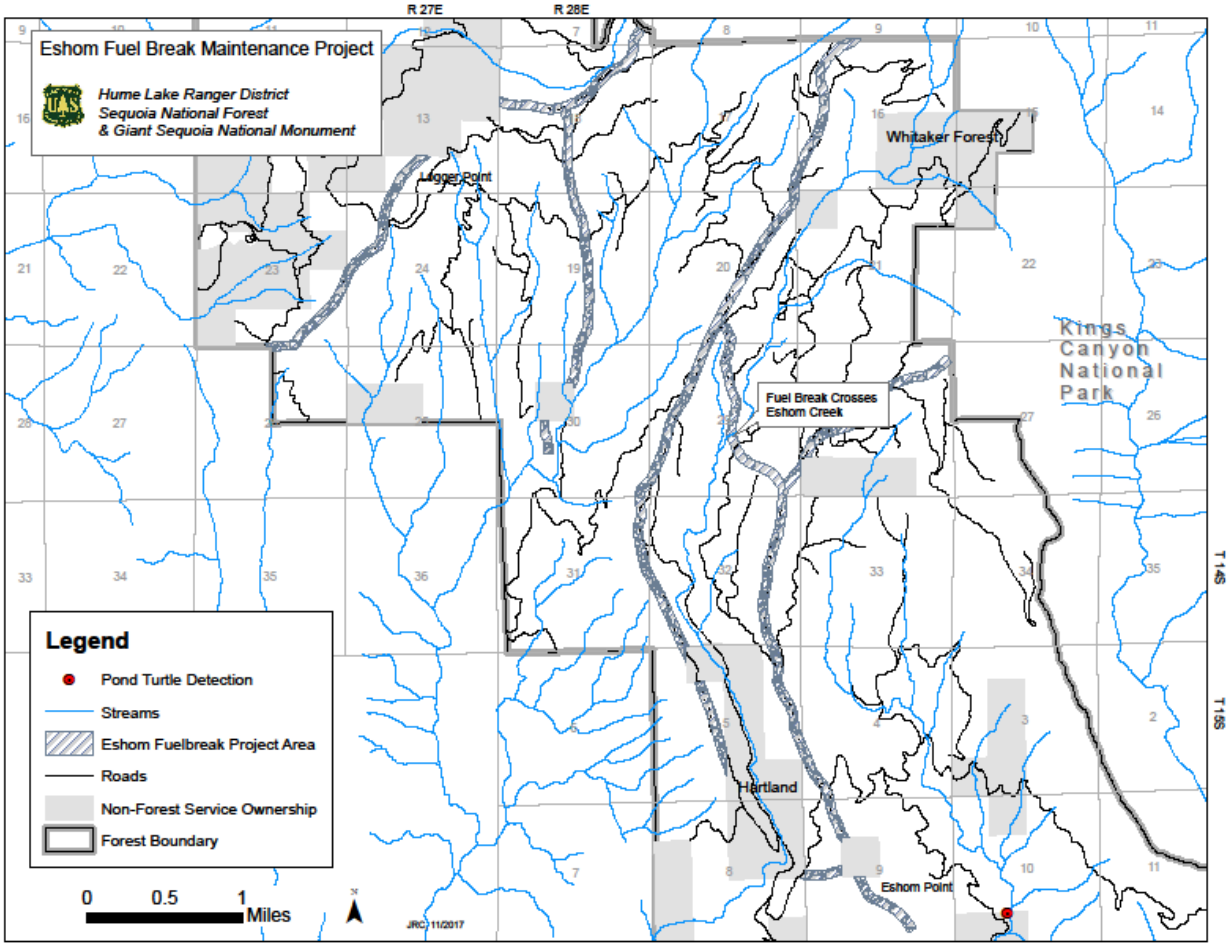
Risk factors

Factors in the decline of southwestern pond turtles include the introduction of predators such as bullfrogs and bass, population fragmentation due to loss and alteration of riparian habitats, and historic commercial harvests (Holland 1994). Roadkill has been documented to occur in some areas.

Management and Status

The Mill Flat Creek Critical Aquatic Refuge was established, in part, to protect habitat for western pond turtles. Standards and guidelines within the CAR are the same as for Riparian Conservation Areas and provide protection by limiting impacts from management activities. Pond turtles are listed as a California state species of concern.

Map 5. Streams near Eshom Fuel Break Project Area



California Legless Lizard *(Annelia pulchra)*

Habitat Preferences and Biology

California legless lizards are associated with sandy or loose, loamy soils in stabilized dunes and coastal scrub, sparse pine-oak woodlands, and mixed hardwood riparian areas. The species is frequently found under cover objects, such as logs and rocks (Jennings and Hayes 1994). Soil moisture is necessary for thermal regulation, and animals may die if they are unable to reach a moist substrate. Soil moisture may limit California legless lizards at the extents of their range (Bury and Balgooyen 1976). California legless lizards feed mainly on larval insects, beetles, termites, and spiders.

California legless lizards show a preference for low temperatures, and are usually encountered at temperatures of 8° to 28° C in the field. California legless lizards may be nocturnal during the summer. In coastal areas, California legless lizards are probably active year-round, while at inland locations they may hibernate in the winter (Jennings and Hayes 1994).

Historic and Current Distribution

California legless lizards are found from the southern edge of the San Joaquin River in northern Contra Costa County south to Baja California. The species is believed extirpated from approximately 20 percent of its known historical range. It occurs in scattered locations in the San Joaquin Valley, and along the southern Sierra Nevada mountains.

The California Natural Diversity Database lists a small number of occurrences for this species in the Sierra Nevada. About one-third of the Giant Sequoia National Monument is within the CWHR mapped range of California legless lizards. This species has been found in the Sequoia National Forest north of Kernville near Bull Run Creek and in the Springville area adjacent to National Forest System land. It is presumed to be present within the limited portion of its range on the Hume Lake Ranger District. This includes overlapping a small portion of the Eshom Fuelbreak project area (Map 6).

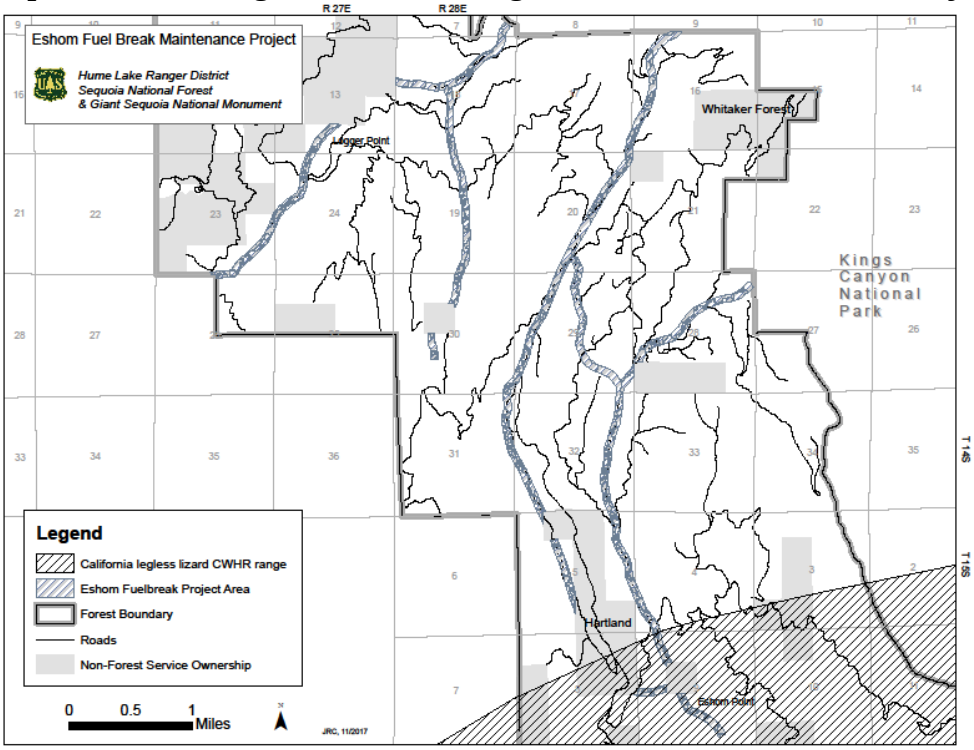
Risk factors

Threats to California legless lizards include urbanization, agricultural development, and the spread of exotic plant species (Goldberg and Miller 1985, Jennings and Hayes 1994).

Management and Status

There is no specific Forest Service management direction for this species. The California legless lizard is listed as a California species of special concern by the California Department of Fish and Wildlife.

Map 6. CWHR Range of California Legless Lizards Relative to the Project Area



V. EFFECTS ANALYSIS

Northern Goshawks, California Spotted Owls, Pallid Bats, Fringed Myotis, Fishers, Western Pond Turtles, and California Legless Lizards

Determining Direct and Indirect Effects
The direct and indirect effects of the proposed action in the Eshom Fuel Break Project on these species were evaluated using four primary metrics:

1. **Loss of Important Habitat Elements (snags and down woody debris)**. Down woody debris provides cover and habitat for important prey species. A reduction in the amount of large down woody material would therefore reduce habitat quality for each of these species.

2. **Disturbance.** Noise and other human activity from tree felling, mastication, chipping and pile burning may cause disturbance to wildlife in the project area.

3. **Habitat Connectivity.** Northern goshawks, California spotted owls, and fishers all depend on large areas of contiguous forested habitat. Habitat fragmentation has been identified as a potential threat to these species.

4. **Fisher Specific Metrics.** The *Southern Sierra Fisher Conservation Strategy* (Version 1.0, February 2016) amended by *Changed Circumstances and Implementation of the Southern Sierra Nevada Fisher Conservation Strategy, Note from the Authors* (2017) contain a number of recommendations for vegetation management in fisher habitat, including:

Within suitable habitat (which the conservation strategy puts in hexagons based on the average size of the home range of female fishers in other areas):

- **Goal 3.** Restore and maintain high quality and resilient fisher habitat conditions.
  Objective 3.1. Improve fisher habitat resiliency and restore fire as a key ecological process.
  Conservation measures. Reduce hazardous fuel conditions and increase habitat heterogeneity patterns that reflect how topography, soil, and other factors affect vegetation characteristics and fire behavior; implement ecological restoration concepts described in GTR 220/237 to promote conditions that allow fire to serve its natural ecological role in maintaining resilient and heterogeneous forest conditions; maximize use of prescribed fire or wildfire managed for resource benefits at large scales and under conditions that promote resiliency and fisher habitat values.
  Objective 3.2. Maintain or increase important fisher habitat elements.
  Conservation measures. Retain and promote recruitment of large trees, coarse woody debris (large snags and logs), trees with cavities and other defects, large black oaks, dense tree clusters and gaps at fine (<0.5 ac) resolution, and clumps of multi-storied tree canopies.

The following should be considered where mechanical treatments are planned in and around remaining high value reproductive habitat (CWHR 4D, 5M, 5D, and 6):

- Design treatments to limit disturbance from mechanical treatments to <13% of each affected cell within a 5-year period (Zielinski et al. 2013b), providing resilience goals for remaining high value reproductive habitat are achievable. Where remaining high value reproductive habitat is at significant risk of loss or isolation due to lack of resilience, design treatments to limit disturbance from mechanical treatments to <30% of each affected cell within a 5-year period (Zielinski et al. 2013b, Spencer et al. 2015). Where remaining high value reproductive habitat is at significant risk, and resiliency goals cannot be met while limiting treatment disturbance to these rates, conduct a cost-benefit assessment to determine if benefits to fisher habitat conservation in the long-term are likely to outweigh short-term costs.

Fishers also select or require specific habitat stand structural conditions, including dense, multi-storied canopies for resting and denning habitats, abundant dead-wood structures, and ground-level hiding and escape cover. The following guidelines should apply to the design of vegetation treatments to retain and promote suitable habitat structural conditions:

- Retain on average 3-5 tons of large (>20-in diameter) logs per acre. Log density should vary across the landscape, with some patches of high abundance (5 tons/ac) and others with lower densities (<1 tons/ac). If large trees or snags must be felled, leave 3-5 tons per acre on the ground in the largest size classes where they do not pose a significant fuel or safety risk.
- Pile brush and retain some slash piles for fisher escape cover and prey habitat.

Proposed Action

Treatments would occur on approximately 565 acres of Forest Service managed land. The fuel breaks are linear features, approximately 300 feet wide, and generally on ridgetops. Snags and any live hazard trees would be felled. Brush and small trees (up to 10 inches in diameter) that create ladder fuels would be masticated with mechanical equipment or cut and piled by hand crews (on steep slopes and stream management zones). Living oaks would generally be unaffected, with only incidental removal of small oaks during mechanical treatments. Piles of slash would later be burned. Some portions of the fuel breaks may be also prescribed burned to further reduce fuels.

No mechanized equipment will be used within Stream Management Zones and no piling or pile burning would occur within 100 feet of a stream. Some of the largest snags may be left standing if they don't pose a safety hazard or compromise the effectiveness of the fuel break. The largest material produced by felling snags and hazard trees would be left on site to ensure the dead and down large woody material requirements for wildlife and soil quality are maintained. This standard requires a minimum of 10 tons per acre of logs greater than 12 inches in diameter (GSNM Management Plan, p.87).

1. **Loss of Important Habitat Elements (snags and down woody debris)**. *Snags would be felled throughout the 565 acre project area. Some of the largest snags may be left standing if they don't pose a safety hazard or compromise the effectiveness of the fuel break. Any live hazard trees felled would also reduce the future number of snags in the area. Slash from felled*

snags and hazard trees would be piled and later burned, reducing down woody debris. This down woody material would be lost as cover for wildlife and habitat for prey species. The largest felled trees would be retained where needed to meet the required minimum of 10 tons per acre of logs greater than 12 inches in diameter.

Habitat quality for Northern Goshawks, California Spotted Owls, Pallid Bats, Fringed Myotis, and Fishers would be reduced from the loss of snags and down woody material. Specific impacts would depend on the number, location and specific characteristics of the material removed. Given the large home range sizes for these species, the loss of snags and down woody material in a portion of that home range is unlikely to threaten the survival of individuals.

Effects on habitat quality for Western pond turtles would be limited to the portion of the Sawmill fuel break that crosses Eshom Creek. In this area, cover from down woody material would be reduced and project activities may cause additional sediment to reach Eshom Creek. However, the project Hydrology Report concluded that the risk of erosion contributing sediment to streams is "very small" and that implementation of Best Management Practices would reduce this risk (Kozlowski 2017).

Habitat quality in the limited portion of the project area within the range of California legless lizards (37 acres) would be degraded due to the loss of ground cover and reduction in soil moisture.

2. **Disturbance.** Noise and other human activity from tree felling, piling, and burning may cause short-term disturbances to wildlife in the project area. However, the activities would only occur outside the breeding season in most cases because of the required limited operating period (see project mitigations).

3. **Habitat Connectivity.** While habitat connectivity is considered important for Northern goshawks and California spotted owls, maintaining shaded fuel breaks is unlikely to create barriers or restrict dispersal by individuals. Since the overstory will be largely unaffected (except for the potential removal of hazard trees), this project is unlikely to further fragment habitat for these species. The fuel breaks are mainly near ridgetops, areas where nesting sites are less likely to be found.

Habitat fragmentation is considered a threat to the southern Sierra Nevada fisher population (Spencer et al. 2016). The Southern Sierra Fisher Conservation Strategy recommends "vegetation management… minimize reduction or fragmentation of female home range potential (denning habitat)." The fuel breaks are linear features, approximately 300 feet wide, lacking understory vegetation or down woody material as hiding cover. While this may not make the habitat unsuitable for fishers, the fuel breaks may create or enhance a reluctance to cross open areas and therefore interfere with dispersal.

Habitat fragmentation, at least at the limited scale of shaded fuelbreaks, has not been identified as a threat to pallid bats, fringed myotis or western pond turtles. The loss of hiding cover provided by understory vegetation and down woody material may negatively impact dispersal ability for California legless lizards in the limited portion of the project area within their range.

Fuel breaks may however, reduce the risk of large stand-replacing fires that would greatly fragment habitat by making large areas unsuitable for these species.

4. **Fisher Specific Metrics.**

We evaluated the consistency of the Eshom Fuel Break Project with the goals, objectives and recommendations in the Southern Sierra Nevada Fisher Conservation Strategy. The project area is within what the strategy labels as Fisher Core Area 3, which includes the area from south of the Kings River to near Mountain Home State Forest. There are no linkage areas near the project area. The project is intended to reduce the risk of large stand replacing fire, while maintaining large trees, oaks, and overstory canopy cover on the landscape. However, in the short-term it reduces the number of snags and down woody material available in the project area.

Hexagonal grid cells about the size of an average female breeding home range or territory (10 km^2, ~4 mi^2) were overlaid on the project analysis area. The Eshom Fuel Break project area overlaps 10 individual hexagons within Core Area 3. An analysis of cumulative effects for these 10 hexagons was conducted using the Sierra Nevada Fisher Conservation Strategy guidelines shown above.

The five-year window from 2018-2022 was used to assess the percentage of each hexagon treated. Implementation of the Eshom Fuel Break Project is expected to begin in 2018. This five-year window accounts for any mechanical vegetation treatment activities expected to occur within each hexagon. Results are shown in Table 2. One of the hexagons exceeds the 13 percent treated Conservation Strategy guideline limit (15%). This hexagon includes private property, Eshom Campground and a county road (Mt. 465) that accesses Whitaker Forest. The remaining nine hexagons are all under 13 percent treated mechanical during that time period (Range of less than 1% to 4%) meeting the Sierra Nevada Fisher Conservation Strategy guideline for limiting disturbance to fishers.

The project requires retention of the largest down trees (minimum of 10 tons per acre of logs greater than 12 inches in diameter) per acre treated. This is expected to meet the Sierra Nevada Fisher Conservation Strategy recommendation of 3-5 tons of large (>20-in diameter) logs per acre.

Table 2: The maximum acreage of possible mechanical treatments and the total percentage potentially treated within the ten hexagons affected by the Eshom Fuel Break Project, shown in a five-year window beginning with project implementation.

	2018-2022	
Hexagon	Maximum Treated Acres	% of Hexagon Treated
5369	9	**<1%**
5370	94	**4%**
5371	54	**2%**
5445	51	**2%**
5446	373	**15%**
5447	16	**1%**
5522	84	**3%**
5523	69	**3%**
5598	19	**1%**
5599	8	**<1%**

*mechanical treatments will not occur on all these acres, **not** in areas with steep slopes or within 100' of streams.

The Eshom Fuel Break Project is generally in alignment with the Southern Sierra Fisher Conservation Strategy, including the goal to "restore and maintain… resilient fisher habitat conditions." Vegetation management where critical habitat elements for fishers are maintained can both preserve existing habitat and increase the resiliency of the habitat to future losses from large stand replacing wildfires.

The 2016 Southern Sierra Nevada fisher conservation strategy also contains management recommendations. Those "Conservation Measures" applicable to the activities proposed in this project include:

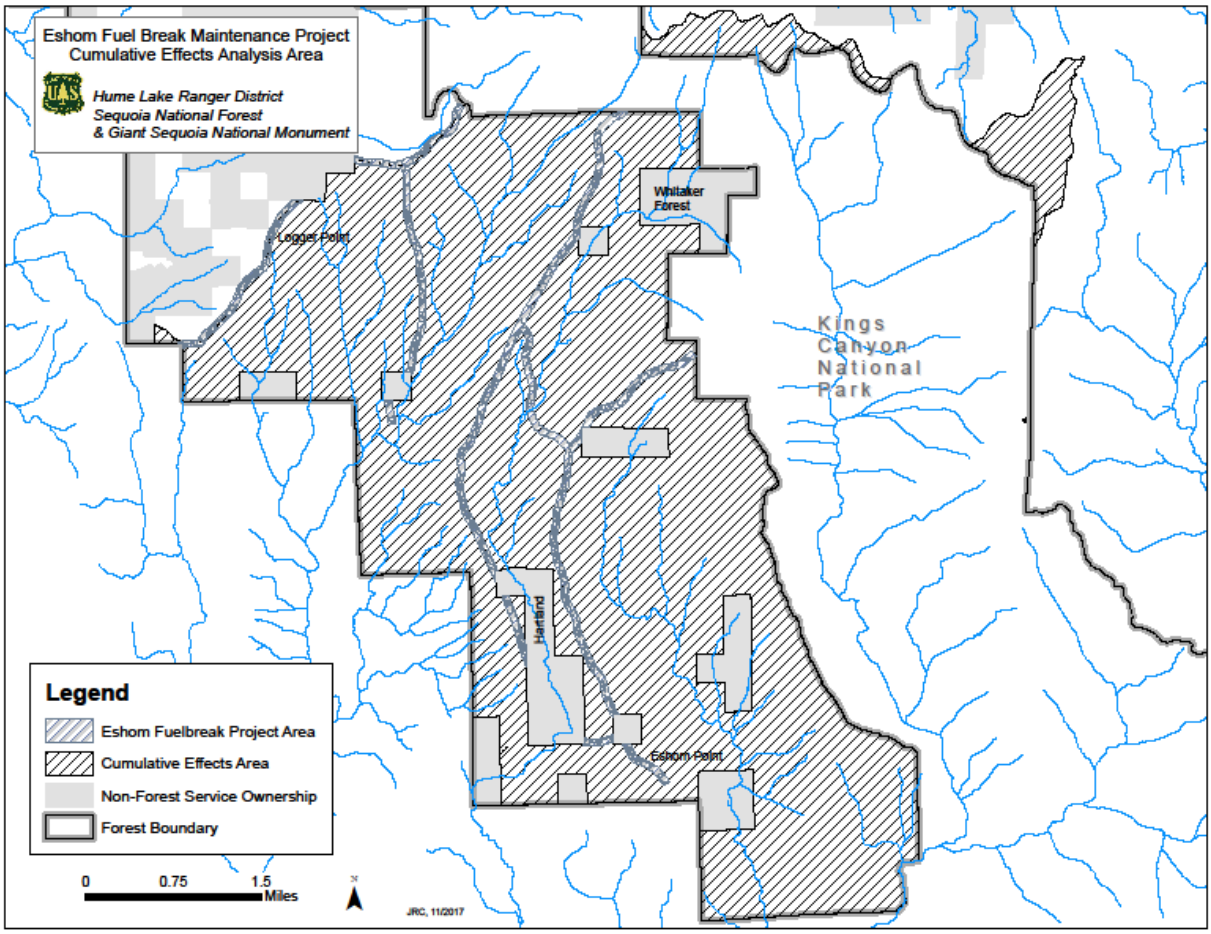
- A limited operating period of **March 1 to June 30** for tree-cutting activities within natural stands with CWHR diameter class 12 in or greater or mastication within stands typed as Sierran mixed conifer (SMC), conifer-hardwood (MHC), and ponderosa pine (PPN) CWHR 4D, 5M, 5D, or 6.
- A limited operating period of **March 15 to May 1** for burning large slash or woody debris piles (>0.1 ac), piles adjacent to possible den structures, or in situations where simultaneous lighting would create intense smoke.

Cumulative Effects

The spatial scale for cumulative effects analysis is all Forest Service land within the Upper Dry Creek and North Fork Kaweah/Eshom Creek HUC6 subwatersheds (Map 7). This is an

appropriate scale for determining cumulative effects since it includes all wildlife habitat potentially affected by implementation of this project. The temporal scale for the analysis is five years into the future, the time frame that future actions can reasonably be predicted. The cumulative effects of past management activities are incorporated within the existing condition. Past vegetation-changing actions or events (for example, fuels treatments and wildland fires) have already been captured by the Forest's GIS vegetation layer (EVEG).

Map 7. Cumulative Effects Analysis Area



For assessment of future projects, the Forest completes a quarterly "Schedule of Proposed Actions" (SOPA) which tracks proposals that are ongoing or have sufficient detail to insure they are reasonably foreseeable. Some projects listed on the SOPA is not included here because they would not measurably affect wildlife habitat.

Climate Change

Climate changes will likely cause changes in the distribution of species in the analysis area. Modeling efforts have projected that forest types and other vegetation dominated by woody plants in California would migrate to higher elevations as warmer temperatures make those areas suitable for colonization and survival. For example, with higher temperatures and a longer growing season, the area occupied by subalpine and alpine vegetation was predicted to decrease

as evergreen conifer forests and shrublands migrate to higher altitudes. The precise effects of climate change on individual species in the analysis area are difficult to predict and will not be addressed in detail in the effects analysis.

Rodenticides

Anticoagulant rodenticides and other toxicants used at illegal marijuana grow sites may threaten fisher and "pose equally grave risks" to Northern goshawks and California spotted owls (Gabriel et al. 2012). No specific information is available regarding the illegal use of toxicants in the analysis area but it is reasonable to assume they are present and a threat to many wildlife species. However, we currently lack the information to quantify the threat for this analysis.

Current Activities

Grazing: Portions of the Buck Rock grazing allotments are within the analysis area. Because grazing is a past, ongoing, and foreseeable future action and because use levels and associated impacts from this activity are not expected to change as a result of implementation of any of the alternatives, cattle grazing activity is not expected to contribute measurable impacts to wildlife habitat.

Recreation and Roads: The analysis area is used regularly by campers, hunters and OHV users. There are over 100 miles of roads in the analysis area. These are ongoing activities and use levels and associated impacts are not expected to change in the foreseeable future. Felling of hazard trees in campgrounds and along roads may occur as needed to protect human safety.

Future Activities

The SOPA dated 10/01/2017 has the following management activities proposed for the cumulative effects analysis area:

Big Stump-Redwood Mtn. Fuels Restoration Project: Proposal to reduce fuels buildup in a portion of Big Stump Giant Sequoia Grove through prescribed burning, including on up to 2,525 acres within the analysis area.

Additional Foreseeable Future Activities (not listed in the SOPA)

Hazard Tree Slash Clean-up Project: Treating fuel created by hazard tree felling in specific campgrounds and fuelbreaks by chipping or burning. May reduce the number of large down logs on some of the 212 acres of this project within the analysis area.

Tower/Park Ridge Prescribed Burns: Prescribed fire project in cooperation with Kings Canyon National Park. Less than 75 acres within the analysis area would be potentially impacted.

Eshom Ecological Restoration Project: Potential forest health/fuels reduction project in the area south of Eshom Campground and adjacent to Hartland. A proposed action has not been developed enough for a quantitative analysis in this document.

Cumulative Effects

1. **Loss of Important Habitat Elements (snags and down woody debris)**.

Snags:
Prescribed burning in the Big Stump-Redwood Mountain Fuels Restoration Project may reduce the number of snags on up to 2,477 acres of forested habitat in the analysis area. This includes 1,262 acres of late seral coniferous forest habitat (of particular importance to Northern Goshawks, California spotted owls, and fishers).
The cumulative effects of the Eshom Fuel Break Maintenance Project would be a reductions in the number of snags per acre on a maximum of 2,977 acres of forested habitat. Snags would be felled if in a fuel break or lost during prescribed burning. There are 10,818 acres of CWHR forested habitat types within the analysis area. The cumulative effects of the Eshom Area Fuel Break Maintenance Project would impact less than 28% of the available habitat and therefore over 2/3 of the forested habitat in the analysis area would be unaffected. In addition, the number of snags per acre in the analysis area has increased greatly due to recent tree mortality.

Down woody debris:
Prescribed burning in the Big Stump-Redwood Mountain Fuels Restoration Project may reduce the number of large logs per acre on up to 2,477 acres of forested habitat in the analysis area, including in 1,262 acres of late seral coniferous forest habitat. The Hazard Tree Slash Clean-up Project may decrease the number of large down logs on up to 201 acres of forested habitat in the analysis area, including 53 acres of late seral coniferous forest habitat (although this would occur near campgrounds and along roads where habitat is generally of less value).

There are 10,832 acres of forested habitat, including 3,505 acres of late seral coniferous forest habitat within the analysis area. The cumulative effects of the Eshom Area Fuel Break Maintenance Project would impact less than 30 percent of the available forested habitat and therefore would not alter the existing trend for this habitat type. All these projects are required to meet the Giant Sequoia Monument Plan retention requirements of 10 to 20 tons per acre of logs greater than 12 inches in diameter (GSNM Management Plan, p.87).

2. **Disturbance.**
Noise and other human activity in the Big Stump Project may cause short-term disturbances to wildlife in the local area. However, Limited Operating Periods would be utilized as needed to protect sensitive areas from disturbance during the breeding season.

3. **Habitat Connectivity.** Habitat connectivity may be reduced in the short-term following prescribed burning in the Big Stump-Redwood Mountain Fuels Restoration Project. The Hazard Tree Slash Clean-up Project may also reduce habitat connectivity by removing hiding cover. Cumulatively, this reduction in connectivity would occur on less than 30 percent of the forested habitat in the analysis area.

VI. DETERMINATIONS

REGION 5 FOREST SERVICE SENSITIVE SPECIES

Northern Goshawks, California Spotted Owls, Pallid Bats, Fringed Myotis, Fishers, Western Pond Turtles, and California Legless Lizards:

It is my determination that the proposed action in the Eshom Fuel Break Project **may affect individuals,** but is not likely to result in a trend toward Federal listing or loss of viability of Northern goshawks, California spotted owls, pallid bats, fringed myotis, and fishers. The cumulative effects of the Eshom Fuel Break Maintenance Project would reduce habitat quality due to a loss of snags and down woody debris. The project would also reduce habitat connectivity and may create a barrier to dispersal for fishers. However, since the cumulative effects of the Eshom Area Fuel Break Maintenance Project would impact less than 30 percent of the available habitat, these affects are not likely to threaten the viability of these species within the analysis area.

The Giant Sequoia Monument Plan retention requirements of 10 to 20 tons per acre of logs greater than 12 inches in diameter will help moderate adverse impacts on habitat quality. The additional mitigation of limited operating periods will also reduce adverse impacts to these species.

It is my determination that the proposed action in the Eshom Fuel Break Project **may affect individuals,** but is not likely to result in a trend toward Federal listing or loss of viability of Pallid Bats and Fringed Myotis. The cumulative effects of this project would reduce snags available for roosting on less than 28% of the forested habitat in the analysis area. While this may reduce habitat quality for these species, the number of snags per acre in the analysis area has increased greatly due to recent tree mortality. Therefore, the reduction in snags due to the cumulative effects of this project are unlikely to limit bat populations or threaten the survival of individuals.

It is my determination that the proposed action in the Eshom Fuel Break Project **may affect individuals,** but is not likely to result in a trend toward Federal listing or loss of viability of Western pond turtles. Effects on habitat quality for Western pond turtles would be limited to the portion of the Sawmill fuel break that crosses Eshom Creek. In this area, cover from down woody material would be reduced and project activities may cause additional sediment to reach Eshom Creek. However, the project Hydrology Report concluded that the risk of erosion contributing sediment to streams is "very small" and that implementation of Best Management Practices would reduce this risk (Kozlowski 2017).

It is my determination that the proposed action in the Eshom Fuel Break Project **may affect individuals,** but is not likely to result in a trend toward Federal listing or loss of viability of California legless lizards. Habitat quality would be degraded due to the loss of ground cover and reduction in soil moisture. However, these effects would occur in a limited area within the range of California legless lizards (37 acres). Impacts on this small amount of habitat is unlikely to effect the viability of this species.

Required Mitigations:

- A limited operating period of **March 1 to June 30** for tree-cutting activities or mastication.
- A limited operating period of **March 15 to May 1** for burning large slash or woody debris piles (>0.1 acre) or for prescribed fire (underburning).

Recommended Mitigations:

- Leave some of the largest snags standing if they don't pose a safety hazard or compromise the effectiveness of the fuel break. Preferably, this would be a minimum of 4 snags per acre.
- Retain some slash piles for fisher escape cover and prey habitat.

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Appendix A. Forest Service Sensitive Animal Species in Sequoia National Forest (*List **Updated** **6/30/2013)***				
Species	**Status**	**Habitat**	**Effects Determination**	**Rationale**
Birds				
Northern goshawk *(Accipiter gentilis)*	FSS, CSSC	Dense mixed conifer forest to open eastside pine	**may affect individuals,** but is not likely to result in a trend toward Federal listing or loss of viability	See analysis and effects determination above.
Western yellow billed cuckoo *(Cocczyus americanus occidentalis)*	FSS, FC, SE	Dense riparian forest. On SQF, only known from Lake Isabella.	No effect	Project area outside known range and lacks suitable habitat.
Little Willow flycatcher *(Empidonax trailii brewsterii*)	FSS, SE	Large meadow complexes with dense willow and standing water, up to 8,000'	No effect	No detections or suitable habitat in or near the project area.
Bald Eagle *(Haliaeetus leucocephalus*)	FSS, SP, SE	Lakes and open water. Nests on large trees.	No effect	Species and habitat not impacted by the proposed action. No potential roost trees near lakes or rivers would be removed.
Great gray owl *(Strix nebulosa)*	FSS, SE	Large meadows & openings 2,500 – 9,000'. Dense forest and large snags for nesting.	No effect	No meadows within ¼ mile of the project area.
California spotted owl *(Strix occidentalis occidentalis)*	FSS, CSSC	Dense forest (>40% canopy closure), preference for stands with ≥2 layers, but open enough to allow for observation and flying space to attack prey. Substantial amounts of dead woody debris are desirable.	**may affect individuals,** but is not likely to result in a trend toward Federal listing or loss of viability	See analysis and effects determination above.
Mammals				
Pallid bat *(Antrozous pallidus)*	FSS, CSSC	Open habitats, rocky crevices, tree cavities, mines, caves, or buildings for maternity	**may affect individuals,** but is not likely to result in a trend toward Federal	See analysis and effects determination above.

Appendix A. Forest Service Sensitive Animal Species in Sequoia National Forest (*List **Updated 6/30/2013)***				
Species	**Status**	**Habitat**	**Effects Determination**	**Rationale**
		roosts. Deep crevices are important for day roosts.	listing or loss of viability	
Townsend's big eared bat *(Corynorhinus townsendii townsendii)*	FSS, CSSC	Nocturnal, roosts in caves, uses wide variety of habitats although usually mesic areas for foraging.	No effect	May forage near the project area. Species and key habitat characteristics not impacted by the proposed action. No potential roost sites would be affected.
Fringed myotis *(Myotis thysanodes)*	FSS	Optimal habitats are pinyon-juniper, valley foothill hardwood, and hardwood-conifer habitats, but it is found in a wide variety of habitats. Roosts in caves, mines, buildings, crevices in rocks, and snags.	**may affect individuals,** but is not likely to result in a trend toward Federal listing or loss of viability	See analysis and effects determination above.
California wolverine *(Gulo gulo luteus)*	FSS, ST, SP	Remote habitats, sensitive to human presence. 4000' to 13,000' mixed habitats	No effect	No verified detections in the area for 50+ years. Unlikely to be found near project area due to human disturbance.
Sierra marten *(Martes caurina sierrae)*	FSS, CSSC	Dense forest (>30% canopy cover), high number of large snags and down logs, close proximity to dense riparian corridors for movement, and an interspersion of small (<1 acre) openings with good ground cover for foraging. Potential occupied elevation 4,000-13,000 ft.	No effect	Project area lacks red fir and other habitat types important to Sierra martens. There have been no known detections of this species in or near the project area.
Fisher *(Pekania pennanti)*	FSS, SPT	Dense forest (>40% canopy cover). high number of large snags and down logs, close proximity to	**may affect individuals**, but are not likely to contribute to the need for federal	See analysis and effects determination above.

Appendix A. Forest Service Sensitive Animal Species in Sequoia National Forest (*List **Updated 6/30/2013)***				
Species	**Status**	**Habitat**	**Effects Determination**	**Rationale**
		dense riparian corridors for movement, and an interspersion of small (<1 acre) openings with good ground cover for foraging.	listing or result in a loss of viability.	
Amphibians				
Yellow blotched salamander *(Ensatina escholtzii croceator)*	FSS, CSSC	Valley foothill/hardwood habitats and conifer, moist habitats and down logs in tributaries of the lower Kern River.	No effect	Project area is outside of known range for this species.
Relictual slender salamander *(Batrachoceps relictus)*	FSS, CSSC	Down logs and moist areas, generally in mixed conifer zone.	No effect	Project area is outside of known range for this species.
Kern Canyon slender salamander *(Batrachoceps simatus)*	FSS, ST	Down logs and moist areas, below 3,500' Limited to Kern Canyon	No effect	Project area is outside of known range for this species.
Fairview slender salamander *(Batrachoceps bramei)*	FSS, CSSC	Down logs and moist areas, ~7,000-8,000'. Limited to Kern Plateau	No effect	Project area is outside of known range for this species.
Foothill yellow-legged frog *(Rana boylii)*	FSS, CSSC	Low gradient streams and ponds generally below 6,000'	No effect	Historically present in the Hume Lake District but no known extant populations near the project area. No activities would occur in suitable habitat.
Reptiles				
Western (Pacific) pond turtle *(Actinemys marmorata)*	FSS, CSSC	Low gradient ponds and streams with basking sites below 5,000 feet. Can be found up to 1 mile from perennial water.	**may affect individuals,** but is not likely to result in a trend toward Federal listing or loss of viability	See analysis and effects determination above.
California legless lizard	FSS, CSSC	Loose, moist soil in chaparral and valley	**may affect individuals,** but	See analysis and effects determination above.

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Species	**Status**	**Habitat**	**Effects Determination**	**Rationale**
(Anniella pulchra)		foothill woodland. Generally below 6,000'.	is not likely to result in a trend toward Federal listing or loss of viability	
Fish				
Kern brook lamprey *(Lampetra hubbsi)*	FSS, CSSC	Silty backwaters of rivers emerging from the Sierra foothills, including the Kings River. Elevations below 1000'	No effect	Project area is outside the range of this species. Habitat in the Kings River would not be affected.
Hardhead *(Mylopharodon conocephalus)*	FSS, CSSC	Warm water rivers at low elevation	No effect	Project area is outside the range of this species. Habitat in the Kings River would not be affected.
California golden trout *(Oncorhynchus mykiss aguabonita)*	FSS, CSSC	Cold water tributaries of the South Fork of the Kern River above Rockhouse Basin.	No effect	Project area is outside of known range for this species.
Kern River rainbow trout *(Oncorhynchus mykiss gilberti)*	FSS, CSSC	Extant populations in the Kern River above Durrwood Creek, in Rattlesnake and Osa Creeks, and possibly upper Peppermint Creek.	No effect	Project area is outside of known range for this species.
Invertebrates				
Tehachapi fritillary butterfly *(Speyeria egleis tehachapina)*	FSS	Currently limited to the Piute Mountains; utilizes violets as host plants.	No effect	Project area is outside of known range for this species.
Listing Status Key: FC= Federal Candidate	FSS= USFS Sensitive Species CSSC=CA Species of Special Concern		SP= State Fully Protected SE= State Endangered ST = State Threatened	