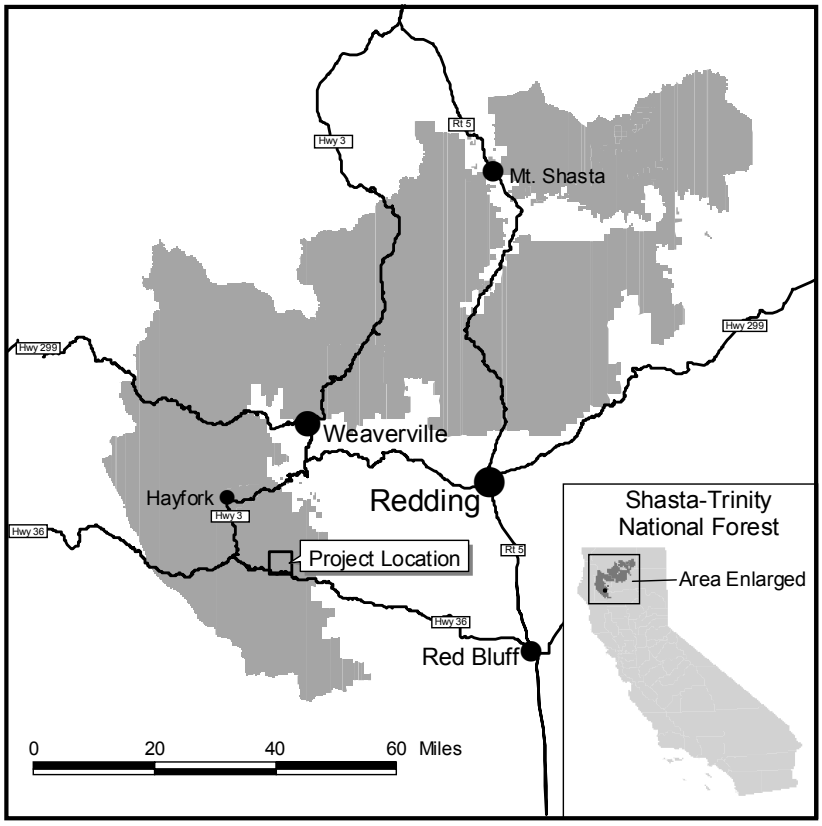
Appendix H: Biological Evaluation – Wildlife



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Introduction

The purpose of this biological evaluation (BE) is to present the likely effects of the actions proposed in Alternatives 1 and 3 of the Gemmill Thin Project Environmental Impact Statement to Forest Service Sensitive species. This document is prepared in accordance with current policy and follows the standards established in Forest Service Manual direction (FSM 2670.32).

The Regional Forester issued the most recent Sensitive Species list for Region 5 in April of 2004. From this list, **the species considered in this document are**:

Mammals

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

Birds

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

Reptiles

- northwestern pond turtle (*Clemmys marmorata marmorata*)

Amphibians

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

Invertebrates

- California floater (*Anodonta californiensis*)
- topaz [scalloped] juga (*Juga* [*Calibasis*] *occata*)
- montane peaclam (*Pisidium* [*Cyclocalyx*] *ultramontanum*)
- Shasta sideband snail (*Monadenia troglodytes troglodytes*)
- Wintu sideband snail (*Monadenia troglodytes wintu*)
- Shasta chaparral snail (*Trilobopsis roperi*)
- Tehama chaparral snail (*Trilobopsis tehamana*)
- Pressley hesperian snail (*Vespericola pressleyi*)
- Shasta hesperian snail (*Vespericola Shasta*)
- nugget pebble snail (*Fluminicola seminalis*)

Species Dropped from Further Analysis

The following species will not be further discussed except in the determinations section for the reasons discussed below:

Our records include no sightings of the secretive **California wolverine** in the project area. The nearest (unverified) sighting (from 1974) to the project area lies approximately 25 miles to the northwest. Wolverines occupy a wide variety of habitats remote from humans and human development (Banci 1994). Dr. Keith Aubrey (2007) reviewed the historical and current records on wolverine occurrence across the United States and did not find any credible sightings in northern California. The last verifiable sighting in California occurred in the southern Sierras in 1922. His historic maps show a disjunct population with numerous historic sightings in the Sierras south of Lake Tahoe and the nearest additional grouping in Central Oregon in the area of the Sisters. Given the lack of suitable habitat due to the high human use in the project area, wolverines are not likely to be found within or near the project area.

Since the release of Dr. Aubrey's review, a single wolverine was detected with a baited motion-triggered camera in the Sierra Nevada on the Tahoe National Forest roughly 180 miles southeast of the Gemmill Project. Whether the animal is a bona fide Sierra Nevada native or a long-distance migrant that wandered in from the North Cascades in Washington or the Sawtooths in northern Idaho – its two closest home ranges – remains unknown. This sighting is separated from the project area by the agriculturally and residentially developed Central Valley that makes wolverine dispersal from the sighting area to the project area unlikely.

The **western red bat** is dependent on riparian and riparian edge habitats (not to be confused with Riparian Reserves that often do not include riparian associated vegetation) and roosts in riparian foliage (USDA 1998). Strategic bat surveys conducted by the Forest Service Pacific Southwest Research Station across the South Fork Management Unit, including a concentrated survey effort near Halls City and Wilson Creeks in the project area vicinity, detected no western red bats. The project would have no effect on the western red bat because **no riparian or riparian edge habitat** lies within or near areas proposed for treatment.

The **bald eagle** does not likely occur in or near the project area because the area does not lie proximate to eagle foraging areas (e.g., lakes, rivers, larger creeks) where eagles typically nest or congregate in the winter. Furthermore, eagles are not know or expected to forage in the creeks adjacent to any of the areas proposed for treatment. Bald eagles are large (6 ½ to 7-foot wingspan) and require open water to approach their primary prey (i.e., fish) in a shallow glide to snatch the fish out of the water. Creeks in the project area vicinity (upper reaches of Hayfork Creek, Chanchellula Gulch, Hall City Creek and Wilson Creek and their tributaries) are narrow, have dense adjacent or overhanging forest canopy, and thus do not provide open access to the water surface required by foraging eagles. Additionally, forest-wide long-term surveys and monitoring efforts have revealed no indications of 'atypical' bald eagle nest sites or communal winter concentration areas in or near the project area. Bald eagles (our national emblem) are conspicuous, readily identified by both bird watchers and the general public. Eagle sightings, especially in new or unusual locations, are typically reported. An 'atypical' nest or winter concentration site in the project area vicinity going unnoticed or unreported is unlikely. On occasion, individual eagles

are seen foraging along Hayfork Creek about four miles downstream (northwest) from the project area. However, we expect no effect to the eagle's prey downstream from the project because any potential negative effects to fish habitat would be so small that they cannot be measured (page 78, Gemmill Thin 'Fishery' Biological Assessment/Evaluation). Therefore, the bald eagle will not be further discussed except in the determinations section (VII).

The **willow flycatcher** occupies relatively large wet meadows adjacent to large streams, and tends to nest in large clumps of willows separated by openings (Marcot, 1979). The project would have no effect on the willow flycatcher because field reviews along with GIS habitat mapping revealed no suitable habitat within or near the project area.

The **northwestern pond turtle** occurs in a variety of habitat types associated with permanent or nearly permanent water (Holland 1991, CDFG 1988), and they concentrate in low flow regions of rivers and creeks, such as side channels and backwater areas (Wilson et al. 1991). They prefer creeks that have deep, still water and sunny banks. Hatchlings are poor swimmers and require shallow edgewater areas with minimal current. Basking sites such as rocks and logs are important. Nesting habitat consists of dry grassy areas with a predominantly south or southwest aspect. Overwintering habitat varies and includes forested areas. These upland habitats can occur as far as 500 meters from occupied aquatic habitat (Reese and Welsh 1998). The project would have no effect on the pond turtle because field reviews of the project area revealed no potential nesting habitat near areas proposed for treatment and streams in the project area vicinity are well shaded and do not provide pond turtle aquatic habitat.

The **Cascade frog** inhabits permanent ponds and streams and can survive in ephemeral water bodies where at least some substrate remains saturated. Open, shallow water that remains unshaded during the hours of strong sunlight provide egg-laying sites. Aquatic sites where this species is found are characterized by a low accumulation of dissolved nutrient salts, oligotrophic (i.e., supporting but a sparse plant and animal life), having a high oxygen content owing to the low organic matter and no predatory fish (USDA 1998). The project would have no effect on the Cascade frog because field reviews of the project area revealed no oligotrophic ponds and streams in the project area vicinity are relatively fast flowing , well shaded, and thus do not provide Cascade frog breeding habitat.

The **foothill yellow-legged frog** breeds in shallow, slow flowing water with only partial shading (USDA 1998). The project would have no effect on the yellow-legged frog because field reviews revealed that streams in the project area vicinity are relatively fast flowing , well shaded, and thus do not provide yellow-legged frog habitat.

The **southern torrent salamander** seldom ventures away from saturated streamside areas and occurs within a relatively narrow range of physical and microclimatic conditions and is associated with cold, clear headwater to low-order streams with loose rocky substrates (low sedimentation) in humid forest habitats with large conifers, abundant moss, and greater than 80% canopy closure. Thus, the southern torrent salamander demonstrates an ecological dependence on streamside conditions of microclimate and habitat structure that are typically best created, stabilized, and maintained within late seral forests in northwestern California. (Welsh and Lind 1996). The project would have no effect on the torrent salamander because field reviews of the project area and vicinity revealed no areas proposed for treatment

in close proximity to potential torrent salamander habitat and the proposed treatments would maintain existing canopy closure adjacent to all perennial streams where even marginal habitat may occur.

The project would have no effect on the **Shasta salamander**, **California floater, topaz juga**, **montane peaclam** (USDA 1998) and **nugget pebble snail** (Furnish & Monthey 1998) because the project area lies well outside the known or expected ranges of these species.

Protocol surveys of the project area and vicinity revealed no **Shasta sideband snails**, **Wintu sideband snails**, **Shasta chaparral snails**, **Tehama chaparral snails**, **Pressley hesperian snails** or **Shasta hesperian snails**.

Interagency Technical Assistance

Consulting biologists with the U.S. Fish and Wildlife Service (USFWS, Red Bluff Field Office) have been involved with the Gemmill Thin project through numerous field visits, meetings and phone conversations since the early planning stages, including: Danielle Chi (2004), Heidi Crowell (2005), Keith Paul and Doug Powers (2006) and Keith Paul (2007, continuing). Field discussions have included review of proposed treatment areas and proposed actions in reference to species associated with late-successional forest habitat including the northern spotted owl and Pacific fisher. The Pacific fisher is a federal candidate species as well as a Forest Service sensitive species. The northern spotted owl is a Federal threatened species, not a sensitive species, and is fully analyzed in the Biological Assessment (BA) submitted to the U.S. Fish and Wildlife Service as part of the consultation process under the Endangered Species Act.

Current management direction

The Shasta-Trinity National Forest (STNF) is currently operating in full compliance with the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (ROD; USDA Forest Service and USDI Bureau of Land Management, 1994). The Regional Forester approved the STNF Land and Resource Management Plan (Forest Plan or LRMP) on April 28, 1995 and it became effective as of June 5, 1995. The Northwest Forest Plan ROD was incorporated into the Forest Plan.

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

Description of proposed action(s)_____

Location of Proposed Actions

The project area is located on South Fork Management Unit in T.29 and 30 N., R.10 and 11 W., Mt. Diablo Meridian, northeast of the community of Wildwood, California and south of Chanchellula Wilderness (see cover page and Map 1). The Forest Land and Resource Management Plan allocates this area to Late-Successional Reserve (LSR), Riparian Reserves (wetlands and areas adjacent to streams) and a minor component of less than 5% to Matrix (commercial timber harvest emphasis). The 5% Matrix will be treated as if it were part of the LSR.

Purpose and Need for Action

Over the past 100 years, local communities, the State and the Forest Service have actively suppressed wildfires within this region. Historically, low intensity wildfire periodically thinned out smaller, less vigorous trees in the Chanchellula Late-successional Reserve (LSR). Fire suppression has allowed a larger proportion of forests to become more densely stocked than would have been historically common. These higher densities suppress tree growth and result in more stands that are slower growing than would be normally found in the area. The competition at high densities suppress forest growth (U.S. Department of Agriculture et al, Forest Wide LSR Assessment, 1997; (1993;Covington and Moore 1994;Arno and Ottmar 1994a;Atzet and Martin 1996;Agee 1999;Graham *et al*. 2004;Backer *et al*. 2004;Brown *et al*. 2004;Agee 2005)).

Overcrowded conditions in 80 to 100 year old (mature) stands and the resulting suppression of additional growth cause a delay in the development of healthy, functioning old-growth habitat. Old-growth habitat refers to stands characterized by multiple canopy layers, an abundance of large dead and dying material (snags and large downed logs), and a dominant overstory of large trees. Overcrowded conditions in older mature/old-growth stands (100 – plus years old) do not promote long-term health and maintenance of key old-growth habitat components because the largest and oldest trees and their replacements are at risk to mortality due to the proximity and number of competing trees (1990). In both cases, tree vigor is reduced because smaller trees are competing with larger trees for limited amounts of nutrients, sunlight, and especially water. This leaves the ecosystem more prone to disease and less resilient to fire (1993)). Without treatment, overstocked stands will not stay healthy or meet the need for more old-growth habitat in the LSR. Most of the existing plantations scattered throughout the LSR have never been thinned so they, too, are overcrowded and are hindered in their development of future old-growth habitat characteristics (Graham 1994;Graham *et al*. 1999;Graham *et al.* 2004)).

There is a need to thin the overstocked mature conifer stands that are 80-100 years old. Fewer and healthier trees per acre would serve two interrelated purposes: (1) accelerate the development of old-growth habitat characteristics and (2) reduce the loss of existing and developing old-growth habitat in the event of drought, disease or insect outbreaks and especially wildfire.

There is a need to thin below older mature/old-growth stands that are over 100 years old. The thinning would favor the oldest/largest trees and would serve three interrelated purposes:

1. Decrease the risk of losing existing large, old-growth trees by:
   a. removing those nearby trees that are competing for the available nutrients,
2. Decrease the risk of losing future replacement old-growth trees by
   a. opening the canopy,
   b. allowing a portion of the understory to respond and grow into mini-gaps formed in the thinning;
   c. and allow potential regeneration to initiate;
3. Reduce the risk of losing both of these key features to wildfire, drought, disease or insects by:
   a. reducing the risk and hazard of wildfire,
   b. decreasing the competitive stress on the remaining trees, which will increase the ability of the remaining trees to resist the physiological stresses of draught, disease and insect attack.

There is a need to thin plantations to increase conifer growth rate and reduce density to levels where flames are not likely to reach the canopy of the adjacent older stands during a wildfire (Landram and Hermit 1996; Graham 1994; Arno and Ottmar 1994b; Skinner and Weatherspoon 1996; Gray and Franklin 1997; Taylor and Skinner 1998; Cissel *et al*. 1998; Graham *et al.* 1999; Omi and Martinson 2002; Graham *et al.* 2004; Brown *et al.* 2004; Beschta *et al*. 2004; Knapp 2005; Agee 2005).

There is also a need to protect late-successional and old-growth habitat from the threat of fire that could start inside or outside the perimeter of the LSR. Overcrowded stands increase competitive stress between trees which increases tree mortality from insect and disease. The higher level of dead and dying trees found in overcrowded stands in turn increases fire risk from either natural or human caused wildfire. These dead and dying trees provide greater fuels to not only carry a fire hotter and faster, but increase the risk that a cooler and slower fire would burn into the canopy. The majority of the private land closest to the Gemmill Thin project was harvested in the late 1960s to 1970s and continuing private harvesting is likely. Two public roads and a transmission line are within or directly adjacent to the project area. These linear features and past harvesting of private lands are associated with higher risk for fire starts that could affect the project area.

Summary of Proposed Actions

To meet the purpose and need, the proposed action will include the following treatments:

- **Thinning From Below in Dense Mature Stands (80 to 100 years old) - 750 acres**: This treatment targets overly dense mature conifer stands to accelerate the development of desired old-growth characteristics and to reduce fuel levels to reduce the risk of stand replacing fires, those fires that burn into the crowns of the trees and kill the large majority of the trees of the stand. These stands do not yet exhibit the desired level of old-growth characteristics, but have the potential to attain them. The largest and healthiest trees would be retained. A sufficient number of trees would be removed to maintain or increase growth rates of the mature trees and remove fuel ladders. Trees marked for removal with this ‘thinning from below’ would start with the smallest least healthy conifers and progressively involve larger trees until the existing 70 to

90 percent canopy cover is reduced to approximately 60 percent to make more water, nutrients, sunlight and growing space available to the remaining trees (conifers as well as hardwoods). The remaining trees would experience accelerated growth and health. In addition, the smaller trees that would be removed currently act as fuel ladders because their crowns are closer to the ground and allow flames to climb into the canopy. This could lead to a large-scale loss of conifer forest habitat. Biological legacies such as large/old green trees and other old-growth structural components (large snags, logs, viable hardwoods, etc.) would be retained within each harvest unit to provide these important habitat components as the stand develops.

- **Thinning From Below in Dense Mature/Old-Growth Stands (over 100 years old) - 530 acres**: This treatment targets overly dense mixed conifer stands that are either currently old-growth or have a stronger component of large/old trees to maintain and prolong the persistence of existing old-growth characteristics. The largest and oldest (predominant or 'legacy') trees within each stand would be retained and competing understory trees would be removed within a zone about 1 ½ the width of the old tree's crowns. A sufficient number of smaller trees would be removed to reduce the number of trees per acre to a level that provides an improved competitive advantage for the larger, older trees and removes fuel ladders that may threaten the remaining trees and adjacent stands. The post treatment stands would average 60% or more canopy cover.

  Note: Although we differentiate the two thinning treatments above, they are mixed within the mapped units. The two general thinning prescriptions described above will be blended within each unit depending upon site specific conditions. In all thinning units, large old trees will be prioritized for protection. Thinnings will target competing understory trees around the 'legacy' trees in all units and dense pockets of mature trees will be targeted for thinning from below within mature/old stands leaving the largest and best of the existing trees.

- **Thinning Plantations (~20 years old) - 45 acres**: This treatment targets overcrowded plantations to decrease competition for sunlight, nutrients, and water. This would improve stand vigor, reduce stand mortality, reduce susceptibility to primary and secondary insect and disease effects, and accelerate the development of large overstory conifers (Oliver and Larson, 1996). The thinning and release treatments would be accomplished through mastication (grinding up excess trees) in three plantations. Small conifer density would be reduced from roughly 300-plus trees per acre down to an average of 150 trees per acre; a level that maintains stand growth rate and reduces ladder fuels. Stand vertical structural diversity would be maintained or improved into the future by retaining intermediate, codominant, and dominant crown class hardwoods.
- **Thinning to Maintain Existing Fuelbreaks (80 to 150 years old) - 260 acres**: This treatment targets fuel breaks that were created about 20 years ago. The effectiveness of the fuebreaks would be maintained through thinning with a prescription that would remove smaller diameter trees, brush and snags and reduce the existing 50-70 percent overstory canopy closure down to about 40 percent. Viable hardwoods would be cut back to the one-or-two most vigorous stems and maintained in the areas to provide vertical structural diversity. In general, these are multi-

aged, multi-storied mixed conifer stands which have been partially cut or sanitized (i.e., dead or dying trees removed) in the past. However, tree mortality is still occurring throughout these stands. Large snags and most large logs have altready been removed for fuels and fire fighter safety concerns. Hardwood species, including canyon live-oak, California black oak, and Pacific madrone, are common but are generally understory components. The forest-floor shrub, forb and grass components of these stands are generally well-developed.

- **Dead Fuels Reduction in mixed conifer forest (100 to 150 years old) – 28 acres**: This treatment targets two stands that have experienced a high level of tree mortality due to insect, disease and windthrow. The resulting high fuel level puts these and adjacent stands at a high risk of being lost to crown fire. All live trees and all snags/logs greater than 19 inches dbh would be retained. Dead-standing trees and dead ground fuels would be concentrated or piled and then burned to reduce woody fuels.
- **Yarding Systems**: Trees, and some activity fuels, from the harvest units would be removed with a combination of tractor/mechanical yarding, skyline/cable yarding and helicopter yarding.
- **Landings**: Up to an estimated 31 (0.25 to 0.5-acre) temporary landings measuring roughly 100x100 to 100x200 feet would be constructed and an additional 23 existing landings would be reused. Landings are critical for handling and storing the substantial amount of woody material that would be produced by the removal of large numbers of relatively small diameter trees and dead fuel within the adjacent units. No trees greater than 24 inches diameter at breast height (dbh) would be cut to minimize impacts to old-growth habitat. The landings landings would be decompacted following the thinnings and fuels treatments to facilitate water infiltration and natural revegetation. Map 3 displays likely landing locations based upon intensive field reviews, topography, stand conditions and experience with where landings may be needed.
- We chose having a higher number of small landings versus fewer large landings because this allows us to strategically place landings to avoid or minimize impacts to the largest/oldest trees or old-growth habitat and minimize the ground disturbing effects of dragging logs long distances.
- **Roads**: Approximately 18 miles of existing roads would be reconstructed (brushed, smoothed, graveled, etc.) and 1.66 miles of temporary road constructed. Temporary roads would access temporary landings within proposed thinning units and would be about 12 feet wide; and would be ripped (i.e., 'decompacted') and closed after completion of harvest activities to facilitate water infiltration and natural revegetation. About 10.5 miles of exisiting roads would be decommissioned to improve water infiltration, reduce erosion potential and reduce human disturbace in the project area vicinity.
- **Rock Pits**: An estimated one existing rock pit would be expanded to provide source material for road reconstruction activities.
- **Activity Fuels Treatments**: Fuels created as a result of the proposed silvicultural prescriptions would be treated with a combination of mastication (plantations), mechanical removal, chipping,

handpiling/burning, tractor piling/burning, prescribed underburning, or burning areas of concentrated fuels.

Additional Design Criteria for further Protection of Forest Resources (Mitigation Measures)

The project development team developed numerous design criteria to reduce or avoid impacts to forest resources. Below are those that closely relate to wildlife issues (need to confirm all of these):

- Limited Operating Periods (LOPs) would be implemented to avoid direct adverse impacts to the northern spotted owl. From February 1 through July 10, all noise- and smoke-generating activities will be prohibited **within ¼ mile** of suitable nesting/roosting habitat. In addition, all vegetation removal/cutting/burning will be prohibited through September 15 **within** suitable nesting/roosting habitat. These LOPs may be lifted if surveys using currently accepted protocols indicate specific areas are not occupied by breeding owls or with the mutual consent of the U.S. Fish and Wildlife Service and the U.S. Forest Service.
- Exclude management activities and avoid loud and continuous noise disturbance within ¼ mile of active goshawk nest sites (or within an area designated by the project wildlife biologist) from February 1 through August 15. These dates may change if the young are known to have fledged and nest is no longer being used, as determined by surveys conducted by a wildlife biologist. **No harvest activities will take place in unit 23 if year of action surveys indicate that nesting is occurring for the nest location discovered during 2008 surveys.**
- No activities and no harvest will take place within 250 feet from known Townsend's big-eared bat or Pallid bat roost sites (caves, mines, and mine adits).
- Retain existing large (>19 inches diameter at breast height) snags and down logs within thinning units. Snags felled for safety reasons would be left on site as logs.
- Maintain an average of 5 tons of logs per acre with a preference to have 4 to 6 logs per acre at the largest available diameter.
- Retain all viable hardwoods (i.e., those that have a reasonable chance of surviving and thriving after stand treatments).
- Riparian Reserves of intermittent and ephemeral streams that display annual scour will have a minimum 150 foot Riparian Reserve based upon the average maximum height of 200-year-old trees for the site.
    - There is one inner gorge greater than 150 feet from the defined channel of intermittent or ephemeral streams in unit 13 that will require a Riparian Reserve greater than 150 feet in width.
- Riparian Reserves of fish bearing streams that display annual scour will have a 300 foot Riparian Reserve based upon twice the average maximum height of 200-year-old trees for the site. There are no inner gorges or flood plains in the project area greater than 300 feet from the defined channel of fish bearing streams.

- Thinning may occur in the Riparian Reserves up to the inner gorge, or to 50 feet from the defined channel if no inner gorge exists, for the purpose of enhancing Riparian Reserve timber stand health and treating hazardous fuels. Thinning and fuels treatment will not reduce crown cover to less than 60% within Riparian Reserves.
- Locate landings and temporary roads so that no trees 24 inches or greater will be removed.

Existing Environment

Land allocations and critical habitat

Virtually all the actions proposed in the Gemmill Thin Project lie within Late-Successional Reserve RC331 (Map 2). That is to say, the project units were established logically and practically using the easily identified main ridgeline that defines the Trinity/Shasta County line on the east side of the project whereas the LSR was mapped at a scale that included the entire range of the northern spotted owl from Washington state through California. Consequently, LSR boundaries, as delineated in computerized geographic information system databases, often are not located precisely on identifiable land features (e.g., ridgelines, roads, rivers, etc.). Therefore, portions of units 7, 10, 12, 15, and 28 lie outside the western official LSR boundary. Nonetheless, although the treatment areas are part of the matrix and not part of the LSR, these areas will be treated with the same LSR-driven purpose & need and management direction.

Both LSR RC331 and CHU CA-36 add protected habitat around the Chanchellula Wilderness and fill a void in the southeastern part of Trinity County. CHUs and LSRs provide relatively large blocks of suitable habitat that are well distributed across the range of the owl to provide the functions considered important to maintaining stable, self-sustaining, and interconnected populations of all species associated with late-successional forest ecosystems such as the Pacific fisher.

Spatial scales analyzed (from largest to smallest)

- The 32,309-acre Upper Hayfork Creek 5th Field Watershed was analyzed only in relation to the "*Provide for Retention of Old-Growth Fragments Where Little Remains*" S&G (see Attachment 1 of the Biological Assessment [BA] in the project file).
- The 22,027-acre **fisher analysis area** (FAA) is the area analyzed for potential impacts to fisher related to this project. The Pacific fisher is analyzed at a scale specific to this species because of its status as being warranted for federal listing but precluded by pending proposals for other species with higher listing priorities (U.S. Fish and Wildlife Service; April 8, 2004). The FAA was established using the same general technique and principles used to depict the 'spotted owl action area' for analyzing the federally listed (threatened) northern spotted owl (see the Gemmill Thin Project Wildlife Biological Assessment). It is designed to focus on female fishers because female survival has been shown to be the most important single demographic parameter determining fisher population stability (Truex et al. 1998, Lamberson et al. 2000). Although there is quite a bit of variation in fisher home range size in different studies, we have selected to

use figures based on studies conducted in proximity to the project site and in similar habitat conditions (Yeager 2005). Yeager conducted fisher studies on the Shasta-Trinity National Forest and calculated female fisher home range size to average about 5,800 acres. Suitable habitat within a female's home range would likely be utilized to some extent within any given year and significant impacts to habitat (both positive and negative) would likely affect (positively or negatively) any current or potential future female fishers raising young in the FAA.

- The actual configuration of a home range is rarely known. Establishing actual project-level home ranges would be time-consuming and exorbitantly expensive, requiring the capture and radio collaring of all individuals in a given landscape and then tracking each individual's movement patterns over at least a year. Additionally, it would be highly intrusive to individual fishers (i.e., capture, radio collaring, etc.) and would be somewhat inconclusive due to the variation in fisher home ranges sizes and preferred use patterns over time. Therefore, we used a 1.7 mile radius circle (i.e., an area of 5,800 acres as per Yeager) to approximate an average female fisher home range in the project area vicinity and created the FAA by mapping a 1.7-mile buffer around all areas proposed for treatment that may impact fisher habitat. This method likely overestimates the number of female home ranges impacted (16,868/5,800 = about 3) since it assumes homogeneous suitable habitat and full occupancy, but we feel the FAA gives a reasonable approximation for project-level NEPA effects analysis.
- The other two species associated with late-successional forest habitat (the American marten and the northern goshawk) are analyzed using the 16,868-acre **'spotted owl action area'** established for the late-successional (late seral) habitat management representative species northern spotted owl that is typically used to analyze the impacts of proposed actions on these species.
- The **project area** includes stand-level effects and is comprised of only the areas that would be directly impacted by the proposed actions (e.g., thinning units, fuel break units, plantations). Thus, Alternative 2 (no action) has no 'project area.'

Species and Habitat Account

Appendix G, Wildlife Biological Assessment; completed for this project provides habitat definitions and the assumptions used to analyze late-successional and old-growth habitat. The Shasta-Trinity National Forest LRMP GIS database was used in conjunction with habitat verification and minor revisions based upon extensive field reviews. Tables H-1 through H-3 display the crosswalk between the three main stand attributes in the GIS database used (crown diameter, canopy closure, and vegetation type) and habitat specific to the Pacific fisher, American marten, and northern goshawk respectively.

Pacific Fisher

Pacific Fisher species account

Existing habitat conditions (described below) suggest that the FAA likely supports up to about three reproductive females and one or two males. Our records include seven sightings of individual fishers in the FAA and we fully expect fishers to still occur in the area even though recent (albeit limited) baited

camera stations failed to detect fishers in the area and Carroll et al. (1999)(Carroll *et al*. 1999) predict a generally low probability of fisher detection in the area. The combination of sighting reports, monitoring results, and study findings demonstrate fisher are widely distributed across a variety of habitat types throughout the Shasta-Trinity National Forest (STNF). On the STNF, over 550 fishers have been observed since 1941 to 2005 through monitoring (track plates or camera stations), trapping, incidental sightings, and fisher research results (e.g. Buck, Marcot, Raphael, Garrison, Yaeger, Zielinski). Sighting records are from many sources; for example California Department of Fish and Game including California Natural Diversity Database, Schempf and White's Forest Service data review, and Sierra Pacific Industries. These data are from STNF GIS databases (*martes_pennanti* _observe: 49 records; fisher_sightings: 182 records; stnf_fisher_points: 284 records) and some recent researcher surveys. Research surveys conducted by Lindstrand from 2003 to 2005,(Lindstrand III 2006) recorded 13 new fisher sites. Yaeger (2005) captured 22 individual fishers from 1992 to 1996 in the Trinity Lake area. Zielinski (2004c) (Zielinski *et al*. 2004) radio-marked 22 individual fishers in his coastal study area (Six Rivers and Shasta-Trinity National Forest). Seglund (1995) captured 10 individual fishers from 1992 to 1993 in the Trinity Lake area.

Pacific fisher habitat account

Existing conditions and potential effects to fisher habitat emphasize resting and denning habitat (i.e., late-successional) in this evaluation because Powell and Zielinski (1994)(Buskirk and Powell 1994) and Zielinski et al. (in press 2004b) (Zielinski *et al.* 2004) suggest that habitat suitable for resting and denning sites may be more limiting for Pacific fishers than foraging habitat. The fisher is an opportunistic predator with a diverse diet that includes birds, squirrels, mice, shrews, voles, reptiles, insects, carrion, vegetation and fruit (Powell 1993; Martin 1994; Zielinski et al. 1999(Zielinski *et al*. 1999), Zielinski and Duncan in press 2004). Thus, aside from their avoidance of nonforested and open areas (Arthur et al. 1989b; Buck et al. 1983, 1994; Coulter 1966; Earle 1978; Jones 1991; Jones and Garton 1994; Kelly 1977; Powell 1977, 1978; Rosenberg and Raphael 1986; Roy 1991), fishers will forage in a wide variety of habitats (seral stages) associated with this diverse prey base. The U.S. Fish and Wildlife Service (April 8, 2004) concluded that "the dominant opinion from published sources and species experts is that, while fishers use a broad variety of habitat types for different life requisites, the primary constituent elements of fisher habitat are best expressed in forest stands with late-successional characteristics."

The characteristics of sites used for resting and denning are the best-known elements of habitat selection by fisher (USDI Fish and Wildlife Service 2004(USDI 2004)). Numerous studies have documented that resting/denning fishers in the western United States utilize stands with certain forest characteristics such as **large trees**, **large snags**, **coarse woody-debris**, **dense canopy closure**, **multiple-canopy layers**, **large diameter hardwoods**, and **steep slopes near water** (Powell and Zielinski 1994; Seglund 1995; Dark 1997; Truex et al. 1998; Self and Kerns 2001; Aubry et al. 2002; Carroll et al. 1999; Mazzoni 2002; Zielinski et al. in press 2004b). Trees must be large and old enough to bear the type of stresses that initiate cavities, and the type of ecological processes (e.g., decay, woodpecker activity) that form cavities of sufficient size to be useful to fishers; tree species that typically decay to form cavities in the bole are more important than those that do not (Zielinski et al in press 2004b). These characteristics

are virtually identical to those associated with late-successional (especially the old-growth subset) and spotted owl habitat. In the Gemmill Project area vicinity, fisher resting/denning habitat structure is typically best created, stabilized, and maintained within late-successional forests. As with northern spotted owl habitat, the major structural components of resting/denning habitat are typically found in greater density and larger sizes in the old-growth subset of late-successional forest.

Table H-1. Pacific fisher resting/denning (RD) and foraging habitat in the Fisher Analysis Area related to late-successional (late seral) and old-growth habitat and crown diameter & canopy closure (see Appendix G, Wildlife Biological Assessment).

Relative Habitat Quality	Crown Diameter & Canopy Closure and Vegetation Types	Existing Available Habitat
High Quality RD (old-growth;)	4G & 4N mixed conifer, Douglas-fir, ponderosa pine, and white fir	2,387 acres
Moderate Quality RD (dense late-successional)	3G mixed conifer, Douglas-fir, ponderosa pine, and white fir	4,443 acres
Low Quality RD (moderately dense late-successional)	3N mixed conifer, Douglas-fir, ponderosa pine, and white fir	2,967 acres
Total Resting/Denning Habitat	**old-growth and late-successional conifer forest with dense to moderately dense canopy closure**	**9,797 acres**
Foraging (low density late-successional and younger conifer)	mixed conifer, Douglas-fir, ponderosa pine, and white fir 4P, 4S, 3P, 3S, 2G, 2N, 2P, 2S, 1G, 1N, 1P, and 1S (from better to worse quality)	**8,862 acres total** (4,962 acres Forest Service land plus roughly 3,900 acres from private property)
Marginal Quality Foraging (fishers forage in a wide variety of habitat types that bear little or no resemblance to late-successional conifer forests)	Chaparral, shrub, hardwood and foothill pine	**923 acres total** (623 acres Forest Service land plus roughly 300 acres from private property)
	Total Fisher Habitat	**19,582 acres** (15,382 Federal land)

American Marten

American Marten species account

Our records include no sightings of the secretive American marten in the spotted owl action area. The nearest sighting to the project area lies approximately six miles to the north. It is noteworthy that the extensive survey work that included the STNF (Yaeger 2005; Zielinski 2004c; Seglund 1995), using techniques suitable for detecting marten, that have detected numerous fishers on the STNF (see above) failed to report any marten detections. Current marginal habitat conditions suggest that marten do not likely occur in the project area vicinity. Generally, the presence of fisher often excludes martens from the area (Buskirk and Powell 1994; Krohn *et al*. 1997; Small *et al*. 2003; Ruggierra *et al*. 2007).

American Marten habitat account

This assessment of marten habitat is based upon the late-successional habitat definitions presented in Appendix G, Wildlife Biological Assessment; cross-referenced to the habitat capability models included in Appendix G of the Forest Plan and uses the LMP-90 database coupled with field reviews of the project area vicinity to confirm habitat capability (i.e., quality).

On the Shasta-Trinity National Forest, the marten is associated with higher elevation (>4,500 feet) late-successional red-fir stands (Buskirk, et al. 1994 (Buskirk and Powell 1994); Freel, 1991(Freel 1991)) and to a lesser extent lower elevation conifer forest similar to fisher habitat. Stand-level habitat characteristics are the same as those discussed previously for fisher resting/denning habitat. The spotted owl action area includes zero acres of high capability marten habitat (zero acres in the project area), 1,688 acres of moderate capability habitat (240 acres in the project area) and 11,735 acres (includes roughly 4,000 acres on private property) of marginal capability habitat (900 acres in the project area) (Table H-2). The nearest high capability habitat lies about 8 miles north of the project area.

Table H-2. American marten habitat in the spotted owl action area related to vegetation types, and crown diameter & canopy closure (see Appendix G, Wildlife Biological Assessment).

Relative Habitat Quality	Crown Diameter & Canopy Closure and Vegetation Types	Existing Available Habitat
High Capability	4N & 4G (red fir only)	0 (zero) acres
Moderate Capability	3N & 3G (red fir; none in action area) 4N & 4G (mixed conifer, Douglas-fir, ponderosa pine, and white fir)	1,688 acres
Low Capability	all remaining 3 all remaining red fir >2P (none in action area)	11,735 acres (7,735 Forest Service land plus roughly 4,000 acres on private property)
Total Marten Habitat		**13,423 acres** (9,423 Forest Service land plus roughly 4,000 acres on private property)

Pallid Bat

Pallid Bat species account

Pallid bats occur and reproduce in the project area vicinity. The Forest Service Pacific Southwest Research Station conducted strategic bat surveys across the South Fork Management Unit, including a concentrated survey effort near Halls City and Wilson Creeks in the project area vicinity where two juvenile and one pregnant female pallid bats were captured.

Pallid Bat habitat account

The pallid bat has a wide distribution throughout the western United States, and can be abundant in many arid, low elevation regions. They roost in deep crevices in rock faces, caves, mines, bridges, and cavities

in trees. Suitable cave, mine adit and rock habitats occur scattered throughout the project area vicinity and tree cavities are common throughout the entire STNF.

Townsend's Big-eared Bat

Townsend's Big-eared Bat species account

Pacific Southwest Research Station conducted strategic bat surveys across the South Fork Management Unit, including a concentrated survey effort near Halls City and Wilson Creeks in the project area vicinity. Big-eared bats were detected during their survey, but not directly within the project area vicinity. A known maternity roost site lies roughly 10 miles to the northwest of the project area. . Several aspects of the biology of this species make it a particularly difficult to survey. It is a slow flying, highly maneuverable bat that is adept at avoiding mist-nets and its echolocation call is relatively quiet, such that acoustic surveys often fail to detect the bat when it is present. An assumption of presence is made, specifically for Hall City caves and other mine adits in the project area due to their high suitability for roosting and the previous detection of big-eared bats in the general vicinity.

Townsend's Big-eared Bat habitat account

This species has a large geographic range and occupies a variety of habitats ranging from coniferous forests and woodlands, to deciduous riparian woodlands, semi-desert and montane shrublands. The distribution of this bat tends to be determined by and strongly correlated with the availability of caves or cave-like roosting habitat such as old mines (Gruver 2006, Zeiner 1990, Arizona Game and Fish 1993).The size of an area outside of a roost structure required by this species depends on availability of water, abundance of insect prey, time of year, reproductive status of the bats, and the size of colony. This species forages in more cluttered habitats, avoiding more open areas while foraging opportunistically within concentrations of insects, relying heavily on riparian areas, wetlands, forest edges or ridges (Fellers and Pierson 2002). Foraging habitat occurs across the STNF and within the project area. Roosting habitat, in the form of Hall City Caves and numerous mine adits, occurs within the project area and surrounding vicinity.

Northern Goshawk

Northern Goshawk species account

Goshawk surveys were conducted in 2007 and 2008 in the project area vicinity, and were focused on areas with historic goshawk nesting or sighting data as well as areas with the most suitable habitat.

In 2007, two general goshawk activity centers were located that implied a close proximity of nest sites:

- An adult goshawk was observed attacking a male spotted owl during a daytime visit roughly 1.2 miles southwest of the project area. Extensive follow-up efforts over several days did not reveal goshawks in the original vicinity. However, the original aggressive behavior suggests a nearby nest site.

- Field visits, current habitat conditions and the territorial nature of goshawks suggest that, in addition to the two goshawk activity centers described above, one additional pair may utilize habitat in the Chanchelulla Gulch area of the action area north of fuel break units #4, #5 and #6.

In 2008, an active goshawk nest was located in the Hall City drainage near the center of the project area, on the edge of unit 23. This unit will not be entered during the goshawk breeding season if year of action surveys indicate nesting activity is occurring. In addition, Limited Operating Periods (LOP) will be in effect for ¼ mile surrounding the nest site.

Year of action surveys will be conducted throughout the project area vicinity. Results from these surveys will guide the implementation of the Limited Operating Periods (LOP) for goshawk nesting season.

Northern Goshawk habitat account

This assessment of goshawk habitat is based upon the late-successional habitat definitions presented in Appendix G, Wildlife Biological Assessment; cross-referenced to the habitat capability models included in Appendix G of the Forest Plan and uses the LMP-90 database coupled with field reviews of the project area vicinity to confirm habitat capability (i.e., quality).

On the west side of the Shasta-Trinity National Forest, goshawks are typically associated with late-successional and old-growth conifer habitat (USDA 1998). Stand-level habitat characteristics are the same as those discussed previously for fisher resting/denning habitat. The action area includes 1,688 acres of high capability habitat (254 acres in the project area), 9,991 acres of moderate capability habitat (5,991 acres National Forest land plus roughly 4,000 acres on private property) (955 acres in the project area) and 4,796 acres of low capability habitat (405 acres in the project area) (Table H-3). Goshawk habitat capability in the analysis area is undoubtedly substantially lower because this analysis does not account for slope steepness. The Forest Plan model includes slope percent; gentle slopes are preferred by the goshawk; the watershed includes many areas dominated by steep terrain.

Table H-3. Northern goshawk habitat in the spotted owl action area related to vegetation types, crown diameter & canopy closure (see Appendix G, Wildlife Biological Assessment).

Relative Habitat Quality	Crown Diameter & Canopy Closure and Vegetation Types	Existing Available Habitat
High Capability	4N & 4G (mixed conifer, Douglas-fir, ponderosa pine, and white fir)	1,688 acres
Moderate Capability	3N & 3G (mixed conifer, Douglas-fir, ponderosa pine, and white fir)	9,991 acres (5,991 acres National Forest plus roughly 4,000 acres on private property)
Low Capability	all remaining ≥2	4,796 acres
Total Goshawk Habitat		**16,475 acres** (12,475 acres National Forest plus roughly 4,000 acres on private property)

Effects of the proposed action

Actions Not Further Analyzed

The interrelated and interdependent actions listed below will not be further analyzed for the following reasons:

- **Road reconstruction and rock pit expansion** would occur within existing Forest Service system roadbeds or already heavily disturbed sites and would have no effect on existing fisher habitat.
- **Temporary road construction** would occur only within proposed thinning units and their widths (about 12 feet) would be comparable to the leave tree spacing (i.e., comparable effects to canopy closure). Additionally, they would be ripped or subsoiled after use (i.e., the soil would be "decompacted") to allow water infiltration and revegetation. That is to say, the recovery of the stands as related to fisher habitat would be similar with or without the temporary road construction. Therefore, the effects are lumped in with the effects of thinning.
- **Dozer and handlines** would occur within proposed harvest units and would have little effect on retained vegetation or habitat components. Therefore, the effects are lumped in with thinning/regeneration effects.
- **Activity fuels treatments** (including burning), **decompacting of temporary roads or landings**, and **road decommissioning** would not affect fisher habitat.

Direct Effects (Mortality, Harm, Failed Breeding Attempts, Displacement)

Pacific Fisher

When assessing project level effects to fisher populations, the USFWS regards the retention of key habitat elements such as large downed logs, large snags that provide cavities for denning and a higher canopy closure that provides protection from the heat and drying effects of the sun, as being the most important factors used to maintain habitat suitability. It is the specific removal of these elements that cause the degradation of a given habitat type. The continuing loss of these important habitat structural elements as well as the continuing loss and fragmentation of suitable habitat constitute the primary threats to fisher populations (USFWS 2006). Because the goal of the Gemmill thin project is for the improvement and protection of late successional habitat for the species that rely on it in perpetuity, the project was designed specifically to retain these key habitat elements, improve habitat structure and contribute to connectivity between areas of suitable habitat.

It is possible that individual fishers may be impacted by short term disturbance during project implementation. Female fishers can and do move their young to alternative denning sites throughout the season (Arthur and Krohn 1991) and may move from the disturbance to large blocks of undisturbed habitat immediately adjacent to the areas proposed for treatment. Disturbances would be short-lived and of a small scale and would not exacerbate the significant threats to viability identified by the USFWS.

American Marten

Little is known about the potential effects to marten behavior (especially breeding success) from related forest management activities. However, we do not expect direct effects to the marten because current habitat conditions and the lack of marten detections on the Trinity side of the STNF indicate that this species does not occur in the project area vicinity.

Pallid Bat

Pallid bats occur in the project area vicinity and may roost in caves, abandoned mines and mine adits, deep rock crevices, and tree cavities scattered throughout the area. Disturbance buffers, where no harvest or harvest activities will take place, of 250 feet for caves and mine adits will reduce impacts to roost sites during project implementation. Even though the proposed actions avoid direct impacts to caves, mines, rock outcrop areas, and large snags/trees (i.e., that most commonly would have larger cavities that could accommodate larger numbers of bats); individuals may be disturbed and vacate the vicinity due to noise during project implementation. Temporary, occasional disturbance may occur, but should not affect breeding or rearing activities. Effects to this species are expected to be similar to those described above for Townsend's big-eared bat.

Townsend's Big-eared Bat

This bat species may use Hall City cave located near the southeast side of the project area as well as two abandoned mine adits within the project area as roost sites.

The *Technical Conservation Assessment for Townsend's Big-eared Bats* (Gruver 2006) identifies several key conservation elements and provides management guidelines aimed at protecting these elements. Within this assessment, the disturbance and destruction of roosts is identified as responsible for the local and range-wide declines of Townsend's big-eared bat. Among the guidelines were standards for management of caves and mines. Protection of known roosts and identification and protection of additional roosts were identified as core conservation actions for this, and several other species of bat.

Protection of roosting bats requires minimizing or eliminating human disturbance at roosts and ensuring that surface disturbing activities are done at appropriate times and at appropriate distances from roosts (Gruver 2006). Disturbance of roosting bats at specific times and of a long duration can be especially detrimental to the fitness of the bats. Continued disturbance at roost entrances can cause bats to become hesitant to exit or can lead to unnecessary expenditure of vital energy reserves (Pierson 2002, Gruver 2006). Delayed emergence from roost sites for bats with high energetic demands, that will have not had food or water for14 to 16 hours, can have detrimental effects. Disturbance of maternity roosts, where large colonies of pregnant females or females and their young roost, may result in total roost abandonment and mothers that may leave non-volant young behind.

Disturbance buffers will be implemented with the proposed actions as a means for protecting known and potential roost sites and reducing impacts from human disturbance during project implementation. Within these buffers, no harvest or harvest activities will take place at any time, within 250 feet for caves and abandoned/old mine adits.

Although the proposed actions avoid impacts to caves, mines and rock outcrop areas, and these areas are over 250 feet from any unit boundary, it is possible that individuals may be disturbed due to noise during project implementation. Studies of the habitat requirements of this bat have indicated that although the bats may leave a particular roost site if sufficiently disturbed, they will generally return to the site if the disturbance is short-term and short duration and the microclimate within and around the roost site has not been altered (Pierson 1999, Ariz. Game and Fish 2002). It is unknown whether maternity roosts are present in the project vicinity, but providing protection buffers to known sites where potential maternity roosts may exist would avoid impacts to reproduction.

No activities would take place at any time within 250 feet from known roost sites, nor would any of the proposed actions alter the environment around cave or abandoned mine entrances (and therefore the microclimate within). Temporary, occasional disturbance may occur, but should not affect breeding or rearing activities.

Northern Goshawk

The pair of goshawks occupying the Hall's City Creek drainage may be disturbed during project implementation, although the unit containing the current nest will not be entered during breeding season if year of action surveys determine that nesting activity is occurring. In addition, the implementation of a ¼-mile LOP surrounding the nest site during nesting season should also help to minimize the impacts to this pair.

Nests have not been located for the two potential pair in the Landis Gulch area and the Chanchellula Gulch area but the birds were aggressively defending territories in areas located far enough away (over 1.2 miles) from the project area, that disturbance to breeding activities would not be likely. In addition, year of action surveys will be conducted within the project area. Results from these surveys will guide the implementation of LOPs that will protect nesting goshawks during project implementation for the duration of the goshawk nesting season.

Indirect Effects (habitat)

Short-Term (from implementation out to about 10-15 years)

The Gemmill Thin Project may affect fisher, marten and goshawk (i.e., late-successional) habitat in the short-term in three general ways:

Effects to Habitat Characteristics

- **Reduction in overall canopy closure**: A moderate to dense canopy closure is an important characteristic of late-successional habitat because it moderates environmental extremes (e.g., temperature, rain/snow fall, etc.) and provides cover from avian predators. A reduction of canopy closure is unavoidable in order to meet the Gemmill Thin Project purpose and need. By design, the remaining canopy closure (60%) will still remain well within the parameters for suitable fisher habitat. The no action alternative leads to a greater risk of stand-replacing fire and loss of habitat (see below).

- **Simplification in vertical structure**: Multiple canopy levels provided by understory conifers and hardwoods provide roost sites for goshawks, resting/denning sites for fishers and cover from potential predators.
- **Reduction in smaller diameter (<24" dbh) snags and logs**: Snags can provide fisher resting/denning sites and both snags and logs provide habitat for fisher, marten and goshawk prey species. Some smaller snags may be removed for operational purposes. However, all large diameter snags and logs will be retained, as well as large trees for future snag recruitment.

The Gemmill Thin Project interdisciplinary team (IDT) specifically designed this project to maintain, protect and develop the key fisher resting/denning habitat attributes discussed previously: 1) **large trees**, 2) **large snags**, 3) **coarse woody-debris**, 4) **dense canopy closure**, 5) **multiple-canopy layers**, 6) **large diameter hardwoods**, and 6) **steep slopes near water**. Note that these attributes also apply to other species associated with late-successional habitat such as the American marten, northern goshawk, and northern spotted owl.

In addition, the timber harvest prescription for this project is not a "sanitation" prescription whereby trees that display defect, disease or decay are removed. Trees that are considered "cull" or "standing cull" are not targeted for removal, thereby leaving the trees that are most likely to become snags and downed logs in the future.

1. **Large Trees**: The thinning from below, dead fuel removal, and fuel break maintenance prescriptions were specifically designed to retain the largest/oldest trees. Additionally, at a tree-specific scale, the prescriptions would thin within close proximity of all existing predominant trees (the largest/oldest) to increase available site resources so these important trees can persist longer. The dead fuel reduction prescription would retain all live trees. The small (½ to ¼-acre) landings would be strategically located to avoid impacting large trees. The fuel break was established about 20 years ago and these areas do not provide resting/denning habitat because of the past removal of key components such as large decadent trees, large snags, and large logs. The plantations proposed for thinning have had these key components removed but the thinning would accelerate the growth of the remaining trees and the more rapid development of these key components.
2. **Large Snags**: Thinning from below and dead fuel reduction prescriptions would retain all existing large snags (≥19" dbh). The small (½ to ¼-acre) landings would be strategically located to avoid impacting large snags. Again, large snags have already been removed within the fuel break and plantations. Smaller snags do not have the potential to include branches or cavities large enough to provide fisher resting or denning sites. The plantation thinning would accelerate the growth of larger conifers and ultimately large snags into the future. Retaining large snags also ensures a supply of future large, downed logs.
3. **Coarse Woody Material**: Thinning from below and dead fuel reduction prescriptions would retain all existing large logs (≥19" diameter at the large end). Again, large logs have already been removed within the fuel break and plantations. Smaller snags do not have the potential to include

branches or cavities large enough to provide fisher resting or denning sites. The plantation thinning would accelerate the growth of larger conifers and ultimately large logs into the future.

4. **Dense Canopy Closure**: The IDT developed the thinning from below prescription as a balance between the maintenance of canopy and a reduction in existing and future fuels to prevent loss of habitat due to wildfire. The resulting post-treatment stand-level canopy closure of about 85 percent (when the retained hardwoods contribution of about 15% is included) is well above the mean canopy closure of 71 percent reported by Self and Kerns (2001) or the over 60 percent reported by Zielinski *et al*. (2004c) for fisher rest sites studied in northern California as well as the over 60 percent for rest sites studied in the southern Sierra Nevada (Mazzoni 2002). The fuel break prescriptions would reduce canopy to about 40 percent but these areas do not likely provide resting/denning habitat because of the past removal of key components such as large decadent trees, large snags and large logs. The dead fuels reduction prescription would not affect canopy closure and the plantation thinning would accelerate the development of a dense canopy comprised of large conifers into the future.
5. **Multiple Canopy Layers**: Thinning from below prescriptions would retain all the largest/oldest trees in the upper canopy, all viable hardwoods in the lower canopy, as well as a variety of conifer sizes in the mid-canopy to maintain multiple canopy layers. No live trees would be removed with the dead fuels reduction prescription. Hardwoods would be maintained at the same spacing guidelines as for conifers within the plantations to assure this understory habitat component is carried into the future.
6. **Large Hardwoods**: Thinning from below and fuel break prescriptions would retain all viable hardwoods. Hardwoods would be maintained at the same spacing guidelines as for conifers within the plantations to assure this habitat component is carried into the future.
7. **Steep Slopes near Water**: The IDT designed the project to avoid actions on steep slopes near water. Thinning is proposed only within carefully chosen riparian reserves in areas with generally gentle slopes adjacent to only intermittent streams and all resting/denning habitat components would be retained.

Pacific Fisher - Short-Term (from implementation out to about 10-15 years)

Alternatives 1 and 3 would affect a total of 1,224 acres and 1,079 acres of fisher resting/denning habitat respectively (Table H-4). Table H-4 displays the habitat available within the FAA and the effects to fisher habitat. Landing construction would remove habitat while the thinning, dead fuel reduction and fuel break prescriptions would maintain suitable habitat conditions by purposefully retaining key habitat components.

Table H-4. Pacific fisher resting/denning habitat (NR) and foraging habitat that would be directly affected by Alternatives 1 and 3 within the Fisher Analysis Area

Habitat Quality	**Existing Available Habitat**	**Landings1** (would remove habitat)	**Thinning, Fuel Reduction and Fuel Break Maintenance** (would reduced canopy closure and/or reduced small logs/snag density)	**Total Affected**
High Quality RD	2,387	3 (0.1%)	254 (11%) **202 (8%)	257 (11%) **205 (9%)
Moderate Quality RD	4,443	9 (0.2%)	656 (15%) **573 (13%)	665 (15%) **582 (13%)
Low Quality RD	2,967	3 (0.1%)	299 (10%) **289 (10%)	302 (10%) **292 (10%)
Total RD	**9,797**	**15 (0.2%)**	**1,209 (12%)** ****1,064 (11%)**	**1,224 (12%)** ****1,079 (11%)**
Foraging	8,862 (4,962 acres Forest Service land plus roughly 3,900 acres from private property)	1 (0.01%)	368 (4%) **360 (4%)	369 (4%) **361 (4%)
Marginal Quality Foraging	923 acres total (623 acres Forest Service land plus roughly 300 acres from private property)	1 (0.1%)	0 (0%)	1 (0.1%)
Total Fisher Habitat	**19,582**	**17 (0.09%)**	**1,577 (8%)** ****1,424 (7%))**	**1,594 (8%)** ****1,441 (7%)**

[1] The reported acres removed by landings represent the unlikely maximum possible impacts. Impacts from actual landing construction will likely be substantially lower and will depend upon site specific evaluation during project implementation. Additionally, all landings will be located so no trees greater than 24 inches diameter at breast height (dbh) would be cut to minimize impacts to old-growth habitat. All figures are rounded to nearest whole number with the exception of landings where decimals are included to display very small impacts (i.e. percentage of existing habitat).

**Acres preceded by double asterisks are for Alternative 3 when it differs from Alternative 1. The approximate percentage of existing habitat that would be affected is included in (parentheses). RD habitat is displayed separately to emphasize its ecological significance, especially old-growth (high quality RD habitat)

American Marten - Short-Term (from implementation out to about 10-15 years)

Alternatives 1 and 3 would affect a total of 1,224 acres and 1,079 acres of marten habitat respectively (Table H-5). Landing construction would remove habitat while the thinning, dead fuel reduction and fuel break prescriptions would maintain suitable habitat conditions by purposefully retaining key habitat components.

Table H-5. American Marten habitat that would be directly affected by Alternatives 1 and 3 within the spotted owl action area

Habitat Quality	Existing Available Habitat	Landings[1] (would remove habitat)	Thinning, Fuel Reduction, and Fuel Break Maintenance (would reduced canopy closure and/or reduced small logs/ snag density)	Total Affected
High Capability	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Moderate Capability	1,688	3 (0.2%)	254 (15%) **202 (12%)	257 (15%) **205 (0%)
Low Capability	2,967	12 (0.4%)	1,103 (37%) **1,004 (34%)	1,115 (38%) **1,016 (34%)
Total Marten Habitat	**11,735 (7,735 acres Forest Service land plus roughly 4,000 acres from private property)**	**15 (0.1%)**	**1,357 (12%)** ****1,206 (10%)**	**1,372 (12%)** ****1,221 (10%)**

[1] The reported acres removed by landings represent the unlikely maximum possible impacts. Impacts from actual landing construction will likely be substantially lower and will depend upon site specific evaluation during project implementation. Additionally, all landings will be located so no trees greater than 24 inches diameter at breast height (dbh) would be cut to minimize impacts to old-growth habitat. All figures are rounded to nearest whole number with the exception of landings where decimals are included to display very small impacts (i.e. percentage of existing habitat).

**Acres preceded by double asterisks are for Alternative 3 when it differs from Alternative 1. The approximate percentage of existing habitat that would be affected is included in (parentheses).

Northern Goshawk - Short-Term (from implementation out to about 10-15 years)

Alternatives 1 and 3 would affect a total of 1,633 acres and 1,482 acres of goshawk habitat respectively (Table H-6). Landing construction would remove habitat while the thinning, dead fuel reduction and fuel break prescriptions would maintain suitable habitat conditions by purposefully retaining key habitat components.

Table H-6. Northern goshawk habitat (acres) that would be directly affected by Alternatives 1 and 3 within the spotted owl action area

Habitat Quality	Existing Available Habitat	Landings[1] (would remove habitat)	Thinning, Fuel Reduction, and Fuel Break Maintenance (would reduce canopy closure and/or reduce small logs/snag density)	Total Acres Affected
High Capability	1,688	3 (0.2%)	254 (15%) **202 (12%)	257 (15%) **205 (12%)
Moderate Capability	9,991 (5,991 acres Forest Service land plus roughly 4,000 acres on private property)	12 (0.1%)	955 (10%) **862 (9%)	967 (10%) **874 (9%)
Low Capability	2,967	4 (0.1%)	405 (14%) **399 (13%)	409 (14%) **403 (14%)
Total Goshawk Habitat	**11,735** (7,735 acres Forest Service land plus roughly 4,000 acres from private property)	**19 (0.2%)**	**1,614 (14%)** ****1,463 (12%)**	**1,633 (14%)** ****1,482 (13%)**

[1]The reported acres removed by landings represent the unlikely maximum possible impacts. Impacts from actual landing construction will likely be substantially lower and will depend upon site specific evaluation during project implementation. Additionally, all landings will be located so no trees greater than 24 inches diameter at breast height (dbh) would be cut to minimize impacts to old-growth habitat. All figures are rounded to nearest whole number with the exception of landings where decimals are included to display very small impacts (i.e. percentage of existing habitat).

**Acres preceded by double asterisks are for Alternative 3 when it differs from Alternative 1. The approximate percentage of existing habitat that would be affected is included in (parentheses).

Long-Term (about 10-15 years after implementation) **Effects to Fisher Resting/Denning (RD) Habitat** (as well as marten and goshawk habitat)

The thinning prescriptions within existing resting/denning habitat and other conifer stands not currently RD habitat would result in a net increase of moderate quality and low quality RD habitat characteristics after about 10 to 15 years (Figure H-1). This net increase in stands comprised of larger overstory conifers and the maintenance of viable understory hardwoods and other late-successional stand characteristics would also benefit the marten and goshawk.

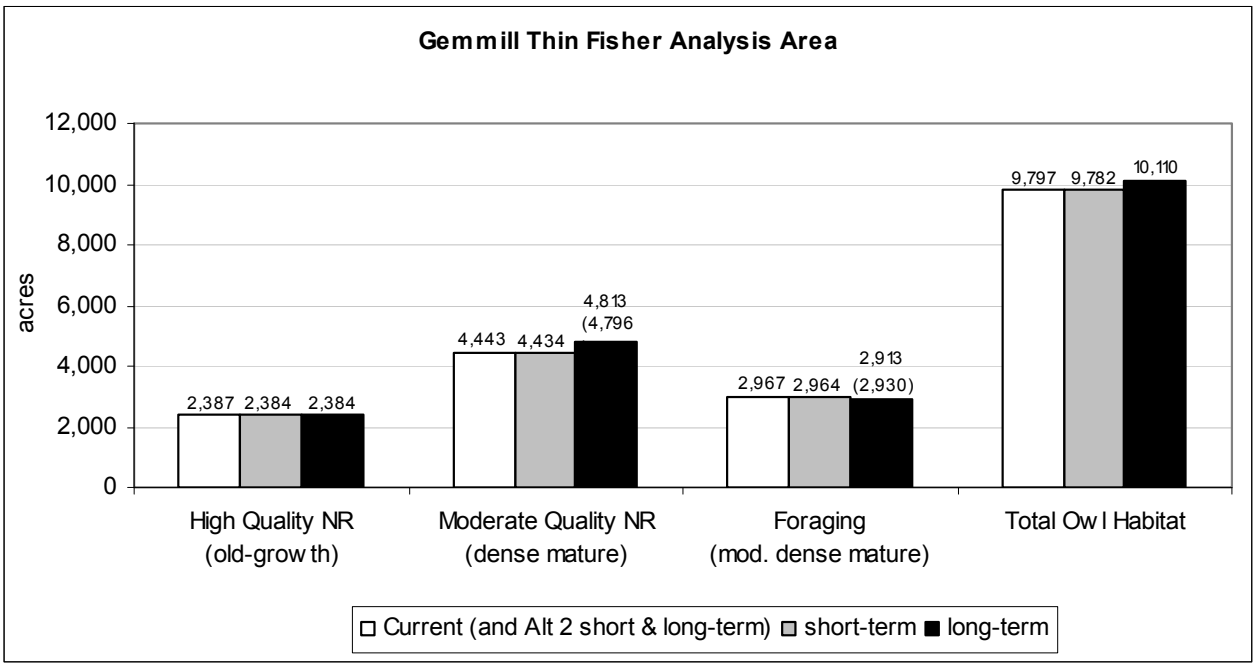


Figure H-1. Current fisher resting/denning habitat conditions (Alternative 2, no action), conditions from implementing Alternative 1 through about 10 to 15 years (short-term) and conditions after about 10 to 15 years within the Fisher Analysis Area. We expect no significant changes in habitat conditions in 15+ years with Alternative 2 (no action). Projected acreages for Alternative 3 are included in parentheses. These acreages assume no severe fire events.

Connectivity

Only landing construction would reduce stand conditions below connectivity habitat conditions. Landing construction would remove up to a maximum of about 15 acres of connectivity habitat but connectivity habitat would remain at well above 50 percent threshold (Thomas et al. 1990) in both the FAA and the spotted owl action area (still over 80%). The size (a maximum of 100 feet wide) and location of the proposed landings would not isolate existing late-successional habitat and multiple connectors through the action area would remain (see Appendix G, Wildlife Biological Assessment, Maps 2 and 3). That is to say these small openings could be easily circumvented and species crossing these areas would never be more than 50 feet from forest cover. Additionally, the proposed plantation thinning would accelerate the development of about 43 acres of connectivity habitat conditions **within** the project area in approximately 10 years.

Connectivity **between** large blocks of suitable habitat for species associated with late successional forests would be improved with the proposed project. The project area is juxtaposed in such a way as to connect the Chanchellula wilderness area to the north with LSR to the south and southeast.

Pallid Bat and Townsend's Big-Eared Bat Habitat

Indirect effects from the proposed actions are expected to be similar enough in nature for these two species that they will be discussed together for the purposes of this analysis. Indirect effects to these

species' habitat would not be represented by using the northern spotted owl habitat analysis because these two species of bats are not necessarily tied to late-successional forest habitat, and will therefore be discussed separately.

Protection of roosting habitat requires ensuring that the microclimate within the roost is not altered. The most significant characteristic of a given roost site for a bat is the microclimate within, and significant changes to it may cause complete abandonment of the site. Air flow plays a considerable role in maintaining the temperature and humidity levels within a cave or cave-like structure. Disruption of the environment immediately outside of a roost site, for example removal of large trees at a cave entrance, will alter the airflow and potentially the microclimate inside. Retaining the site specific microclimate is of the greatest significance to a maternity roost where pregnant females or females and their young rely on these highly specific areas during the summer months.

No activities would take place at any time within 250 feet from known roost sites, nor would any of the proposed actions alter the environment around cave or abandoned mine entrances/adits, thereby retaining the microclimate within. There would be no impact to cave or mine roosting habitat from the proposed activities.

Fuels & fire effects to late successsional habitat

Up to this point, the discussion has focused on the effects to habitat without quantifying the critically important interrelated issues of tree mortality, fuels and the risk of losing habitat to fire. This section looks at the effects of the proposed thinning compared with no treatment related to fuel build-up and the resulting effects that can be expected with a one-time fire event with continued tree-mortality (fuels build-up) at ten-year intervals. These effects are dramatic in improving the treated stands' ability to withstand future fire events and maintaining suitable fisher, marten, and goshawk habitat conditions into the future. The impact to canopy closure is stressed because canopy closure is an important component of old-growth habitat that we cannot avoid impacting. That is to say, we will maintain other attributes such as the largest/oldest trees, large snags/logs and viable hardwoods but a reduction in overall canopy closure is unavoidable to meet the stated purpose and need of this project.

This section uses the northern spotted owl and its habitat as a surrogate for other species associated with late-successional habitat (e.g., pacific fisher, American marten and northern goshawk). We consider this an appropriate analytical use since the stand characteristics of owl habitat are virtually identical to those for fisher, marten, and goshawk. By maintaining the suite of habitat components that are necessary for quality northern spotted owl habitat, we also maintain the key habitat components for other late-successional dependent species.

Forest Stand Modeling

We used forest stand data collected in the Gemmill Thin project area to run the **Forest Vegetation Simulator** model (FVS) along with the **Fire and Fuels Extension to the Forest Vegetation Simulator** (FFE-FVS). FVS (stand level) is an individual tree, distance independent growth and yield model. It simulates growth and yield for most major forest tree species, forest type, and stand conditions. FVS can simulate a wide range of silvicultural treatments. We used the 'ICASCA' variant of FVS for the specific

geographic area that includes the project area. FFE-FVS links FVS with models of fire behavior, fire effects, fuel loading, and snag dynamics. Model outputs include predictions of potential fire behavior and effects and estimates of snag levels and fuel loading over time. Because FFE is linked to the FVS growth model, it helped us assess both the short and long term effects of our proposed thinning and fuels treatments. More detailed information about FVS can be found at the following website: http://www.fs.fed.us/fmsc/fvs/index.php.

FVS Model limitations

- **Maintaining the largest/oldest trees**:
  The model assumes an even distribution of the trees we propose for removal. Therefore, when we modeled thinning from an existing canopy closure (or basal area) down to a target canopy closure the model assumes the "cut trees" are relatively evenly distributed through the stand. This assumption is essentially true in the mature stands that are much more homogeneous than the older stands (or older portions of mature stands). In the mature stand treatments the model predicts logical results reasonably consistent with our past experience with similar thinning treatments. Conversely, the prescription related to the older more heterogeneous portions of the stands is more nuanced in that we identify trees for removal on both a relatively evenly distributed canopy closure (basal area) basis as well as on a much more scattered, very site specific basis dictated by individual tree's proximity to, and competition with, very large/old trees. Consequently, in the older stands the model seems to give credible results for growth, fuels, or fire behavior but shows little or no affects to the mortality rate for the largest/oldest trees in the stands even though the prescription specifically targets thinning competing trees around them. The model's assumed even distribution of "cut trees" misses this nuance of the prescription even though our field reviews of the stands shows that many of these large/old trees are already beginning to display obvious signs of distress such as fungal/insect damage and fading/yellowish foliage.

- **Hardwoods**:
  The relatively small diameter of the existing hardwoods in the lower levels of the stand structure (i.e., stratum 3) results in this important stand component being largely missed by the modeling even though we specifically target all hardwoods for retention. This limitation is reflected in the model under predicting canopy closure recovery after thinning. Our extensive field reviews of the project area indicate that the hardwood component would add another 10 to 20 percent canopy closure (average roughly 15%).
  We assume the model's predicted results to canopy closure after fire events are still valid because hardwoods represent a vulnerable component in the lower understory that would be lost regardless. We also assume that the predicted mortality of the smaller size class trees with no treatment includes hardwoods.

- **Low density conifer size classes**:
  Because of their low density, our sampling failed to pick up conifers within the 18 through 26 inch dbh size classes within mature stands and 16 through 20 inch dbh size classes within the older stands. Intensive field reviews of the project area revealed that these size classes do occur, but at very low density. We did not consider this to be a limiting factor in the usefulness of the modeling. The only time these trees would be considered for removal is in the rare occasion when they occur in direct competition with much larger predominant (legacy) conifers or they occur in temporary landings (<24"). Additionally, our data collection did not account for conifers below roughly 8 inches dbh. Field reviews indicate that this heavily suppressed 'sapling' component occurs at a density of well over 200 trees per acre.

Modeling results

Fuel Build-Up (No Fire)

Based upon intense field reviews and long-term experience, we see an existing excessive fuel load in the stands proposed for thinning and anticipate this to worsen with time as competition for limited site resources leads to increasing tree mortality. Our modeling indicates that without treatment dying trees will increase surface fuels from an existing 17 tons per acre to about 100 tons per acre in mature stands and from an existing 44 tons per acre to about 57 tons per acre in the older stands while the proposed thinning would reduce this fuel build-up (Figure H-2). This accumulation of coarse woody material could be viewed as a positive trend for old-growth habitat. However, the projected mortality leading to this accumulation of material involves primarily smaller understory trees (i.e., those targeted for thinning) that would not provide 'large' snags/logs associated with old-growth habitat. Additionally, the tree mortality with no thinning would have a negative impact on canopy closure, another important component of old-growth habitat.

Canopy Closure (No Fire)

Intense field reviews, long-term experience and our modeling indicate that even without treatment, canopy closure will drop as competition for limited site resources leads to tree mortality. Within about 15 years in mature stands and about 10 years in older stands projected mortality in the untreated scenario will reduce canopy closure to or below the projected canopy closure that would result from the proposed thinning (Figure H-3). We project higher canopy closures in the treated stands than in untreated stands from about 20 years on, especially in the mature stands. This indicates that either we remove trees or trees will fall out of the stands through mortality. Allowing the mortality to 'thin' the stands would increase fuel build-up and maintain dense fuel ladders up into the overstory.

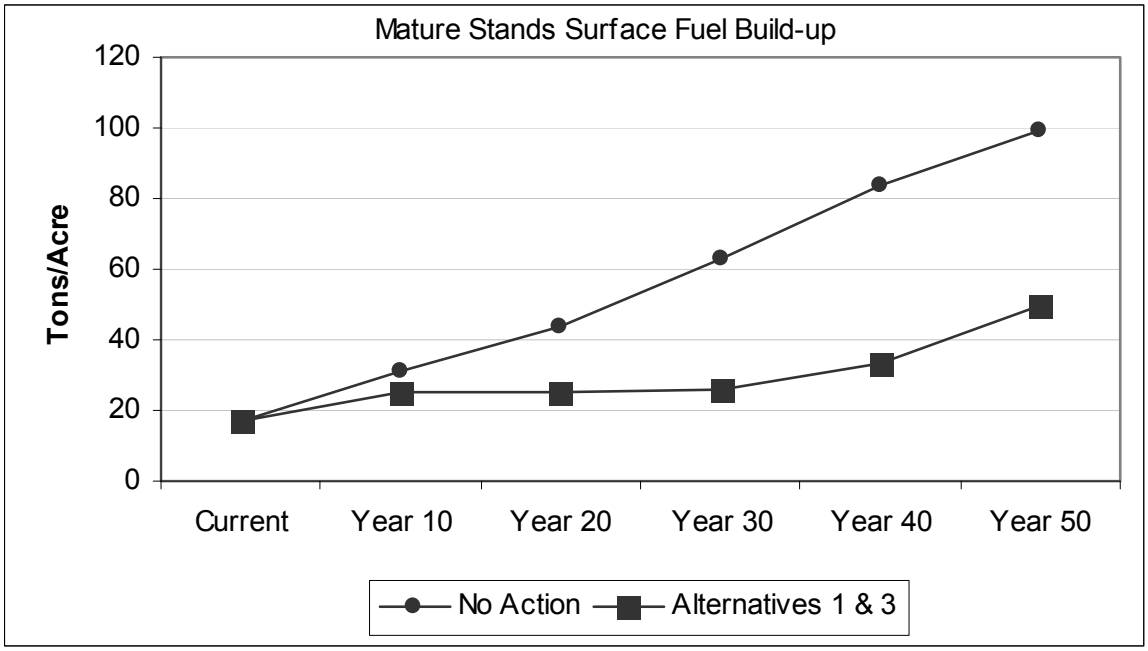
What Happens with Fire

The proposed thinning treatments will dramatically reduce the loss of overstory conifers (canopy closure) due to late summer fire into the future (Figure H-4). That is to say, fire at this point in time in untreated stands would reduce canopy closure well below owl NR suitability and below even connectivity habitat conditions in roughly 5 years (mature stands) to 25 years (older stands) of continuing fuel build-up.

Conversely, because of the reductions of existing/future fuels coupled with the increased vigor of the remaining trees, fire after the thinning treatments would not reduce canopy below owl NR habitat conditions out past about 45 years of fuel build-up in the mature stands and canopy closure would be at or just below NR habitat conditions in the older stands for the same time period. Note that Figure 5 depicts projected effects from a one-time fire event. For example, a "year 30 fire" assumes no fires for the previous 30 years.

A synopsis of these modeling results shows that:

- While our proposed thinning treatments would reduce canopy closure, the same level of canopy reduction would be quickly exceeded if we did nothing due to tree mortality related to competition for limited site resources.
- By thinning the stands, smaller diameter snags/logs would be reduced with a concurrent reduction of existing and future fuel. These smaller diameter trees would either die due to competition induced mortality or be removed through thinning. They would not provide 'large' snags/logs associated with old-growth habitat.
- The reduction in fuels and the concurrent increase in the vigor of the remaining trees would allow the treated stands to better survive late-summer fire events and provide relatively dense late-successional habitat (i.e., fisher, marten, goshawk, spotted owl habitat) into the future. Without thinning, the stands would not provide late-successional habitat after a late-summer fire.



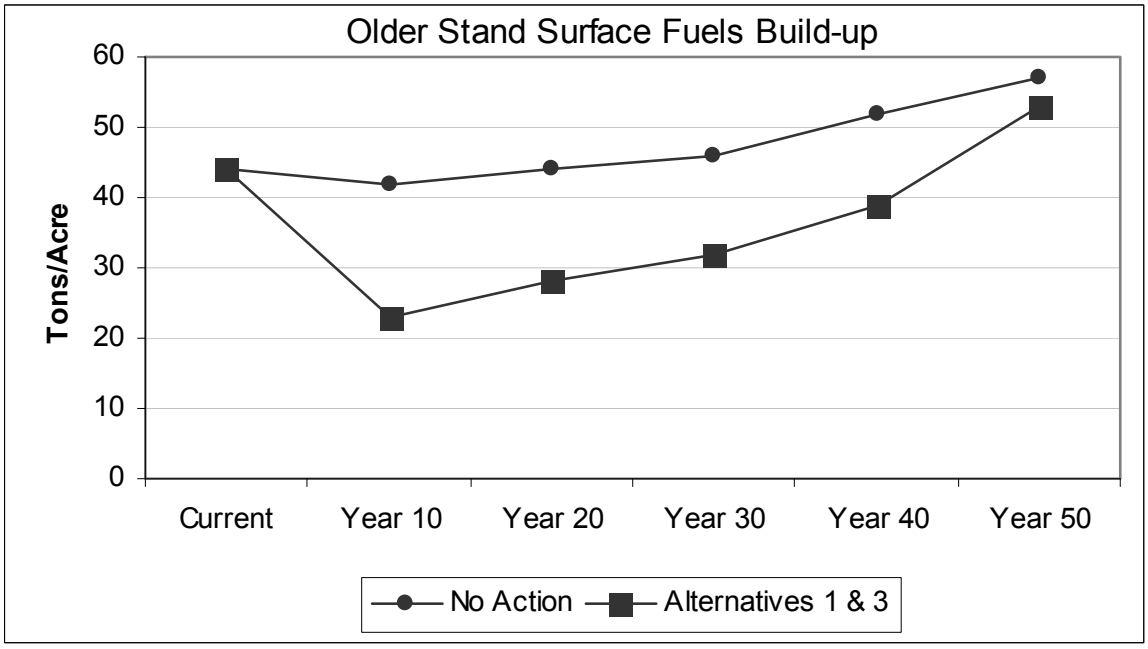
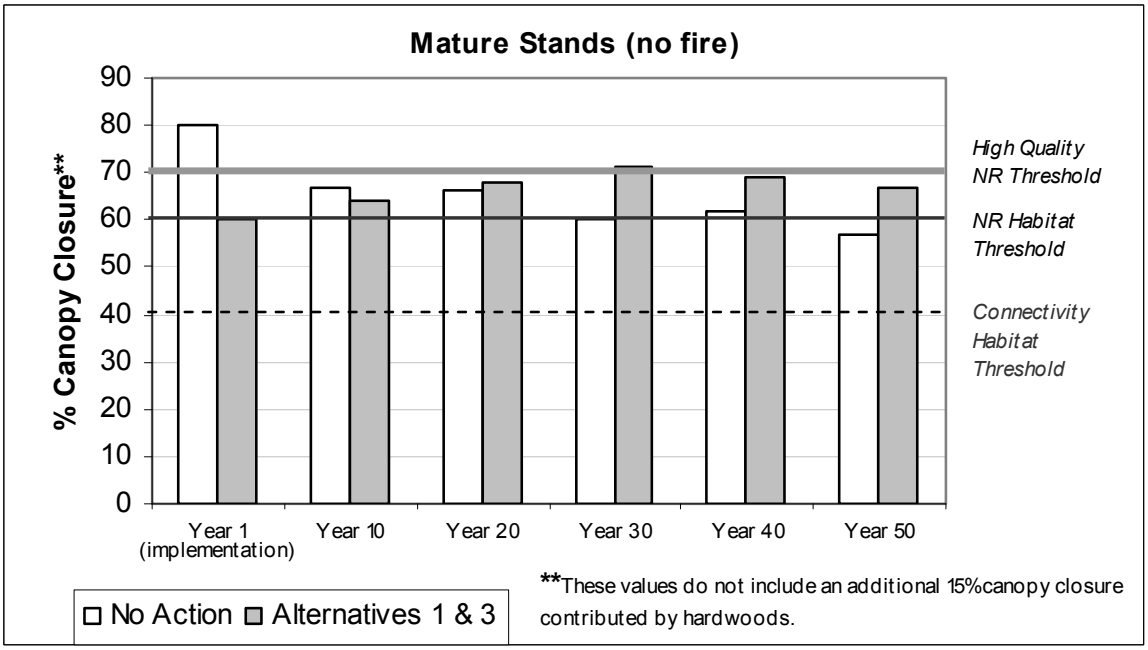


Figure H-2. The proposed thinning treatments within dense forest stands would reduce fuel build-up into the future. Existing large snags and logs as well as large overstory conifers will be retained to provide owl and fisher nesting and denning sites and large snags and logs into the future.



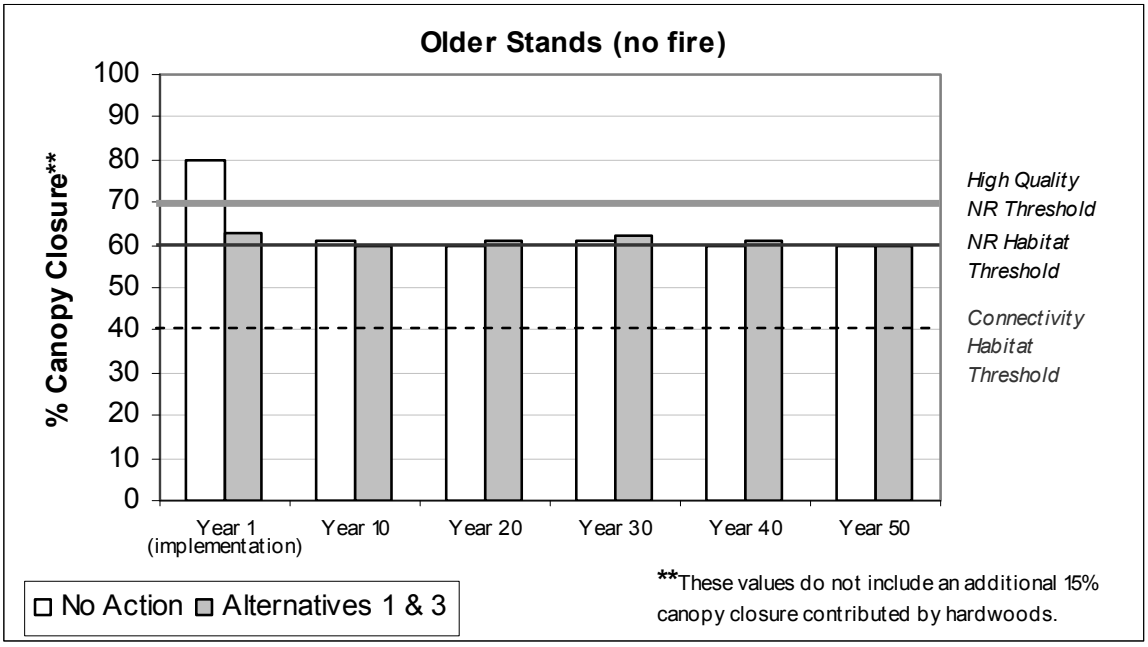
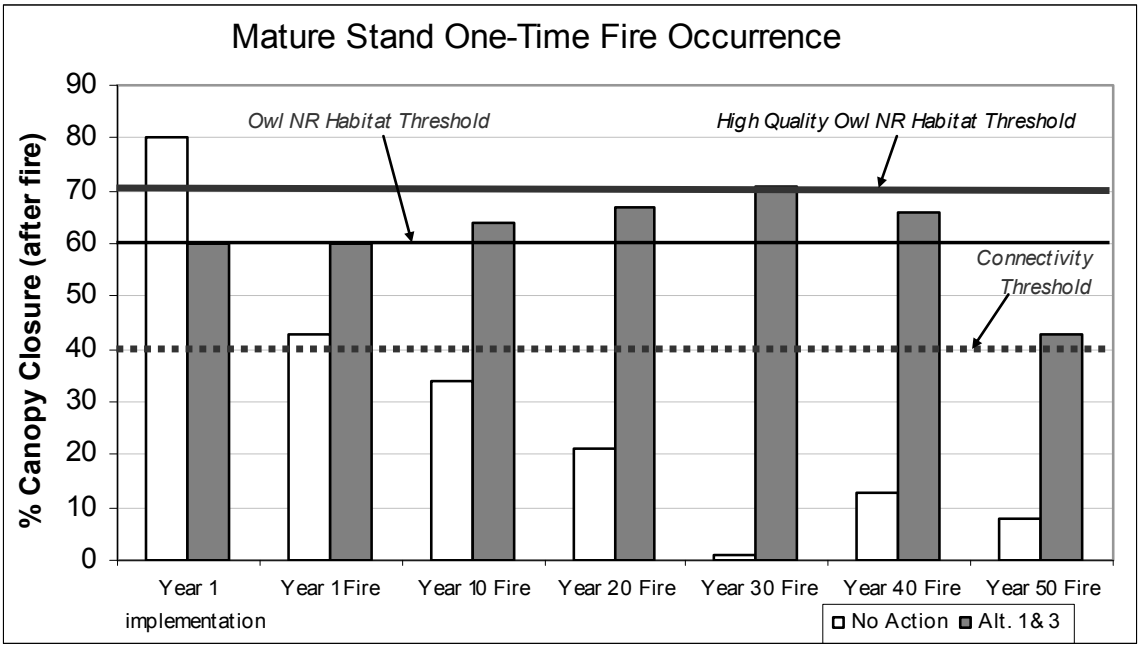


Figure H-3. The proposed thinning treatments within dense forest stands maintain a moderate to dense canopy closure. Note that this modeling does not include an additional 15% canopy closure contributed by hardwoods that would be retained. Moderate to high canopy closure is a key habitat component for species associated with old-growth conifer forests such as the northern spotted owl and Pacific fisher. Large overstory conifers will be retained to provide owl and fisher nesting and denning sites and large snags and logs into the future



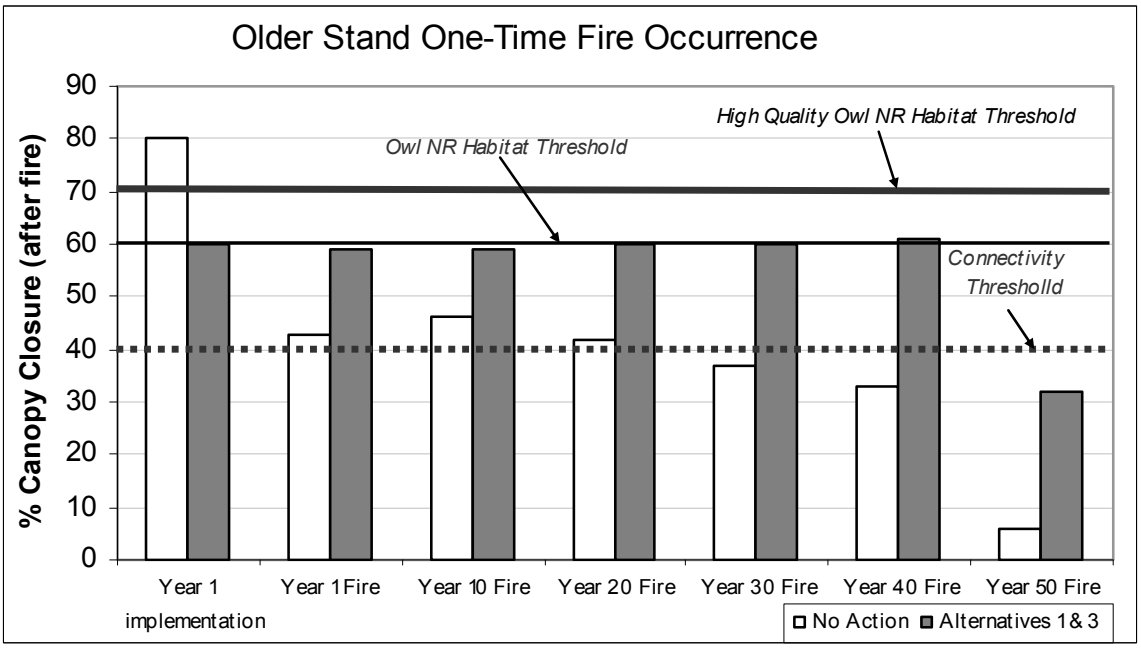


Figure H-4. The proposed thinning treatments within dense forest stands will dramatically reduce the loss of overstory conifers (canopy cover) due to fire into the future. Moderate to high canopy closure is a key habitat component for species associated with old-growth conifer forests such as the northern spotted owl and Pacific fisher. Large overstory conifers are those trees that will provide owl and fisher nesting and denning sites and large snags and logs into the future. Late summer fire was modeled because this is the driest time of the year and the period when most catastrophic wildfires occur in the project area vicinity.

Cumulative effects

Bounding

Bounding for the cumulative effects analysis for the fisher was the 22,027-acre **fisher analysis area** (FAA), as described in detail earlier in this analysis. This is the appropriate unit of measure because it is designed to focus on female fishers and female survival has been shown to be the most important single demographic parameter determining fisher population stability.

Bounding for the cumulative effects analysis for the spotted owl and the remainder of the species in this analysis (other than the fisher) is at the spotted owl Action Area level and is established using a 1.3 mile buffer around all areas proposed for treatment. This is an appropriate unit of measure because this is what the USFWS has estimated the median annual home range size for the northern spotted owl in California to be, based on available radio telemetry. Because this analysis uses the spotted owl as a representative species for late-successional and old-growth associated species, and because owl home range size is large enough to encompass the home ranges for the species other than the fisher in this analysis, the analysis is appropriately bounded by using the owl home range Action Area method.

Bounding for an effects analysis for bat species, specifically Townsend's big-eared and pallid bats, depends on a wide variety of factors besides the specific presence of a suitable roost structure. These factors include; availability of water, abundance of insect prey, time of year, reproductive status of the bats, and the size of colony. This species does not construct nests or dens for reproductive purposes and must rely solely on the presence of highly specific structures for reproduction and survival. It is the presence of these structures in a given juxtaposition to sources of water and food that provide the bounding of their home range. Home range size and composition is highly variable once the specific parameters are met for suitability. Using the spotted owl Action Area to provide the bounding for this analysis is appropriate because the environmental factors that constitute suitable habitat for these bat species are encompassed within the owl Action Area.

Past

The existing conditions related to spotted owl habitat included in this document reflect past actions and events (e.g., fire) that led to those conditions. An inspection of aerial photographs shows that most of the forested land within the Action Area has been harvested for timber. Timber harvesting has had a significant impact on late-successional habitat within the spotted owl Action Area. Timber harvesting on Federal lands has removed roughly 960 acres of suitable spotted owl habitat in the last 20 to 25 years. The 4,310 acres of private property has been heavily harvested and is now dominated by very dense pine and mixed conifer forest that provides only marginal owl connectivity habitat. Much (roughly 75 to 80 percent) of this private property was likely suitable owl habitat prior to harvest. This past loss of habitat played an important role in determining the sense of urgency for the Gemmill Thin Project.

Future

No Forest Service projects that would negatively impact existing owl or old-growth habitat are planned in the Action Area in the foreseeable future. The STNF has completed Categorical Exclusions whereby

approximately 870 additional acres of existing plantations will be thinned as funding becomes available (see LSR PCT displayed in Cumulative Actions Table (Appendix E) of the Gemmill Thin Project EIS). As with the 45 acres of plantations proposed for thinning in the Gemmill Thin Project, the future plantation thinning would accelerate the development of about 870 acres of connectivity habitat in approximately 10 years. Without thinning, these plantations would remain so dense that owls would not be able to freely fly through them for 35+ years.

The STNF is in the early planning stages of developing a prescribed burning project within the Gemmill Thin Project fuel break and selected thinning units (see Prescribed Burning displayed in the Cumulative Actions Table (Appendix E) of the Gemmill Thin Project EIS). The early planning for this project includes provisions for maintaining the habitat components that would be established by the Gemmill Thin Project (e.g., canopy closure, large trees/log/snags, and viable hardwoods).

The California Department of Forestry and Fire Protection (CDF) web site (http://www.fire.ca.gov/ResourceManagement/THPStatusUpload/THPStatusTable.html) lists no private timber harvest plans in the Action Area. Nonetheless, we assume that intense timber management will continue on this private land into the foreseeable future, discounting these areas as providing suitable owl habitat beyond use as connectivity. Older conifer forest habitat will likely be restricted to the 15,784 acres of Federal Forest Land within the Action Area, adding to the sense of urgency for implementing the Gemmill Thin Project in order to maintain, protect and develop owl habitat. Existing non-conifer areas such as hardwood and shrub dominated habitats and riparian vegetation would likely remain largely intact on both federal and private lands.

There are no present or foreseeable actions that would negatively affect spotted owl habitat or species associated with the late-successional habitat within the project area and that would cumulatively warrant a change in either of the Gemmill Thin Project action alternatives. There are no future foreseeable actions within the area bounded by this analysis that would have any additive effects to the Sensitive bats species in the project area. No actions will contribute to or constitute a threat to the persistence and viability of these bat species.

Because this analysis uses the spotted owl as a representative species for late-successional and old-growth associated species, the analysis is appropriately bounded by using the owl home range method.

Determinations

Pacific Fisher

It is my determination that the proposed actions **may impact individual fishers but would not likely cause a change in the U.S. Fish and Wildlife Service prioritization towards federal listing**[1] based upon the following rationale:

[1] **Note**: Generally, the analysis for Forest Service sensitive species focuses on whether or not the action "is likely to lead to a trend in Federal listing." However, the U.S. Fish and Wildlife Service has already determined that the listing of the Pacific Fisher is 'warranted, but precluded' by higher priorities (USDI 2004). Therefore we have evaluated here whether or not the proposed action is likely to cause a significant enough shift in the population

- Existing fisher resting/denning habitat would be reduced (maximum of about 15 acres), 'slightly' degraded (910 acres) in the short-term (roughly10-15 years), and the quantity and relative quality of resting/denning habitat would be increased in the long-term (after roughly 10-15 years).
- The probability of losing fisher habitat due to fire would be reduced.
- Human-caused disturbance during project implementation may cause failed reproductive attempts for a maximum of three female fishers for one season if the spotted owl LOPs are not implemented (i.e., local owls are found to non-nesting).
- Female fishers can and do move their young to alternative denning sites (Arthur and Krohn 1991) and may move from the disturbance.
- Proposed road decommissioning would reduce human disturbance in the action area into the future.
- Drs. Roger Powell and William Zielinski (Powell & Zielinski, 2005) modeled the effect of the removal of 20 fishers from northwestern California over an eight year period in order to evaluate the population impacts of a proposed reintroduction program. These internationally known fisher experts evaluated the population level effects of this removal over 2, 3, 5 or 8 years. They also modeled two different types of impact (five fishers from each of 4 different subpopulations or 1 fisher from each of 20 subpopulations) over those years. They weighted the removal of females as having a greater impact than the removal of males and decreased the modal litter size by 20% over the two to eight year period to represent the potential cost to population level productivity from the loss of reproductive aged females. For this model, they assumed a continuing rate of both public and private timber harvest consistent with the current proposal.
  The probability of extinction rose by <5% when 20 fishers were removed, five from each of 4 subpopulations over an eight year period. Removal of 1 fisher from each of 20 populations for 3 years had no measurable effect on the probability of extinction.
  Both of these impacts, arguably potentially much greater than the short term loss of one breeding season from three fisher that remain within relatively intact habitat, are minor and not significant enough to warrant a modification of the FWS priority system in developing listing packages.

American Marten

It is my determination that the proposed actions **may impact individual martens but would not cause a trend towards federal listing or a loss of viability** based upon the following rationale:

- Current marginal habitat conditions suggest that marten do not likely occur in the project area vicinity.
- The project would not affect any high capability habitat.
- There would be a short-term reduction in habitat and a long-term increase in habitat and habitat quality.

factors that it would cause the FWS to reprioritize the Pacific fisher and accelerate the development of a listing package and its official listing as a threatened and endangered species.

- The probability of losing marten habitat (albeit moderate to low capability) due to fire would be reduced.
- The project is consistent with the Northwest Forest Plan habitat management strategy for managing species associated with late-successional and old-growth forest ecosystems by maintaining the best available old-growth habitat in the watershed, maintaining the Aquatic Conservation Strategy objects within Riparian Reserves and maintaining adequate connectivity on federal land between large areas set aside for these species.
- Proposed road decommissioning would reduce human disturbance in the action area into the future.

California Wolverine

It is my determination that the proposed actions **would have no effect on the wolverine** based upon the following rationale:

- This species occupies a wide variety of habitats remote from humans and human development. Wolverines are not likely to occur in or near the project area because the project area is near humans and human development.

Pallid Bat

It is my determination that the proposed actions **may impact individual bats but would not cause a trend towards federal listing or a loss of viability** based upon the following rationale:

- Individuals roosting in large trees or snags may be disturbed due to noise.
- Suitable roost sites, where reproduction or large congregations may occur, would remain untouched.
- A 250’ protection buffer would be implemented directly outside known cave and abandoned mine entrances where **no harvest** would occur. This would prevent alteration of the microclimate within the roost area.

Townsend’s big-eared bat

It is my determination that the proposed actions **may impact individual bats but would not cause a trend towards federal listing or a loss of viability** based upon the following rationale:

- Individuals roosting in large trees or snags may be disturbed due to noise.
- Suitable roost sites, where reproduction or large congregations may occur, would remain untouched.
- A 250’ protection buffer would be implemented directly outside known cave and mine entrances where **no harvest** would occur. This would prevent alteration of the microclimate within the roost area.

Bald Eagle

It is my determination that the proposed actions **would have no effect on the bald eagle** based upon the following rationale:

- The bald eagle does not likely occur in or near the project area because the area does not lie proximate to foraging habitat (e.g., lakes, rivers, larger creeks) that eagles require for nesting or congregating in the winter.
- Furthermore, eagles are not known or expected to forage in the creeks adjacent to any of the areas proposed for treatment.
- We expect no effect to the eagle's prey downstream from the project because any potential negative effects to fish habitat would be so small that they cannot be measured (refer to the Gemmill Thin Fisheries Biological Assessment/Evaluation).

Northern Goshawk

It is my determination that the proposed actions **may impact individual goshawks but would not cause a trend towards federal listing or a loss of viability** based upon the following rationale:

- There would be a reduction in habitat but a long-term increase in habitat quality. The probability of losing goshawk habitat due to fire would be reduced. The project is consistent with the Northwest Forest Plan habitat management strategy for managing species associated with late-successional and old-growth forest ecosystems by maintaining the best available old-growth habitat in the watershed, maintaining the Aquatic Conservation Strategy objects within Riparian Reserves and maintaining adequate connectivity on federal land between large areas set aside for these species.
- A Limited Operating Period from Feb.1 to Aug. 15 for ¼ mile around known nest sites will help to alleviate potential impacts from human disturbance during project implementation.
- Proposed road decommissioning would reduce human disturbance in the Action Area into the future.

Northwestern Pond Turtle

It is my determination that the proposed actions **would have no effect on the western pond turtle** because:

- Field reviews of the project area revealed no potential nesting habitat near areas proposed for treatment and streams in the project area vicinity are well shaded and do not provide pond turtle aquatic habitat.
- Indirect effects to downstream aquatic habitat (i.e., potentially increased water turbidity) would be immeasurable.
- The project is consistent with the Aquatic Conservation Strategy for maintaining aquatic habitats.

Foothill Yellow-legged Frog

It is my determination that the proposed actions **would not affect the yellow-legged frog** based upon the following rationale:

- No actions are proposed in areas where this frog occurs or is likely to occur.
- Indirect effects to downstream aquatic habitat (i.e., potentially increased water turbidity) would be immeasurable.
- The project is consistent with the Aquatic Conservation Strategy for maintaining aquatic habitats.

Cascade Frog

It is my determination that the proposed actions **would not affect the Cascade frog** based upon the following rationale:

- No actions are proposed in areas where this frog occurs or is likely to occur. Indirect effects to downstream aquatic habitat (i.e., potentially increased water turbidity) would be immeasurable.
- The project is consistent with the Aquatic Conservation Strategy for maintaining aquatic habitats.

It my determination that the proposed actions would have no effect on the **western red bat, willow flycatcher, southern torrent salamander, Shasta salamander, California floater, topaz juga, montane peaclam, Shasta sideband snail, Wintu sideband snail, Shasta chaparral snail, Tehama chaparral snail, Pressley hesperian snail , Shasta hesperian snail**, or the **nugget pebble snail**, for one or more of the following reasons:

- the project would not affect suitable habitat,
- the project area lies outside the species' range,
- protocol survey results indicate the species does not occur in or near the project area,
- or indirect effects to downstream aquatic habitat (i.e., potentially increased water turbidity) would be immeasurable.
- The project is consistent with the Aquatic Conservation Strategy for maintaining aquatic habitats.

Contributors

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- Donnie R. Ratcliff, Assistant Fishery Biologist, Shasta-Trinity National Forest.
- Kelly Wolcott, Forest Wildlife Biologist, Shasta-Trinity National Forest.

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