ELDORADO NATIONAL FOREST

Amador Ranger District

Biological Evaluation – Aquatic and Terrestrial Wildlife

Forest Projects Plan (Phase 1)

October 2022

PROJECT LOCATION:

Amador, El Dorado, and Calaveras counties, California

7.5-minute Quad	Township	Range	Section(s)
West Point	7N	13E	2,13,24
Devils Nose	7N	14E	1, 3, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20
Garnet Hill	7N	15E	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 16, 17, 18
Calaveras Dome	7N	16E	5,6
Oma Ranch	8N	13E	35,36
Caldor	8N	14E	13, 14, 20, 21, 22, 23, 24, 25, 28, 29, 30, 36
Peddler Hill	8N	15E	1, 2, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
	9N	15E	36
Bear River Reservoir	8N	16E	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33
	9N	16E	12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36
		17E	7, 18, 31

Prepared by: Sara Reece Date: 10/19/22

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Reviewed by: CHARLES LOFFLAND Digitally signed by CHARLES LOFFLAND Date: 2022.10.19 13:05:11 -07'00' Date: _____

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I. INTRODUCTION

The Forest Projects Plan (Phase 1), (FPP or Project) is a large, 25,670-acre landscape-level forest stand and wildlife habitat improvement and protection project located on U.S. Forest Service (USFS or Forest Service) lands, primarily within the Upper Mokelumne River Watershed (**Map 1**). The FPP is designed to help prevent high-intensity, large-scale wildfires, improve forest conditions, and protect important wildlife habitat and other resources. The Project analyzed in this document encompasses Phase 1 of a two-phased approach. Phase 1 proposes non-commercial actions to reduce forest ladder fuels and implement other forest management activities on the Eldorado National Forest (ENF)'s Amador Ranger District.

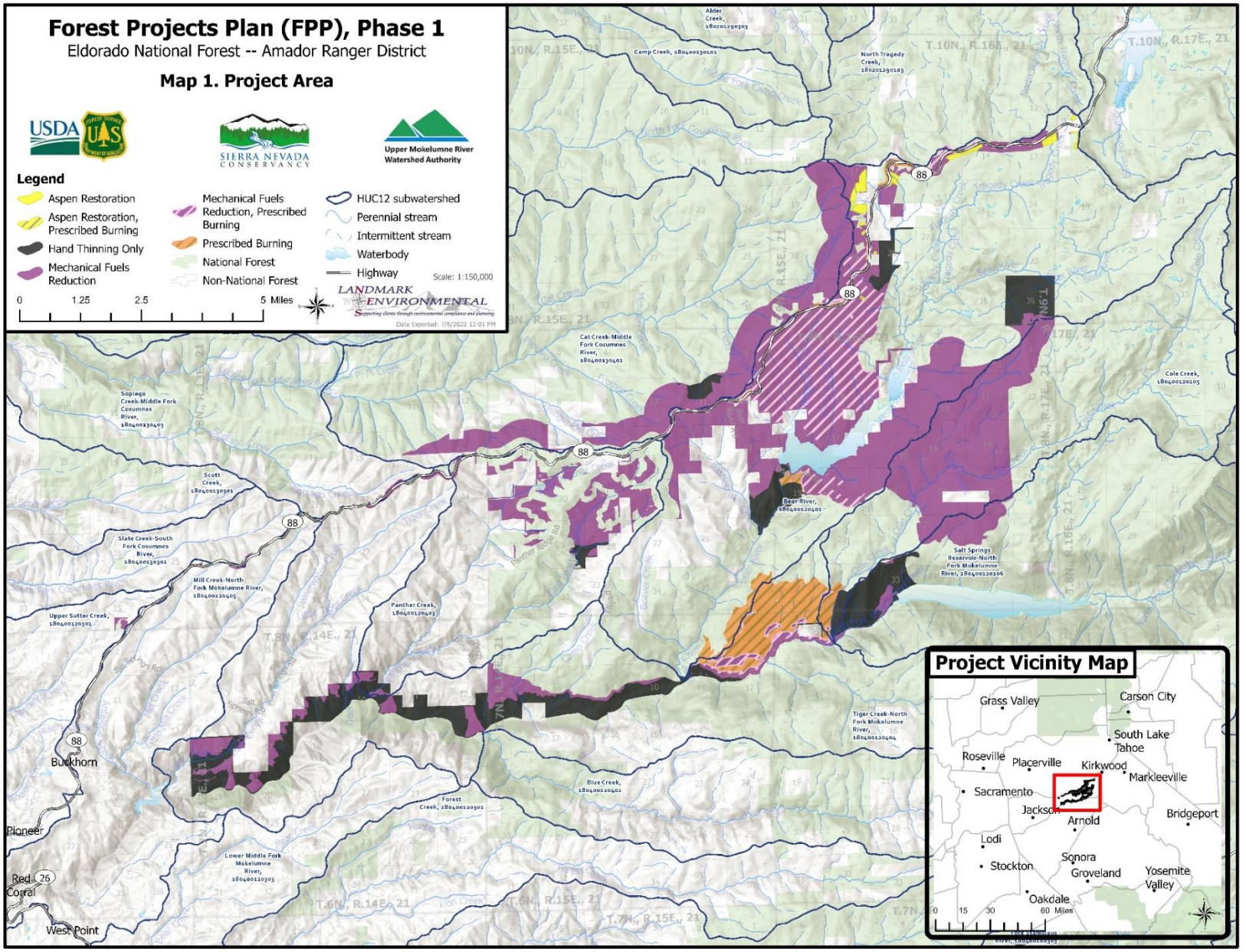
Forest Service Manual (FSM) 2672.42 directs that a biological assessment (BA) be prepared for all proposed projects that may have effects upon United States Fish and Wildlife Service (USFWS) listed threatened, endangered, and proposed species. In addition, FSM 2670.32 directs that a biological evaluation (BE) be prepared to determine the effects of proposed projects on Forest Service Region 5 designated sensitive species. The purpose of these documents is to ensure that project decisions do not adversely affect species viability or create significant trends towards federal listing.

This document analyses the potential effects of the Project on Region 5 listed sensitive terrestrial species. Effects to federally listed endangered, threatened, and candidate species including California red-legged frog, foothill yellow-legged frog, and Sierra Nevada yellow-legged frog have been addressed in a separate Biological Assessment (BA). It was determined that the FPP would have no effect on several additional federally listed endangered, threatened, and candidate species including monarch butterfly, Yosemite toad, Delta smelt, and Sierra Nevada red fox. Refer to the BA developed for the FPP for additional information.

Location: The FPP comprises approximately 25,670 acres entirely within National Forest System (NFS) lands administered by the ENF on the Amador Ranger District between approximately 2,700 and 8,000 feet above mean sea level (msl) within:

- T7N, R13E, Sec. 2, 13, 24, Mount Diablo base and meridian (MDB&M) within the U.S. Geological Service (USGS) 7.5-minute West Point Quadrangle
- T7N, R14E, Sec. 1, 3, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, MDB&M within the USGS 7.5-minute Devils Nose Quadrangle
- T7N, R15E, Sec. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 16, 17, 18, MDB&M within the USGS 7.5-minute Garnet Hill Quadrangle
- T7N, R16E, Sec. 5, 6, MDB&M within the USGS 7.5-minute Calaveras Dome Quadrangle
- T8N, R13E, Sec. 35, 36, MDB&M within the USGS 7.5-minute Omo Ranch Quadrangle
- T8N, R14E, Sec. 13, 14, 20, 21, 22, 23, 24, 25, 28, 29, 30, 36, MDB&M within the USGS 7.5-minute Caldor Quadrangle
- T8N, R15E, Sec. 1, 2, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, MDB&M within the USGS 7.5-minute Peddler Hill Quadrangle
- T8N, R16E, Sec. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, MDB&M within the USGS 7.5-minute Bear River Reservoir Quadrangle
- T9N, R15E, Sec. 36, MDB&M within the USGS 7.5-minute Peddler Hill Quadrangle

- T9N, R16E, Sec. 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, MDB&M within the USGS 7.5-minute Bear River Reservoir Quadrangle
- T9N, R17E, Sec. 7, 18, 31, MDB&M within the USGS 7.5-minute Bear River Reservoir Quadrangle


Forest Projects Plan (FPP), Phase 1
Eldorado National Forest -- Amador Ranger District
Map 1. Project Area
Upper Mokelumne River Watershed Authority
Legend
Aspen Restoration
Aspen Restoration, Prescribed Burning
Hand Thinning Only
Mechanical Fuels Reduction
Mechanical Fuels Reduction, Prescribed Burning
Prescribed Burning
National Forest
Non-National Forest
HUC12 subwatershed
Perennial stream
Intermittent stream
Waterbody
Highway
Scale: 1:150,000
0 1.25 2.5 5 Miles
LANDMARK ENVIRONMENTAL
Supporting clients through environmental compliance and planning.
Project Vicinity Map
Grass Valley
Carson City
South Lake Tahoe
Roseville
Placerville
Kirkwood
Markleeville
Sacramento
Jackson
Arnold
Bridgeport
Lodi
Stockton
Sonora
Groveland
Yosemite Valley
Oakdale
0 15 30 60 Miles
Buckhorn
Pioneer
Red Corral
West Point

FPP treatment areas fall within areas administered by three counties (Amador, El Dorado, and Calaveras counties). Treatments are not proposed on private lands, nor in designated wilderness areas, proposed wilderness areas, inventoried roadless areas, or research natural areas. The FPP is located outside of, and complements, several other recent NEPA planning projects: Scottiago Fuels Reduction Project, Scottiago Forest Health Project, Panther Fuels Reduction Project, View 88 Fuels Reduction Project, Power Fire Reforestation, and the Power Fire Pre-Commercial Thin Project.

Eighty-four percent of the FPP is within the Wildland Urban Interface (WUI), including the WUI defense zone (32 percent of the FPP area) and the WUI threat zone (52 percent). The FPP is within 5 miles of four U.S. Census defined populated areas (i.e., Buckhorn, Pioneer, Red Corral, and West Point). Approximately 17 percent of the FPP is located within lands identified by the Amador-Calaveras Consensus Group (ACCG) as having very high or high wildfire risk.

Analysis Area: The Analysis Area, which is defined to include a buffer of approximately 0.5-mile around the FPP treatment area, totals approximately 63,680 acres. The Analysis Area was delineated to encompass habitat that species considered might use, and based on treatment types, in close enough proximity that habitat effects and potential disturbance effect would be captured, but not so large as to potentially mask Project effects on the species.

SPECIES CONSIDERED

Table 1 provides a list of species considered sensitive on the ENF.

Based on current literature for the species listed in Table 1, several would not be affected by the FPP. **Table 2** provides a list of the species that are not present and/or for which no suitable habitat is present. It is not expected that the Project will generate any direct, indirect, or cumulative impacts to the species or its habitats. These species are not further analyzed in this document. **Appendix A** provides further information on the range of these species and their habitat requirements.

Table 1. Eldorado National Forest Service Sensitive Species.

Pacific lamprey (*Entosphenus tridentalus*)	Great gray owl (*Strix nebulosa*)
Hard head (*Mylopharodon conocephalus*)	Willow flycatcher (*Empidonax trailli*)
Western pond turtle (*Actinemys marmorata*)	Fisher (*Martes pennanti*)
Western bumblebee (*Bombus occidentalis)*	North American wolverine (*Gulo gulo luscus*)
California spotted owl (*Strix occidentalis occidentalis*)	Pallid bat (*Antrozous pallidus*)
Northern goshawk (*Accipiter gentilis*)	Townsend's big-eared bat (*Corynorhinus townsendii*)
Bald eagle (*Haliaeetus leucocephalus*)	Fringed myotis (*Myotis thysanodes*)

Table 2. Forest Service Sensitive Wildlife Not Affected by the Forest Projects Plan, Phase I.

Species	USFS Status	Federal/State Status	Potential for Occurrence in Analysis Area; Justification for "No Effect" Determination
Entosphenus tridentalus Pacific lamprey	FS-Sensitive	–/CSC	Analysis area is outside the range of Pacific lamprey. Project will have no effect on this species, no further analysis is provided in this BE.

Species	USFS Status	Federal/State Status	Potential for Occurrence in Analysis Area; Justification for "No Effect" Determination
Mylopharodon conocephalus Hardhead	FS-Sensitive	–/CSC	Analysis area is outside species range. Hardhead occur downstream, but project effects are not expected to significantly impact downstream habitat. Project will have no effect on this species, no further analysis is provided in this BE.
Empidonax traillii Willow flycatcher	FS-Sensitive	–/SE	Analysis area does not support suitable habitat for this species. Project will have no effect on this species, no further analysis is provided in this BE.
Pekania pennanti Fisher	FS-Sensitive	–/ST	The Analysis Area is outside the known range of the fisher, and there are no occurrences in the watershed. Project will have no effect on this species, no further analysis is provided in this BE.
Gulo gulo luscus North American wolverine	FS-Sensitive	FPT/ST, CFP	The Analysis Area is outside the known range of the fisher, and there are no occurrences in the watershed. Project will have no effect on this species, no further analysis is provided in this BE.

II. CURRENT MANAGEMENT DIRECTION

The Sierra Nevada Forest Plan Amendment Final Supplement was approved and signed in January 2004. This document amends all Forest plans across the Sierra Nevada range. It also includes revised and new Forest-wide standards and guidelines for management of forest lands. Standards and guidelines from the Eldorado National Forest Land and Resource Management Plan (LRMP) and the Sierra Nevada Forest Plan Amendment Record of Decision (ROD) that are pertinent to this Project have been summarized below.

Region 5 Listed Sensitive Species
Direction to maintain the viability of Region 5 sensitive species is provided by the National Forest Management Act, the Code of Federal Regulations (219.19), the Forest Service Manual (2672), and the Eldorado National Forest Land Management Plan (LRMP). The Sierra Nevada Forest Plan Amendment (SNFPA) Final Supplementary Environmental Impact Statement (SEIS) Record of Decision (USDA 2004) amends the Eldorado National Forest LRMP.

Forest Service Manual and Handbooks (FSM/H 2670) include the following:

- As part of the National Environmental Policy Act process, review programs and activities, through a biological evaluation to determine their potential effect on sensitive species.
- Avoid or minimize impacts to species whose viability has been identified as a concern.
- If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole.
- Establish management objectives in cooperation with the States when a project on National Forest System lands may have a significant effect on sensitive species population numbers or distribution.

National Forest Management Act (NFMA), and implementing regulations (CFR 219.19): Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area.

Eldorado National Forest Land and Resource Management Plan (LRMP), as amended in January 2001 and January 2004: Utilize administrative measures to protect and improve endangered, threatened, rare, and sensitive wildlife species. General management direction is to avoid or minimize impacts to species whose viability has been identified as a concern, and to manage fish and wildlife habitat to maintain viable populations of existing native and desired non-native vertebrate species in the planning area.

Specific standards and guidelines from the LRMP and the Sierra Nevada Forest Plan Amendment ROD that are pertinent with regard to terrestrial sensitive species potentially affected by the Project are described below.

California Spotted Owl

- Conduct surveys in compliance with the Pacific Southwest Region's survey protocols during the planning process when proposed vegetation treatments are likely to reduce habitat quality in suitable California spotted owl habitat with unknown occupancy. Designate California spotted owl protected activity centers (PACs) where appropriate based on survey results (SNFP SEIS ROD Appendix A-54).

- Limited operating periods are applied within a quarter mile of spotted owl activity centers, from March 1 through August 15, if activities may disturb nesting spotted owls (SNFP SEIS ROD Appendix A-60). Note: change in limited operating period (LOP) from August 31 to August 15, based on a letter from Regional Office based on owl demographic study results in regard to owl fledgling times in the Sierra Nevada.

- California spotted owl PACs are delineated surrounding each territorial owl activity center detected on National Forest System lands since 1986. Owl activity centers are designated for all territorial owls based on: (1) the most recent documented nest site, (2) the most recent known roost site when a nest location remains unknown, and (3) a central point based on repeated daytime detections when neither nest nor roost locations are known (SNFP SEIS ROD Appendix A-37).

- PACs are delineated to: (1) include known and suspected nest stands and (2) encompass the best available 300 acres of habitat in as compact a unit as possible. The best available habitat is selected for California spotted owl PACs to include: (1) two or more tree canopy layers; (2) trees in the dominant and co-dominant crown classes averaging 24 inches diameter at breast height (dbh) or greater; (3) at least 70 percent tree canopy cover (including hardwoods); and (4) in descending order of priority, California Wildlife Habitat Relationships (CWHR) classes 6, 5D, 5M, 4D, and 4M and other stands with at least 50 percent canopy cover (including hardwoods). Aerial photography interpretation and field verification are used as needed to delineate PACs (SNFP SEIS ROD Appendix A-37).

- As additional nest locations and habitat data become available, boundaries of PACs are reviewed and adjusted as necessary to better include known and suspected nest stands and encompass the best available 300 acres of habitat (SNFP SEIS ROD Appendix A-37).

- When activities are planned adjacent to non-national forest land, available databases are checked for the presence of nearby California spotted owl activity centers on non-national forest lands. A 300-acre circular area, centered on the activity center, is delineated. Any part of the circular 300-acre area that lies on national forest lands is designated and managed as a California spotted owl PAC (SNFP SEIS ROD Appendix A-37).

- PACs are maintained regardless of California spotted owl occupancy status. However, after a stand-replacing event, evaluate habitat conditions within 1.5-mile radius around the activity center to identify

opportunities for re-mapping the PAC. If there is insufficient suitable habitat for designating a PAC within the 1.5-mile radius, the PAC may be removed from the network (SNFP SEIS ROD Appendix A-37).

- Desired conditions in each PAC are: (1) at least two tree canopy layers; (2) dominant and co-dominant trees with average diameters of at least 24 inches dbh; (3) at least 60 to 70 percent canopy cover; (4) some very large snags (greater than 45 inches dbh); and (5) snag and down woody material levels that are higher than average (SNFP SEIS ROD Appendix A-37).

- For California spotted owl PACs: Conduct vegetation treatments in no more than 5 percent per year and 10 percent per decade of the acres in California spotted owl PACs in the 11 Sierra Nevada national forests. Monitor the number of PACs treated at a bioregional scale. (ROD 2004, page 37).

- Breeding season limited operating period restrictions may be waived, were necessary, to allow for use of early season prescribed fire in up to 5 percent of California spotted owl PACs per year per forest (ROD 2004, page 37).

- California spotted owl home range core areas (HRCAs) are established around each territorial spotted owl activity center detected after 1986. The core area amounts to 20 percent of the area described by the sum of the average breeding pair home range plus one standard error. HRCA sizes are 1,000 acres for the ENF (SNFP SEIS ROD Appendix A-39). Desired conditions in each HRCA are (1) at least two tree canopy layers; (2) at least 24 inches dbh in dominant and co-dominant trees; (3) a number of very large (greater than 45 inches dbh) old trees; (4) at least 50 to 70 percent canopy cover; and (5) higher than average levels of snags and down woody material (SNFP SEIS ROD Appendix A-40).

- Aerial photography is used to delineate the core area. Acreage for the entire core area is identified on national forest lands. Core areas encompass the best available California spotted owl habitat in the closest proximity to the owl activity center. The best available contiguous habitat is selected to incorporate, in descending order of priority, CWHR classes 6, 5D, 5M, 4D, and 4M and other stands with at least 50 percent tree canopy cover (including hardwoods). The acreage in the 300-acre PAC counts toward the total HRCA. Core areas are delineated within 1.5 miles of the activity center (SNFP SEIS ROD Appendix A-39).

- Within California spotted owl HRCA: Where existing vegetative conditions permit, design projects to retain at least 50 percent canopy cover averaged within the treatment unit. Exceptions are allowed in limited situations where additional trees must be removed to adequately reduce ladder fuels, provide sufficient spacing for equipment operations, or minimize re-entry. Where 50 percent canopy cover retention cannot be met for reasons described above, retain at least 40 percent canopy cover averaged within the treatment unit (SNFP SEIS ROD A-51).

- Outside of California spotted owl HRCA: Where existing vegetative conditions permit, design projects to retain at least 50 percent canopy cover within the treatment unit. Exceptions are allowed where project objectives require additional canopy modification (such as need to adequately reduce ladder fuels, provide for safe and efficient equipment operations, minimize re-entry, design cost efficient treatments, and/or significantly reduce stand density). Where canopy cover must be reduced below 50 percent, retain at least 40 percent canopy cover averaged within the treatment unit (SNFP SEIS ROD A-51).

- Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate

proposals for new roads, trails, off-highway vehicle routes, and recreational and other developments for their potential to disturb nest sites (SNFP SEIS ROD Appendix A-38).

Northern Goshawk

- Conduct surveys in compliance with the Pacific Southwest Region's survey protocols during the planning process when proposed vegetation treatments are likely to reduce habitat quality in suitable northern goshawk nesting habitat that is not within an existing California spotted owl or northern goshawk PAC. Suitable northern goshawk nesting habitat is defined based on the survey protocol (SNFP SEIS ROD Appendix A-38).

- Limited operating periods are maintained, prohibiting vegetation treatments within approximately ¼ mile of the nest site during the breeding season (February 15 through September 15) unless surveys confirm that northern goshawks are not nesting. If the nest stand within a PAC is unknown, either apply the LOP to a ¼ mile area surrounding the PAC, or survey to determine the nest stand location (SNFP SEIS ROD Appendix A-60).

- The LOP may be waived for vegetation treatments of limited scope and duration, when a biological evaluation determines that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location. When a biological evaluation concludes that a nest site would be shielded from planned activities by topographic features that would minimize disturbance, the LOP buffer distance may be modified (SNFP SEIS ROD Appendix A-54).

- Northern goshawk PACs are delineated surrounding all known and newly discovered breeding territories detected on National Forest System lands. Northern goshawk PACs are designated based upon the latest documented nest site and location(s) of alternate nests. If the actual nest site is not located, the PAC is designated based on the location of territorial adult birds or recently fledged juvenile goshawks during the fledgling dependency period (SNFP SEIS ROD Appendix A-38).

- PACs are delineated to: (1) include known and suspected nest stands and (2) encompass the best available 200 acres of forested habitat in the largest contiguous patches possible, based on aerial photography. Where suitable nesting habitat occurs in small patches, PACs are defined as multiple blocks in the largest best available patches within 0.5 miles of one another. Best available forested stands for PACs have the following characteristics: (1) trees in the dominant and co-dominant crown classes average 24 inches dbh or greater; (2) in westside conifer and eastside mixed conifer forest types, stands have at least 70 percent tree canopy cover; and (3) in eastside pine forest types, stands have at least 60 percent tree canopy cover. Non-forest vegetation (such as brush and meadows) should not be counted as part of the 200 acres (SNFP SEIS ROD Appendix A-38).

- As additional nest location and habitat data becomes available, PAC boundaries are reviewed and adjusted as necessary to better include known and suspected nest stands and to encompass the best available 200 acres of forested habitat (SNFP SEIS ROD Appendix A-38).

- When activities are planned adjacent to non-national forest lands, available databases are checked for the presence of nearby northern goshawk activity centers on non-national forest lands. A 200-acre circular area, centered on the activity center, is delineated and managed as a northern goshawk PAC (SNFP SEIS ROD Appendix A-38).

- PACs are maintained regardless of northern goshawk occupancy status. PACs may be removed from the network after a stand-replacing event if the habitat has been rendered unsuitable as a northern goshawk PAC and there are no opportunities for re-mapping the PAC in proximity to the affected PAC (SNFP SEIS ROD Appendix A-38).

- It is desired that PACs have: (1) at least two tree canopy layers; (2) dominant and co-dominant trees with average diameters of at least 24 inches dbh; (3) at least 60 to 70 percent canopy cover; (4) some very large snags (greater than 45 inches dbh); and (5) snag and down woody material levels that are higher than average (SNFP SEIS ROD Appendix A-38).

- For northern goshawk PACs: Conduct vegetation treatments in no more than 5 percent per year and 10 percent per decade of the acres in northern goshawk PACs in the 11 Sierra Nevada national forests (SNFP SEIS ROD Appendix A-38).

- Breeding season limited operating period restrictions may be waived, where necessary, to allow for use of early season prescribed fire in up to 5 percent of northern goshawk PACs per year on a forest (SNFP SEIS ROD Appendix A-38).

- Mitigate impacts where there is documented evidence of disturbance to the nest site from existing recreation, off highway vehicle route, trail, and road uses (including road maintenance). Evaluate proposals for new roads, trails, off-highway vehicle routes, and recreational and other developments for their potential to disturb nest sites (SNFP SEIS ROD Appendix A-38).

Pacific Marten

- Pacific marten is associated with large patches of late seral stage forests. Management direction for Old Forest Emphasis Areas in the SNFP are intended to maintain suitable habitat well distributed throughout the Sierra Nevada Range for species dependent on late seral forest.

- Protect marten den sites from disturbance with a LOP from May 1 through July 31st for vegetation treatments (SNFP SEIS ROD Appendix A-62).

- Mitigate impacts where there documented evidence of disturbance to the den site from existing uses. Evaluate proposals for travel routes for the potential to disturb den sites.(SNFP SEIS ROD Appendix A-62).

- Minimize old forest habitat fragmentation. Assess potential impacts of fragmentation on old forest associated species in biological evaluations (SNFP SEIS ROD Appendix A-53).

- Assess the potential of projects on the connectivity of habitat for old forest associated species (SNFP SEIS ROD Appendix A-54).

- Consider retaining forested linkages (with canopy cover greater than 40 percent) that are interconnected via riparian areas and ridgetop saddles during project-level analysis (SNFP SEIS ROD Appendix A-54).

- Identify areas for acquisition, exchange, or conservation easements to enhance connectivity of habitat for old forest associated species (SNFP SEIS ROD Appendix A-54).

Pallid Bat, Townsend's Big-Eared Bat and Fringed Myotis Bat

Pallid bats, Townsend's big-eared bats and fringed myotis bats are associated with oak woodlands, snags, rock outcrops, caves, bridges, abandoned mines, and riparian habitat. Forest-wide Standards and Guidelines are expected to provide habitat to support viable populations of these species. Restoration of hardwood ecosystems is accomplished through standards and guidelines requiring retention of large live hardwood trees and snags and recruitment of young hardwood trees.

The LRMP or SNFP do not provide specific guidelines for the management of these three bat species. Standards and guidelines for hardwoods, snag and down logs, and riparian conservation areas (RCAs) (USDA 1988, USDA 2004), address some of the habitat elements important to these species. Riparian Conservation Objectives (RCOs) under the Sierra Nevada Framework aid in sustaining riparian habitat. In addition, Best Management Practices (BMPs), designed to reduce the amount of sediment and erosion created by project activities, are implemented to protect water quality. Adult stages of aquatic insects are used as forage by all three bat species.

Western Bumblebee

The western bumble bee was added to the Regional Forester's Sensitive Species List for Region 5 in 2013; there are no current standards and guidelines for this species at the time this document was written. Current management guides, primarily developed by the Xerces Society in association with other agencies, including the Forest Service, will be used in assessing existing conditions, effects, and mitigations for this species in regard to this Project.

III. PROJECT DESCRIPTION

The past decade has brought major environmental changes in the Sierra Nevada, including unprecedented drought, bark beetle and other insect outbreaks, large high-intensity wildfires, and associated tree mortality. While ecosystems of the Sierra Nevada have evolved to be well-adapted to fire, the recent increases in the size, frequency, and intensity of fires have resulted in ecosystem transitions, changes in hydrology, and associated effects to sediment and nutrient fate and transport. These dramatic shifts have reduced habitat quality and quantity for sensitive species and pose a significant risk to natural biodiversity (North et al. 2021).

The purpose of the Project is to improve the quality and resiliency of wildlife habitat quality by:

1. Protecting wildlife habitat, aspen stands, forest resources and developed communities within the Wildland Urban Interface (WUI) and beyond from potential severe wildfire effects.

As a result of decades of fire suppression and lack of recent management, aspen stands and conifer forests in the Project Area have an abundance of dense small diameter trees, thick undergrowth and a high density of surface fuels. These conditions, together with periodic drought and a warming climate, weaken mature trees and create a higher potential for uncharacteristically severe, stand-replacing wildland fire leading to higher mortality of vegetation, damage to wildlife habitat, and severe impacts on special status species that rely on these habitats, soils, and watershed values. Further, wildland fire results in the destruction of homes and property; and risk of safe egress/ingress. Action is needed to improve timber stand conditions in order to protect wildlife habitat, reduce fire severity and to make the stands more resilient to wildfire. The Project Area incorporates late seral/old forest ecosystems, aquatic ecosystems, and aspen stands and areas in close proximity to private property, summer tract homes, recreational facilities, and important infrastructure which are at risk in the event of a large fire occurring in the area. Removing dense understory trees, shrubs, and surface vegetative debris reduces fuel loading, fuel continuity, competition for limited resources (water, sunlight, nutrients), and increases the ability for the public to evacuate unharmed and for fire-fighting assets to directly suppress fire in a safe and efficient manner.

The proposed treatments would be implemented across the landscape including within PACs which have traditionally been excluded from these types of fuel treatments both inside and outside the WUI areas. The proposed treatments within PACs would contribute toward meeting fuels objectives for PAC protection, maintain habitat structure and function (SNFPA Record of Decision (ROD) p. 60), and are expected to enhance old forest stand habitat by supporting the health and growth of larger trees.

2. Strategically placing treatments which complement and extend continuity of existing forest and fuel treatments to create a fire resilient landscape.

There is a need to strategically place fuel reduction treatments that are effective, connect past treatments and complement planned and completed treatments on adjacent NFS and private lands. The Forest Service has completed NEPA planning and is currently implementing thinning treatments on nearby NFS lands including Scottiago Fuels Reduction Project, Scottiago Forest Health Project, Panther Fuels Reduction Project, and the Power Fire Pre-Commercial Thin Project. Forest Service partners are in the process of completing surface fuel reduction and prescribed fire readiness treatments within portions of the View 88 Project. The proposed activities would complement and extend the efficacy of this collective work particularly within the WUI surrounding portions of the Project Area.

3. Strategically placing treatments to prepare the landscape for prescribed burning and improve the safety and efficacy of wildfire suppression efforts.

There is a need to strategically place fuel reduction treatments to facilitate prescribed burning. The current surface fuel loading and ladder fuels in this area create hazards to communities and firefighters. These hazards can be reduced through widespread reduction of surface and ladder fuels, tree thinning and prescribed burning. As demonstrated in the recent Caldor Fire, these treatments would facilitate fire suppression tactical operations in the event of a wildfire. The Forest Service is implementing ongoing prescribed fire treatments on nearby NFS lands and the proposed activities would complement and extend the efficacy of this work.

EXISTING CONDITION

Lands proposed for treatment under the FPP are dense with trees of varying size, shrubs, and surface fuels and therefore at risk of loss to wildfire. Treatment areas were strategically placed within the WUI, and in locations that connect to past and future treatment areas on both public and adjacent private lands. The dominant forest types within the FPP landscape are Sierran mixed conifer (27 percent), predominately in the lower elevations (< 6,000 ft), and red fir (26 percent), predominantly in the higher elevations (> 6,000 ft). The dominant seral stage within the Project Area is mid-seral closed (56 percent of the FPP area), followed by late-seral closed (11 percent) and mid-seral open (11 percent). Based on 2019 LiDAR returns, 66 percent of the Project Area has ≥ 50 percent canopy cover.

Mature wildlife forest habitat (e.g., conifer/mixed conifer/hardwood forest types, greater than 24 inches diameter at breast height [dbh], greater than or equal to 40 percent canopy) makes up 11 percent of the Project Area, and immature wildlife forest habitat (e.g., conifer/mixed conifer/hardwood forest types, 11–24 inches dbh, less than 40 percent canopy) makes up 49 percent of the Project Area (USDA 2019).

Seventeen percent of the FPP falls within areas identified as high- risk to high-valued resources and assets, and according to a USFS R5 analysis, 6 percent of the FPP has stand densities considered to be at high risk to mortality from drought, insects, disease, and wildfire (USDA 2021(b)). According to fire modeling inputs used in the ACCG 2020 wildfire risk assessment, 6 percent of the FPP falls within areas predicted to have high-intensity wildfire.

Riparian woodlands composed of deciduous trees and shrubs can be found along perennial and some intermittent watercourses. The predominant forest types within the FPP landscape are further described below.

Figure 1. Existing Condition of Sierran Mixed Conifer Habitats in Proposed Treatment Areas.

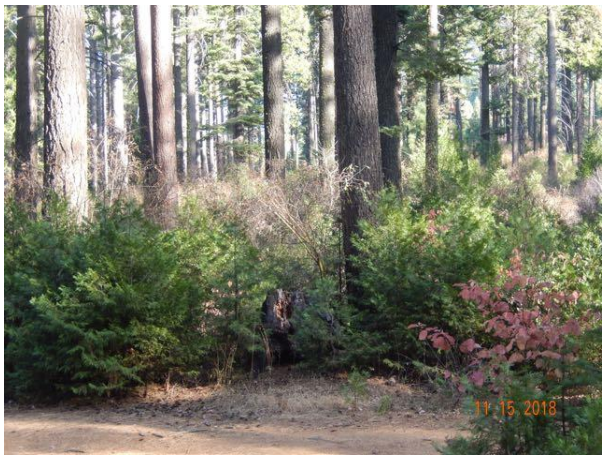


Figure 1a: example of dense stand of multi-storied/multi- aged trees with no recent understory treatment.

Figure 1b: example of dense stand selectively harvested in the past where there has been no treatment of the understory in recent years.

Figure 1c: example of pole-sized mixed conifer stand naturally regenerated after past timber harvest

Figure 1d: example of areas with sparse tree overstory with dense shrub understories

RED FIR

Red fir (26 percent) is the predominant forest type in the higher elevations (> 6,000 ft). These stands are characterized by high density, regeneration of understory and overstocked stands (USFS 2011) with sometimes large components of dead material. Refer to **Figure 2** for a representative photograph of a red fir stand in the FPP.

Figure 2. Existing Condition of Red Fir Habitats in Proposed Treatment Area.

ASPEN

Aspen stands within the Project Area have been compromised by fire suppression and conifer encroachment, which, over time, has resulted in fewer and smaller stands comprised of a single age-class of trees. **Figure 3** below illustrates an aspen monitoring stand on the Amador Ranger District with encroaching conifers (young lodgepole pine and red fir).

Figure 3. Existing Condition of Aspen Stand in the Proposed Treatment Area.

DESIRED CONDITION

The goal of the FPP treatments is to reduce understory ladder and surface fuels to ameliorate wildfire behavior and facilitate the future application of prescribed fire. Stands would be less overcrowded, and have fewer small trees, lower surface fuels, and higher canopy base height (**Figure 4**). Hardwoods would be retained and managed consistent with SNFPA guidelines and direction (SNFPA ROD, p. 53) shrubs and ground cover would be retained in canopy openings to the extent that there is minimal connectivity to overstory trees. In the event of a wildfire, flame lengths and fire intensity would be reduced; crown fire potential would be lessened; suppression effectiveness would be increased; and firefighter safety would be improved.

Figure 4. Example of a Forest Stand Following Fuels Treatment (mastication).

METHODS

Table 3 below lists the maximum extent (in terms of acres) of each type of treatment proposed under the Project. A more detailed description of each treatment is in the text following the table. A preliminary list of general management requirements and Project-specific 'Design Criteria,' are also described below and would be required during Project implementation.

The Project includes four treatment activities and two supplement activities/treatments:

Treatment Activities

1. Mechanical Fuels Reduction (treatments of surface and ladder fuels);
2. Hand Thinning (brush and small trees),
3. Prescribed Burning; and
4. Aspen Restoration.

Supplemental Activities/Treatment

1. Pruning
2. Hazard Tree Felling and Removal

Table 3. Proposed Treatment Activities.

Type of Treatment	Description	Treatment Details	Maximum Extent
TREATMENT ACTIVITIES			
Mechanical Fuels Reduction (treatments of surface and ladder fuels)	Mastication, chipping/grinding or crushing ladder and surface fuels. Equipment typically consists of larger horsepower, low ground pressure track laying equipment, similar in some cases to excavators or tractors.	Mastication/pruning only treatments will be implemented on 14,537 acres. An additional Prescribed burning will be implemented within 4,715 acres following mechanical treatments.	19,252 acres
Hand Thinning (brush and small trees)	Cutting, bucking, lopping, scattering and/or piling of smaller trees (< 10 inches dbh)[b] and brush using chainsaws.	Hand thinning treatments will be utilized wherever mechanical fuels reduction treatments are determined to not be suitable based on field reconnaissance.	4,337 acres

Type of Treatment	Description	Treatment Details	Maximum Extent
Prescribed Burning	Burning involves ground based or aerial ignition methods to reduce understory fuels.	Fire lines will be constructed where needed to contain the fire. Natural barriers and roads would be utilized as fire containment lines wherever possible. Prescribed burning only treatment will be implemented on 1,888 acres. 4,715 acres will be mechanically treated prior to prescribed burning; and 22 acres of prescribed burning will be implemented as part of aspen restoration.	6,625 acres[c]
Aspen Restoration	Remove encroaching conifers and shrubs to reestablish the historic aspen stand edge.	Aspen restoration only will be implemented on 172 acres; an additional 22 acres will be treated with prescribed burns as well.	194 acres
SUPPLEMENTAL ACTIVITIES/TREATMENTS			
Pruning	Pruning tree limbs would occur in conjunction with mechanical fuels reduction and hand thinning.	This involves severing all limbs on live trees up to a height of 8 to 12 feet on the bole, while retaining a minimum of 50 percent but not to exceed 50 percent of total tree height.	TBD
Hazard Tree Felling and Removal	Weak and high- risk trees of all sizes (both dead and unstable live trees) identified as an imminent hazard will be felled and may be removed.	Only hazard trees that pose a risk to Project activities would be removed. Hazard trees will be identified and assessed using the 2012 Region 5 Hazard Tree Guidelines for Forest Service.	TBD

The most cost efficient and effective treatment or combination of treatments will be chosen for each area based on in-field verification of on-the-ground conditions, suitability, timing, equipment availability, and post-treatment results. Additionally, two supplemental activities/treatments (pruning and hazard tree felling and removal) may be undertaken at select locations where conditions warrant such supplemental activities.

Actions include thinning brush and small trees, removing ladder fuels, pruning residual trees, and removing or compacting the arrangement of surface fuels in order to prepare the landscape for wildfire resilience and prescribed burning. These are simple, cost efficient and effective fire hazard reduction techniques that will increase the annual acreage of fuels reduction treatments and enable more intensive treatments in key areas. The FPP would also utilize prescribed burning as an initial treatment where site conditions allow.

Mechanical Fuels Reduction

Mechanically reduce live shrubs and small trees generally up to 10 inches dbh. Larger live trees may be masticated where necessary to facilitate machinery movement within the stand. Masticate dead trees up to 16 inches dbh, or larger where necessary to abate an imminent safety hazard. Refer to Figure 5 for photographs of typical mastication equipment. Mechanical fuels reduction treatments within the prescribed fire treatment areas will only occur where required field surveys have been conducted.

Figure 5. Existing Condition of Sierran Mixed Conifer Habitats in Proposed Treatment Areas.

Figure 5a: Example of a boom-type masticator.

Figure 5b: Example of a front-mounted masticator.

- Mechanical fuels reduction would be applied:
    - to slopes less than or equal to 40 percent where feasible;
    - within 0.25 mile of road centerline;
    - where hand treatments are not required or specified;
    - within California spotted owl and northern goshawk PACs, or portions thereof, that are located within WUI Defense and Threat Zones. Note that all areas within 500 feet of the activity center (nest tree) will be treated by hand, consistent with SNFPA) (SNFPA ROD, p.60, #72 and #73);
- No live trees shall be cut that are larger than 10 inches dbh and meet minimum merchantable timber specifications (i.e., would produce at least a 10-foot straight log with 6-inch diameter inside bark at the small end. Lodgepole pine is not considered merchantable for this Project). Exceptions will be made if such removal is necessary to facilitate machinery movement within the stand.
- On slopes of greater than 40 percent, a tethered mastication system may be implemented where feasible and in accordance with soils standards following site specific review and recommendation by a Forest Service soil specialist. Tethered systems consist of a cable winch mounted on a piece of equipment. The winch system either mounts to the working equipment or it is mounted to another piece of equipment, like a dozer, that also acts as the anchor. When mounted to the working equipment, the winch line is anchored to an anchor point, such as a stump or the base of a standing tree, somewhere on the slope. The mechanical influence of the winch is used for enhanced traction and mobility on steep slopes (often called “traction assist”) or for safety on steep slopes (preventing machine sliding and overturning and reducing soil disturbance).
- Ground fuels will be treated through grinding, machine crushing, or chipping.

- In areas adjacent to roads, a “reach-in and grab” mastication system may be utilized. This system keeps the masticator on the road while the arm reaches off the road to remove or masticate adjacent vegetation and ladder fuels.

Hand Thinning (Brush and Small Trees)

Hand thinning may occur where other treatments are not feasible or where this activity will not conflict with other resource concerns/restrictions.

- Brush and live trees up to 10 inches dbh and dead trees up to 16 inches dbh will be hand-thinned in areas where mechanical fuels reduction treatments are unsuited or prohibited. Larger dead trees may also be removed, if necessary to abate an imminent safety hazard.

- Hand thinning within California spotted owl and northern goshawk PACS outside of the WUI and surrounding activity centers within WUI would target select conifer trees less than 6 inches dbh prior to implementing prescribed fire (SNFPA ROD, p. 60, #74). Outside the WUI, stand-altering activities would be limited to reducing surface and ladder fuels through prescribed fire treatments.

- In forested stands with overstory trees 11 inches dbh and greater, prescribed fire treatments will be designed to promote average flame length of 4 feet or less. Hand treatments, including handline construction, tree pruning, and cutting of small trees (less than 6 inches dbh), may be conducted prior to burning as needed to protect important elements of owl habitat.

- Hand thinning may be followed by chipping, lopping and scattering, and/or prescribed burning.

Prescribed Burning

- Implement prescribed burning using ground based or aerial ignition methods to reduce understory fuels. Prescribed understory fire would be prioritized in strategic locations to reduce the risk of large fires within treatment areas and on the surrounding landscape. Prescribed understory burning may take place following mastication or hand thinning, or as a stand-alone treatment.

- Construct hand or machine fire lines where needed to contain the fire. Natural barriers and roads would be utilized as fire containment lines where possible.

- Machine fire lines will only be constructed in areas where adequate Arch surveys have been completed prior to signing this decision.

Aspen Restoration

- Aspen stands will be defined in consultation with the United States Forest Service.

- Remove encroaching conifers generally less than 12 inches dbh and shrubs to reestablish the historic aspen stand edge.

- Treatments for aspen may extend beyond the current perimeter of an aspen stand up to (1) 1.5 times the height of aspen trees in the stand (the maximum extent of lateral aspen roots), (2) the distance required to prevent remaining, adjacent conifers from shading the aspen stand and suppressing aspen regeneration, or (3) up to 100 feet (to conduct treatments or process treatment by-products), whichever is greater.

- Utilize hand thinning, ground based mechanical equipment (e.g., masticator, feller buncher, skidder), chipping, lopping and scattering, and/or prescribed burning.

- Mechanical fuels reduction treatments would be applied to stands on slopes generally less than or equal to 40 percent and hand thinning would be applied on slopes generally greater than 40 percent; removing trees generally less than 12 inches dbh.

Supplemental Activities/Treatments

Pruning

Residual trees may be pruned to raise the base height to live crown and to reduce the risk of wildfire or prescribed fire moving into the crowns. Pruning involves severing all limbs on live trees up to a height of 8 feet to 12 feet on the bole, while retaining a minimum of 50 percent but not to exceed 50 percent of total tree height.

Hazard Tree Felling and Removal

Weak and high- risk trees of all sizes (both dead and unstable live trees) identified as an imminent hazard to the implementation of FPP activities will be felled and may be removed. Hazard trees will be identified and assessed using the 2012 Region 5 Hazard Tree Guidelines for Forest Service.

ANTICIPATED TIMING AND EXTENT OF PROPOSED ACTIVITIES

Under Phase 1 of the FPP:

- Between approximately 500 to 2,000 acres of hand treatments and 500 to 2,000 acres of mechanical fuels reduction treatments could be implemented on an annual basis over the next 5 to 6 years and repeated for 10 to 15 years or more, depending on fuel conditions and funding.

- Approximately 10,000 acres or more may be treated with prescribed fire in the next 5 to 6 years.

The actual number of acres treated will largely depend upon the Forest Service and its' partners' staffing and financial capacities.

DESIGN CRITERIA

At the Project level the ENF will implement the following Design Criteria relevant to the protection of sensitive aquatic and terrestrial wildlife.

ID	Project Design Criteria
1	All applicable standards and guidelines described in the Eldorado National Forest Land and Resource Management Plan (USDA 1989), as amended by the 2004 Sierra Nevada Forest Plan Amendment ((SNFPA) USDA 2004) shall be followed during Project implementation. Mechanical and fuels prescriptions have been designed to be consistent with Forest-wide management standards and guidelines (SNFPA ROD 2004, pages A-49 to A-59), as well as land allocation standards and guidelines for California spotted owl and Northern Goshawk PACs (SNFPA ROD 2004, pages A-59 to A-61), and RCAs and Critical Aquatic Refuges (SNFPA ROD 2004, pages A-62 to A-66). This Project will also incorporate the National Best Management Practices (BMPs) for Water Quality Management on National Forest System Lands (USDA 2012). In addition, there are other applicable, standard policies, and guidelines included in various Forest Service Handbooks, laws, and regulations that shall be adhered to throughout implementation of this Project.

<table>
<tr><th>ID</th><th>Project Design Criteria</th></tr>
<tr><td>2</td><td>All Project activities shall be consistent with Riparian Conservation Objectives described in the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (USFS 2004a). and the U.S Fish and Wildlife Service Conservation Measures from the programmatic Biological Opinion on three federally listed amphibian species, the Sierra Nevada yellow-legged frog, the Northern Distinct Population Segment of the mountain yellow-legged frog, and the Yosemite toad (USDI, Fish and Wildlife Service 2014).</td></tr>
<tr><td>3</td><td>If federally listed Threatened, Endangered, or Forest Service Sensitive (TES) botanical, aquatic, or terrestrial species are detected during work, operations shall cease in that area and the appropriate biologist shall be informed immediately to determine appropriate actions to take. Before restarting activities, consultation may need to be initiated with USFWS for listed species.</td></tr>
<tr><td>6</td><td>Storage of fuel or other toxic materials and maintenance of equipment shall not occur within RCAs[1].</td></tr>
<tr><td>7</td><td>The table below defines boundaries where mechanical operations are prohibited for the protection of aquatic resources and applies to features identified on map and those found in the field during treatment. Unmapped features will be treated as Special Aquatic Features[1].
<table>
<tr><th>Aquatic Feature Type</th><th>Require Exclusion Zone/Other Criteria</th></tr>
<tr><td>Perennial and Intermittent Streams</td><td>No ground-based equipment within 50 feet of the edge of the stream channel. Equipment is allowed to reach into the equipment exclusion zone to masticate vegetation.</td></tr>
<tr><td>Ephemeral Streams and Draws</td><td>No ground-based equipment within 15 feet of the edge of the stream channel or bottom of the draw.</td></tr>
<tr><td>Special Aquatic Features (SAF)[a]</td><td>No ground-based equipment within 50 feet of the edge of the wet area or riparian vegetation, whichever is greater.</td></tr>
<tr><td>Dufrene Pond</td><td>No ground-based equipment within 50 feet of the exclusion fencing around Dufrene pond.</td></tr>
</table></td></tr>
<tr><td>8</td><td>Hand falling of trees is allowed within the mechanical exclusion zone. Any trees should be felled away from the stream and left in place, bucked and scattered, or removed by reach in and full suspension.</td></tr>
<tr><td>9</td><td>If mechanical falling/skidding equipment is used: No new landings shall be created in the RCA. Reuse of existing landings within the RCA will be allowed where creation of a new landing is likely to result in more resource damage than use of the existing landing within the RCA.</td></tr>
<tr><td>10</td><td>If mechanical falling/skidding equipment is used: Any skid trails or landings within RCAs shall be repaired to restore soil infiltration capacity and soil cover to reduce erosion and may include practices such as, reshaping to restore natural surface flow patterns, installation of drainage control features, decompaction, placement of organic material, and seeding on disturbed soil surfaces. Slash shall be added to any skid trails while operations are occurring to facilitate incorporation into the substrate and help stabilize soil.</td></tr>
<tr><td>11</td><td>Ground cover will be maintained at least at 70 percent in the zone of 50 to 100 feet from the edge of the stream channel. If the existing ground cover is less than 70 percent, then the existing ground cover will be maintained. Tops, limbs, and small trees within the mechanical exclusion zone can be lopped and scattered to meet ground cover criteria.</td></tr>
</table>

[1] The RCA is defined as 300 feet on each side of perennial streams and from the edge of special aquatic features (lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs), and 150 feet from each side intermittent and ephemeral streams. For streams, the RCA is measured from the bank full edge of the stream.

ID	Project Design Criteria
12	At a minimum, an annual review of burning treatment plans will occur with a Forest Aquatic Biologist, Terrestrial Biologist, and Botanist to ensure conditions for Threatened, Endangered or Sensitive species have not changed and to ensure consistency with FWS consultation determinations.
13	Ignition of prescribed fires shall not occur within 50 feet of any perennial or intermittent stream or SAF. The ignition exclusion zone shall be measured from the edge of the channel or high-water mark of the SAF or the adjacent riparian vegetation if present. a. Fire will be allowed to back into the exclusion zone b. Ignition may occur within the exclusion zones if it is deemed necessary to maintain control of a prescribed burn or to control burn severity.
14	Prescribed fire containment lines shall be rehabilitated to prevent transport of water and sediment to nearby aquatic systems prior to the onset of winter weather or large summer storm
15	No burn piles shall be placed within meadows, fens, springs, or draws, or within 50 feet from the edge of perennial or intermittent stream channels or riparian vegetation, whichever is greater.
16	Large reservoirs will be used for water drafting. If it is necessary to use waterholes, ponds, rivers, and streams for water drafting, the ENF aquatic biologist will be consulted, and surveys for aquatic threatened, endangered and sensitive species prior to use. In the event that threatened, endangered and sensitive species are found or are known to occur at drafting sites, sites will not be used unless ENF-approved minimization measures are put into place.
17	Low to moderate intensity prescribed burning may have adverse effects on aspen stands, due to shallow rooting of this species. For this reason, existing aspen stands, and adjacent areas will be evaluated before inclusion in prescribed burning units.
18	Botanical surveys will be conducted in suitable habitat for Sensitive, Proposed, or Federally listed plant species prior to Project implementation unless recent surveys (within 5 years) have been conducted. Surveys shall be conducted by qualified individuals and adhere to Forest Service standards for botanical surveys as defined by FSH 2609.26. Sensitive plant occurrences will be flagged for avoidance. Site-specific mitigations to avoid impacts to un-surveyed Sensitive plant habitat will be approved by Forest Service Botanist prior to implementation of Project activities. Mitigations may include flag and avoid, LOPs, hand fell and leave, or remove by reach-in only. Hand thinning and prescribed fire within plant protection areas may occur at the recommendation of the Forest Service botanist.
19	Watch list species encountered during surveys for Sensitive, Proposed, or Federally listed plant species will be noted. Protection measures shall be developed and approved by the District Ranger for any watch list plant that may qualify as a Forest Service Sensitive species.
20	Burning operations within Sensitive, Proposed, or Federally listed plant populations shall be designed to produce a low intensity fire. No ignition within occupied habitat shall occur unless required to moderate fire intensity.
21	Lava cap plant communities shall be protected from motorized equipment and vehicles. All Project related equipment and vehicles shall remain on existing road corridors within lava caps; including no parking off road, heavy equipment travel, etc.
22	Where sensitive plant populations occur within or adjacent to thinning units, actions will be taken to limit OHV activity including scattering materials, placing barricade rock, and/or leaving strategic patches of vegetation to discourage vehicles from driving off designated routes into sensitive plant habitat.
23	Riparian vegetation associated with perennial, ephemeral streams, and other special aquatic features will be avoided during Project implementation.

ID	Project Design Criteria
24	When working above 7,000 feet, areas with potential habitat for whitebark pine will be assessed for stand-health and delineated for avoidance. Hand-thinning, line construction, and active ignition shall not occur in healthy stands of whitebark pine.
29	Invasive plant surveys will be conducted prior to Project implementation unless recent surveys (within 5 years) have been conducted. Known invasive plant sites will be flagged prior to implementation and will be avoided as much as possible by conducting all Project work outside of flagged exclusion areas. If Project activities cannot be completely avoided within flagged infestations, risk minimization strategies shall be employed, such as working in the infested area last, working in infested areas when propagules are not viable, limiting the number of people or equipment within the infestation, and cleaning mechanical and hand equipment, clothing, boots, etc., before moving to other un-infested National Forest System lands.
30	Post-implementation invasive plant surveys shall also be conducted in areas of ground disturbing activities. If found, newly detected or expanding ENF Priority 1 or 2 invasive plants shall be treated in accordance with the design features of the Forest-Wide Treatment of Invasive Plants Project (ENF 2013).
31	All off-road equipment shall be cleaned to ensure it is free of soil, seeds, vegetative matter or other debris before entering National Forest System lands to prevent the introduction or spread of invasive plants. Equipment will be inspected before initial entry and any subsequent re-entries onto the Project Area. If determined necessary during the inspection, cleaning shall occur at a vehicle washing station or agreed upon cleaning location before the equipment enters or re-enters the Project Area.
32	Known invasive plant sites in the Project Area will be flagged prior to implementation and the spread of occurrences will be avoided as much as possible by conducting all Project work outside of flagged exclusion areas. If Project activities cannot be completely avoided within flagged infestations, risk minimization strategies shall be employed such as working in the infested area last, working in infested areas when propagules are not viable, limiting the number of people or equipment within the infestation, and cleaning mechanical and hand equipment, clothing, boots, etc., before moving to other un-infested National Forest System lands. These areas will be identified on Project maps.
33	Warning signs shall be posted in work areas, including all access points along trails and roads, to alert oncoming traffic and recreational users to safety hazards associated with the Project.
38	The Project is designed to meet SNFPA 2004 and ENF Plan standards related to California spotted owl, and northern goshawk PACs. These standards and guidelines have been incorporated into the Project.
39	Standard LOPs shall be adhered to, for all activities, for both the California spotted owl and northern goshawk (NG), unless surveys conclusively ascertain that nesting/reproduction will not be affected in that particular breeding season by the treatments. The LOP periods are March 1 through August 15th for the California spotted owl, and February 15th through September 15th for the northern goshawk. Where surveys and biological assessment determine that impacts will not affect reproduction for these species, the LOP may be lifted, or the area affected by the LOP reduced. Based on nesting status, additional mitigation measures, such as (but not limited to): exclusion of portions of the treatment areas until after the breeding season, additional fire lines, and different treatment techniques (lighting techniques, postponing slash work), may be implemented to reduce potential effects to nesting spotted owls and goshawks.

ID	Project Design Criteria
40	Snags (≥15” dbh) shall be retained, except where they pose a threat to human health and safety, or perimeter control risk for containment of prescribed fire, and will not be actively lit during burning operations.
41	Should any Threatened, Endangered or ENF Sensitive species be detected during any phase of the Project, the Forest Service district wildlife staff will be notified, and potential adjustments to the Project will be evaluated and may be adjusted accordingly.
42	Mechanical and hand fuel reduction treatments to remove ladder fuels less than 12" dbh are designed to ensure protection and retention of highly suitable habitat for California spotted owl and northern goshawk. Within existing suitable habitat, maintain canopy closure at or above 90percent of starting canopy closure following mechanical and hand treatments.
43	The district wildlife biologist shall be involved in prescribed burn planning and notified prior to implementation of prescribed burning in California spotted owl or northern goshawk PACs. When possible, the biologist and/or staff shall be onsite to take part in, and/or monitor burning and associated effects.
44	Prescribed burning is designed to ensure retention of highly suitable habitat for California spotted owl and northern goshawk, where it currently exists. Within suitable California spotted owl and northern goshawk habitat planned for burning, maintain canopy closure at or above 85percent to 90percent of starting canopy closure following prescribed burning. Prescribed burning may result in small openings (generally ≤ 1/4-1/2 acre in size), however design burning to limit the total area of openings created less than 5percent of treated area.
45	Additional hand treatments, including handline construction, tree pruning, and cutting of small trees (less than 6 inches dbh), may be conducted within a 1–2 acre area surrounding known nest trees, to the extent necessary, to protect nest trees and trees in their immediate vicinity during prescribed burning.
46	To reduce impacts to local populations, no more than four PACs within the FPP Project Area shall be burned in a 12-month period. Burning shall avoid direct impacts to known nest/roost stands by either not burning through them, or clearing material from around known nest and roost trees and other trees/snags > 30” dbh in the nest stands.
47	Retain downed logs greater than 30” diameter (large end) by not actively lighting during implementation of prescribed burning.
48	Where the design criteria standards applicable to prescribed burning are not expected to be met, no prescribed burning shall occur within California spotted owl and northern goshawk PACs, or applicable portions of PACs without further survey and analysis.
49	Detection of a wolverine or Sierra Nevada red fox will be validated by a forest carnivore specialist. When verified sightings occur, conduct an analysis to determine if activities within 5 miles of the detection have a potential to affect the species. If necessary, apply a limited operating period from January 1 to June 30 to avoid adverse impacts to potential breeding. Evaluate activities for a 2-year period for detections not associated with a den site.
50	Downed logs greater than 16 inches in diameter (small end diameter) will be retained during mechanical fuels treatments (i.e., mastication) to the extent practicable.

IV. SPECIES AND HABITAT ACCOUNTS

WESTERN POND TURTLE

SPECIES AND HABITAT ACCOUNT

The western pond turtle is actually a species complex comprised of the Northwestern pond turtle (*Actinemys marmorata*) and the Southwestern pond turtle (*Actinemys pallida*). A species and habitat account for the species complex is available in the *Western Pond Turtle Range-wide Management Strategy* (Western Pond Turtle Range-Wide Conservation Coalition 2020), which can be obtained from the World Wide Web at: https://ecos.fws.gov/docs/recovery_plan/western pond turtlepercent20RCCpercent20Strategypercent202020.pdf.

The western pond turtle is currently a candidate species for listing under the Federal Endangered Species Act (ESA), as well as a Species of Special Concern in California (CSC) (CNDDB 2022). A brief summary of biological and habitat characteristics relevant to this analysis is provided below.

Western pond turtles are found only on the west coast of North America. The Northwestern pond turtle occurs from Washington through northern California, while the closely related Southwestern pond turtle occurs from southern California to Baja California (Western Pond Turtle Range-Wide Conservation Coalition 2020). On Region 5 lands this turtle can be found on all National Forests, except the Inyo and Lake Tahoe Basin. The Project Area is within the range of the Northwestern pond turtle and references to the western pond turtle in the rest of this report refer to this northern species.

The western pond turtle is a semi-aquatic species requiring aquatic and dry land habitat. Foraging, basking, and mating take place in the water, whereas oviposition, estivation, and overwintering occur on land. Turtles migrate to terrestrial habitats in response to declining temperatures or water levels, or high flows. The extent to which western pond turtle use terrestrial habitat varies widely and depends largely on geographic location, local climatic conditions, hydrology, and water source. Various studies have recorded considerable variances in distances western pond turtles travel overland away from water.

Aquatic habitats include lakes, natural ponds, rivers, oxbows, permanent streams, ephemeral streams, marshes, freshwater and brackish estuaries, and vernal pools. Additionally, these turtles will use man-made waterways including drainage ditches, canals, reservoirs, mill ponds, ornamental ponds, stock ponds, abandoned gravel pits, and sewage treatment plants (Buskirk 2002). Turtles favor areas with offshore basking sites including floating logs, snags, protruding rocks, emergent vegetation, and overhanging tree boughs, but also will use steep and/or vegetated shores. Growth and maturation in western pond turtles are heavily influenced by ambient air and water temperatures and basking behaviors which include aerial basking, and cryptic behaviors such as burying in warm sand or lying in warm algal mats (Germano and Rathbun 2008). Sites with cold water require turtles to bask more, causing average body size to be smaller compared to sites with warmer water. Areas which have higher invertebrate densities, typically classified as having organic mud bottom substrates, yield larger turtles (Lubcke and Wilson 2007).

Turtles nest in upland habitats, typically within 5 to 150 meters (approximately 16 to 492 feet) of aquatic habitat (Rathbun et al. 1992, Reese and Welsh 1997, Lucas 2007, Pilliod et al. 2013). Most nests are excavated within roughly 100 m of water, but some have been documented as far as 500 m away (Holland 1991 & 1994, Rathbun et al. 1992, Crump 2001, Rathbun et al 2002, Riensche et al. 2019, Davidson & Alverez 2020). It is likely that nest site fidelity is common, and sites are changed only after a negative encounter during either a walkabout or while

forming a nest at a particular site (Holland 1994, Crump 2001). The nesting season is late April through July depending on environmental conditions (Scott et al. 2008, Shaffer and Toffelmier 2020). Females dig a hole and bury the eggs in dirt and vegetation (to create air space), topped with wet soil. The young typically emerge the following spring in northern areas.

Western pond turtles may move to terrestrial refugia to estivate in response to water drying at intermittently wet sites or during drought conditions. Estivation behavior involves turtles burying and concealing themselves just beneath the surface under organic duff and leaf litter in shaded and moist areas. Estivation sites have been documented in mostly dried wetlands, willow woodlands, and scrub brush habitat (Rathbun et. al. 2002, Bondi & Marks 2013, Zaragoza et al. 2015 , Nerhus 2016).

Many western pond turtles overwinter in upland terrestrial habitats, typically within approximately 500 meters (1,640 feet) of aquatic habitats. Propensity for terrestrial overwintering in populations living in permanent ponds appears to be much lower than stream and river populations (Reese 1996 in Pilliod et al. 2018). Movement of pond turtles away from streams and rivers in late fall has been attributed to avoidance of high flow of winter and spring runoff (Goodman 1994; Reese 1996; Rathburn et al. 2002 in Pilliod et al. 2013). Turtles move upland at different times across the range of this species. Some individuals move upland as early as September, but typically move following the first winter storm in November or December. In southern California animals spend only one to two months in terrestrial habitats, while animals in the northern portions of the range can be terrestrial for up to eight months (Lovich and Meyer 2002). Individuals have been documented to overwinter under litter or buried in soil in areas with dense understories consisting of vegetation such as blackberry, poison oak, and stinging nettle, which reduces the likelihood of predation (Davis 1998).

CURRENT CONDITION

Suitable Habitat

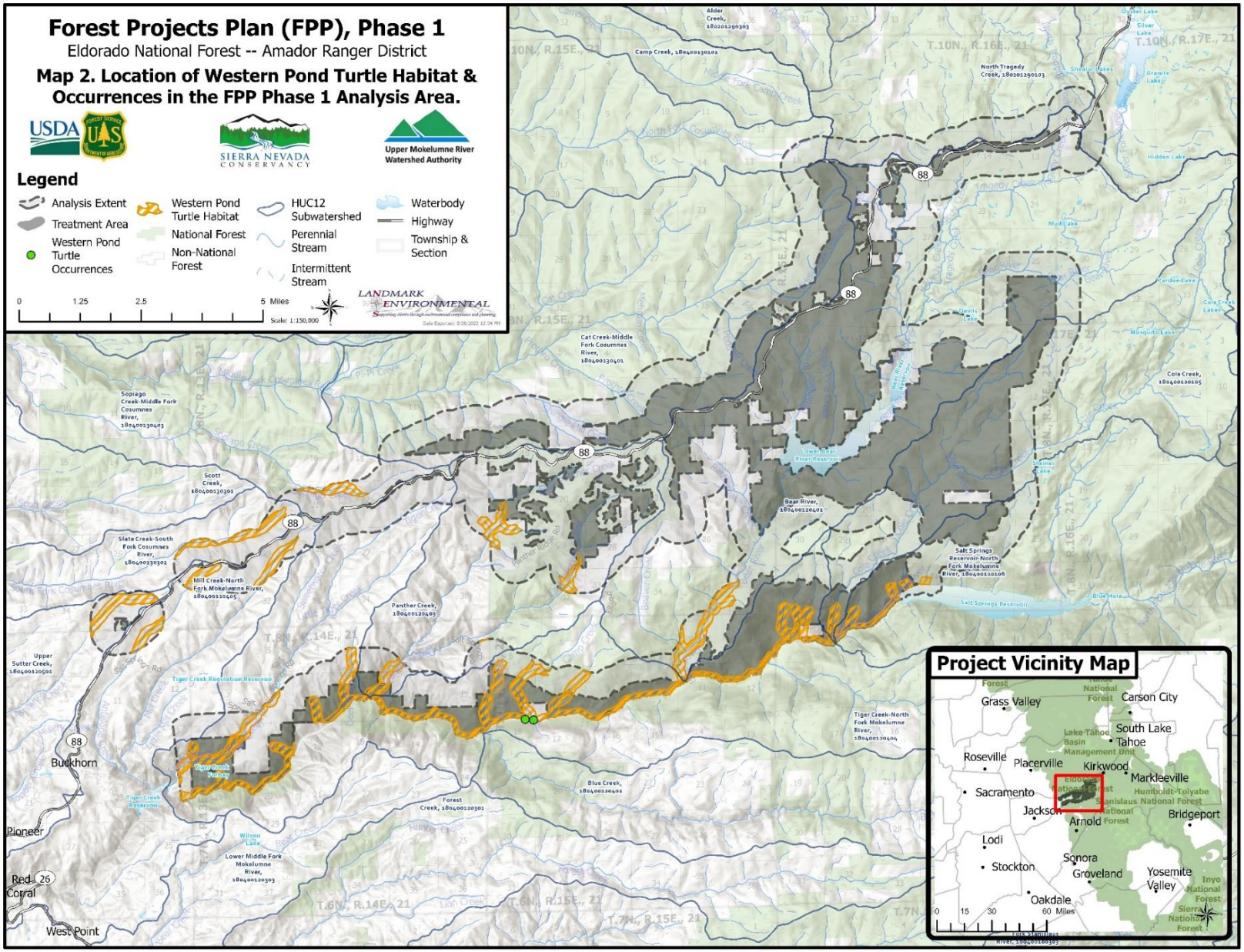
The spatial extent of the Analysis Area for western pond turtle is approximately 63,680 acres, extending 0.5 mile beyond the Project Area to encompass habitat that western pond turtle might use, but not so large as to potentially mask Project effects on western pond turtle habitat.

For the purposes of this analysis, aquatic habitat is defined to include all perennial and intermittent streams below 4,500 feet msl. Breeding habitat and overwintering is conservatively estimated to include all areas within approximately 500 meters (approximately 1,640 feet) of aquatic habitat (Reese and Welsh 1997 in Western Pond Turtle Range-Wide Conservation Coalition 2020). However, nesting is most likely to occur within approximately 5 to 150 meters (approximately 16 to 492 feet) of aquatic habitat, where the large majority of western pond turtles nest (Western Pond Turtle Range-Wide Conservation Coalition 2020; Mabe, pers. comm., 2019). As shown in **Table 4**, there are approximately 4,214 acres of suitable habitat in the Analysis Area, with a large proportion (approximately 54 percent) located in the Tiger Creek-North Fork Mokelumne River HUC 12 watershed. Approximately 2,090 acres of habitat (50 percent) are within proposed treatment areas.

Table 4. Western Pond Turtle Habitat in the Analysis Area and the Project Area.

HUC 12 Number	HUC 12 Name	Acres of Suitable Habitat within Analysis Area	Proposed Treatments (Acres)				Total Acres of Suitable Habitat within Project Area
			Mechanical Fuels Reduction	Hand Thinning	Prescribed Burning	Aspen Restoration	
180400120105	Cole Creek	77	7[a]	34	41[a]	0	77
180400120106	Salt Springs Reservoir-North Fork Mokelumne River	232	77	136	0	0	213
180400120401	Bear River	358	1	4	0	0	5
180400120403	Panther Creek	408	39	38	0	0	77
180400120404	Tiger Creek-North Fork Mokelumne River	2,298	530[b]	1019	280[b]	0	1,718
180400120405	Mill Creek-North Fork Mokelumne River	325	0	0	0	0	0
180400120501	Upper Sutter Creek	197	0	0	0	0	0
180400130302	Slate Creek-South Fork Cosumnes River	202	0	0	0	0	0
180400130403	Sopiago Creek-Middle Fork Cosumnes River	118	0	0	0	0	0
	Total Suitable Habitat	**4,214**	**653[c]**	**1,232**	**321[c]**	**0**	**2,090**

[a]Includes approximately 5 acres that will be treated with prescribed burning following completion of mechanical fuels reduction.
[b]Includes approximately 110 acres that will be treated with prescribed burning following completion of mechanical fuels reduction.
[c]Total includes approximately 115 acres in which both mechanical fuels reduction and prescribed burning will be implemented.


Forest Projects Plan (FPP), Phase 1
Eldorado National Forest -- Amador Ranger District
Map 2. Location of Western Pond Turtle Habitat & Occurrences in the FPP Phase 1 Analysis Area.
USDA
SIERRA NEVADA CONSERVANCY
Upper Mokelumne River Watershed Authority
Legend
Analysis Extent
Treatment Area
Western Pond Turtle Occurrences
Western Pond Turtle Habitat
National Forest
Non-National Forest
HUC12 Subwatershed
Perennial Stream
Intermittent Stream
Waterbody
Highway
Township & Section
0
1.25
2.5
5 Miles
Scale: 1:150,000
LANDMARK ENVIRONMENTAL
Project Vicinity Map
Grass Valley
Carson City
South Lake Tahoe
Roseville
Placerville
Kirkwood
Markleeville
Sacramento
Jackson
Arnold
Bridgeport
Lodi
Stockton
Sonora
Groveland
Yosemite Valley
Oakdale
0
15
30
60 Miles
Buckhorn
Pioneer
Red Corral
West Point
88
26

Surveys and Known Occurrences

Refer to **Map 2** for the location of known occurrences within the Analysis Area and the Project Area. A review of ENF visual encounter survey data for the Analysis Area yielded three records for western pond turtle along the North Fork Mokelumne River near the confluence with Camp Creek in 1999, 2002, and 2009. western pond turtle were also incidentally observed at this location during monitoring studies conducted for Pacific Gas and Electric Company's (PG&E)'s Stream Ecology Monitoring Program in 2009 (CNDDB 2022).

EFFECTS ANALYSIS

Effects to Individuals

Western pond turtles are known to occur in the Analysis Area, in close proximity to the Project Area (refer to **Map 2**). Considering that suitable habitat for western pond turtle overlaps area proposed for treatment, there is potential for individuals from known populations to be present in uplands within proposed treatment areas. Breeding is most likely to occur within approximately 5 to 150 meters (approximately 16 to 492 feet) of aquatic habitats, where the large majority of western pond turtles nest (Rathbun et al. 1992, Reese and Welsh 1997, Lucas 2007, Pilliod et al. 2013).). Therefore, the potential for impacts would be greatest within approximately 500 feet of aquatic habitats supporting these known populations. Potential direct impacts to western pond turtle include a) contact with ground-based equipment, as well as impacts from felled trees, b) burning, desiccation, or other injury from prescribed fire, c) entrapment in plastic monofilament or other tightly woven netting if used for erosion control purposes, and d) juvenile turtles coming into contact with water drafting equipment. Each of these potential effects is discussed below.

Ground-Based Equipment and Tree Felling: Use of ground-based mastication equipment could directly affect western pond turtles by burying or crushing individuals using upland habitats during breeding (March to August) or overwintering (late fall to early spring). The level of risk varies with proximity of activities to suitable aquatic habitats (risk decreases as activities move away from aquatic habitat). Mechanical fuels reduction and hand-thinning would take place within approximately 1,885 acres of suitable upland habitat for western pond turtle, or approximately 45 percent of the total suitable upland habitat in the Analysis Area. Therefore, there is some risk for crushing or burying of individuals during use of ground-based mechanical equipment or tree felling in upland areas.

Risk of direct impacts to western pond turtle from implementation of mechanical fuels reduction and hand thinning would be minimized through implementation of Design Criteria. **DC 7** would minimize impacts to western pond turtle in the FPP treatment areas by excluding mechanical fuels treatments within 50 feet on either side of perennial and intermittent streams and Special Aquatic Features. This measure would reduce the potential for effects to western pond turtle nests and individuals overwintering relatively close to water; the risk to individuals outside this buffer and up to approximately 500 feet would remain. Hand thinning would be implemented within the mechanical exclusion zones, as well as along steep slopes where mechanical treatments are not practicable. While hand thinning is considered a relatively low-impact activity, western pond turtle, if basking along the banks of the streams within treatment areas, could potentially be crushed by hand-felling of small trees. **DC 8** would reduce the possibility of this effect by requiring that trees be felled away from streams, avoiding direct impacts within the stream or adjacent banks. **DC 9** would further protect turtles in the uplands by requiring that no new landings would be created in RCAs if mechanical falling/skidding equipment is used. Reuse of existing landings in RCAs may be allowed where creation of a new landing would result in more resource damage.

Lastly, if western pond turtle are observed in uplands where fuel reduction treatments are being implemented, **DC 3** and **DC 41** states that operations would cease in that area and the appropriate ENF biologist would be informed immediately to determine appropriate actions to take.

Considering that western pond turtle is more likely to use upland areas immediately adjacent to stream corridors (and within mechanical equipment exclusion zones), and with implementation of **DC 3, 7, 8, 9** and **41**, the risk of direct impacts to western pond turtle individuals from these activities would be minimized within equipment exclusion zones. Outside of the exclusion zones, and up to approximately 500 meters from aquatic features, there would remain some potential for direct impacts to individuals. However, these effects are expected to be minimal considering that western pond turtles have only been observed in the Mokelumne River canyon and its tributaries, which are very steep and heavily vegetated. The physical features of the canyon in these locations (steepness of the slopes, steepness of tributaries, and heavy vegetation) make it less likely that turtles would travel larger distances overland to nest and overwinter and encounter heavy equipment outside of the mechanical equipment exclusion zones. Therefore, any such effects are unlikely.

Prescribed Burning: The Project includes the use of prescribed burns to reduce forest fuels and to prepare the landscape for wildfire. Prescribed fire treatments would be implemented in approximately 321 acres, or approximately 7 percent of suitable habitat in the Analysis Area. There are few studies on the effects of fire on western pond turtles. It is generally assumed that reptiles living in aquatic or moist environments are unlikely to be directly affected by low-intensity fire (e.g., prescribed fire). Lovich et al. (2017) report negative impacts to Southwestern pond turtles from wildfire in conjunction with protracted drought. At high enough intensities, fire can kill turtles over-wintering on land and hatchlings still in the nest (Ashton et al. 1997). High-intensity wildfire caused a reduction in European pond turtle (*Actinemys orbicularis*) populations in southeastern France by 60 to 70 percent, with heavy mortality of very young turtles as a result of the destruction of riparian vegetation, the rapid filling of watercourse as a result of erosion, and accentuation of torrential flow and shortened run-off times (Cheylan and Poitevin 1998). Greenberg and Waldrop (2008) studied the short-term response of reptiles and amphibians to prescribed fire and mechanical fuel reduction in a southern Appalachian upland hardwood forest. They found that the relative abundance of reptiles was not changed by the fuel reduction treatments. However, no turtles were included in this study.

Prescribed fire could potentially affect turtles using upland habitats during nesting (if fires are ignited in the spring) or overwintering (if fires are ignited in the fall or winter). Implementation of Design Criteria would minimize the potential for direct effects from prescribed burns. **DC 12** requires that, at a minimum, an annual review of burning treatment plans will occur with a Forest Aquatic Biologist, Terrestrial Biologist, and Botanist to ensure conditions for TES species have not changed. **DC 13** states that ignition of prescribed fires would not occur within 50 feet of any perennial or intermittent stream of Special Aquatic Feature. The ignition exclusion zone would be measured from the edge of the channel or high-water mark of the Special Aquatic Feature or the adjacent riparian vegetation if present. However, fire would be allowed to back into the exclusion zone; and ignition may occur within the exclusion zones if it is deemed necessary to maintain control of a prescribed burn or to control burn severity.

While **DC 12** and **13** would minimize the risk to western pond turtle from prescribed burning, outside of the exclusion zones, and up to approximately 500 meters from aquatic features, there would remain some potential for direct impacts to individuals. Therefore, even with implementation of Design Criteria, there remains some risk or harm or loss of western pond turtle individuals from implementation of prescribed burns. However, the purpose of the Project is to reduce the risk of high severity wildfire, which could potentially result in greater impacts to western pond turtle than low-intensity prescribed burns.

Erosion Control Materials: Small turtles, particularly nestlings that have just left the nest, may potentially become entangled or entrapped in plastic or synthetic mesh erosion control or animal exclusion materials used for construction and forestry projects. In order to avoid mortalities resulting from entrapment or entanglement, **DC 4** requires that temporary erosion control products (blankets, mats, rolls, etc.) that contain exposed netting would

use wildlife friendly loose weave netting or similar materials when netting is left exposed. Implementation of **DC 4** would minimize the potential for direct impacts to western pond turtle from erosion control materials.

Water Drafting: Water drafting could potentially affect juvenile western pond turtle, if implemented within occupies streams in the treatment areas. There is minimal risk to adult western pond turtle from contact with water drafting equipment. **DC 16** limits water drafting, to the extent possible, to large reservoirs. For the purposes of the FPP, water drafting would likely occur only at Bear Reservoir, which is above the elevation range of and does not provide suitable habitat for western pond turtle. Use of non-reservoir locations would require consultation with Forest Service biologists to determine whether the location represents suitable habitat for sensitive aquatic species such as western pond turtle. If required, surveys would be conducted prior to use and, if western pond turtle (or any other sensitive species) were observed, an alternate site would be selected. With implementation of **DC 16**, water drafting will have a negligible effect on western pond turtle.

Effects to Habitat

Potential indirect effects (i.e., effects to western pond turtle habitat) include a) effects to water quality within aquatic habitats resulting from increased sedimentation or leakage of toxic substances, and b) reduction in habitat structures used by turtles for basking, nesting, dispersal or overwintering. Each of these effects is discussed briefly below.

Water Quality: The proposed treatments (i.e., mechanical treatments, hand thinning, and prescribed burns) could potentially expose bare soil and destabilize hill slopes along approximately 2,090 acres of suitable habitat for western pond turtle, including 1,718 acres in the Tiger Creek-North Fork Mokelumne River watershed where occurrences have been reported. Exposed, unprotected soil has the potential to move into aquatic systems, particularly with the season's first significant rain or during overland flows during snowmelt. Increased sedimentation within aquatic habitats could, in turn, affect western pond turtles. An increase in sediment loads within perennial streams could reduce deeper water habitat for western pond turtles and could negatively affect macroinvertebrate populations that form a portion of the prey base for western pond turtles.

Sediment-related effects are expected to be minimal for several reasons. The FPP, as designed, would generally result in the removal of brush and live trees up to 10 inches dbh and snags up to 16 inches dbh. With the potential exception of hazard trees that pose a safety risk during implementation of the treatments, larger trees would remain in place, and roost systems would remain largely intact and would continue to stabilize soils. While use of ground-based mastication equipment may disturb soils, such disturbance would be outside of mechanical equipment exclusion zones and would not generally occur on slopes of 40 percent or greater. On some slopes greater than 40 precent, a tethered mastication system may potentially be utilized, where feasible and in accordance with soils standards following site specific review and recommendation by a Forest Service soil specialist. The effects of tethered mastication are not well documented, but are considered similar to typical mastication. One study on mechanized mastication efforts in the western Lake Tahoe Basin found "relatively low or non-existent environmental impacts" related to both compaction and erosion) with increased erosion occurring only in areas where bare ground was present), at least in the short term (Hatchett et al., 2006).

The potential for sediment-related water quality effects would be minimized through implementation of Design Criteria. All proposed treatment activities would be implemented consistent with BMPs for erosion control and prevention of sediment transport in accordance with the National Best Management Practices for Water Quality Management on National Forest System Lands (USFS 2012) (**DC 1**) and consistent with RCOs described in the SNFPA (UDSA, Forest Service 2004) (**DC 2**).

DC 7 defines exclusion zones where mechanical operations are prohibited for the protection of aquatic resources. Specifically, ground-based mechanical treatments would be excluded within 50 feet from the edge of a perennial or intermittent stream channels and special aquatic features, including those that represent suitable habitat for western pond turtle (although equipment may "reach in" to masticate). In addition, ground cover will be maintained at least at 70 percent in the zone of 50 to 100 feet from the edge of the stream channel (**DC 11**). If the existing ground cover is less than 70 percent, then the existing ground cover will be maintained. Tops, limbs, and small trees within the mechanical exclusion zone can be lopped and scattered to meet ground cover criteria. **DC 9** states that no new landings would be created in the RCA. Reuse of existing landings within the RCA would be allowed where creation of a new landing is likely to result in more resource damage than use of the existing landing within the RCA. Any skid trails or landings within RCAs would be repaired to restore soil infiltration capacity and soil cover to reduce erosion and may include practices such as, reshaping to restore natural surface flow patterns, installation of drainage control features, decompaction, placement of organic material, and seeding on disturbed soil surfaces. Slash would be added to any skid trails while operations are occurring to facilitate incorporation into the substrate and help stabilize soil (**DC 10**).

Several Design Criteria would minimize the potential for soil destabilization resulting from prescribed burns and/or from construction of fire containment lines. As described in **DC 12**, Forest Service will conduct an annual review of burning treatment plans to assess whether conditions related to sensitive species (including western pond turtle) have changed. Ignition of prescribed fires would not occur within 50 feet of any perennial or intermittent streams that represent suitable habitat for western pond turtle (however, fire would be allowed to back into the exclusion zone) (**DC 13**). Prescribed fire containment lines would be rehabilitated to prevent transport of water and sediment to nearby aquatic systems prior to the onset of winter weather or large summer storm (**DC 14**).

Finally, in order to avoid contamination and resultant degradation of water quality, **DC 6** prohibits the storage of fuel or other toxic materials and maintenance of equipment within RCAs.

Considering that the proposed treatments, as designed, would retain mature trees; and with implementation of water quality BMPs and Design Criteria including DC 1, 2, 6, 7, 9, 10, 11, 12, 13, and 14, indirect effects to aquatic habitat as a result of sedimentation are expected to be minimal.

Soils and Habitat Structures: Use of ground-disturbing equipment could result in soil disturbance which could reduce the quality of nesting, estivating, and overwintering habitat. Western pond turtles typically nest in areas with compact, well-drained soils (Davidson and Alvarez 2020, Western Pond Turtle Range-Wide Conservation Coalition 2020). Use of heavy equipment and prescribed fire could potentially loosen soils in upland habitats. Treatments may also result in a reduction in availability of duff and woody debris that provides nesting, estivating, and overwintering cover for turtles. Soil integrity and ground cover would be protected, particularly within RCAs, through implementation of Design Criteria. These include, but are not limited to, designating equipment and prescribed burning exclusion zones around aquatic habitats (DC 7 and 13); avoiding creation of new landings in RCAs (and rehabilitating skid trails and landings in RCAs following implementation of the Project) (DC 9 and 10); and retaining ground cover of at least 70 percent within the zone of 50 to 100 feet from a stream channel (DC 11). In areas that would be treated but are outside of this 50- to 100-foot zone, masticated vegetative debris (with pieces typically less than 18 inches long) left on the forest floor.

Even considering implementation of Design Criteria, the Project would result in short-term effects to soils and reduce ground cover within approximately 2,090 acres of upland habitat for western pond turtle.

Effects Summary

There are 2,090 acres of suitable habitat for western pond turtle in the Project Area, and there are several records for pond turtles along the North Fork Mokelumne River, in close proximity to the Project Area.

Use of ground-based mastication equipment could directly affect western pond turtles by burying or crushing individuals using upland habitats during breeding (March to August) or overwintering (late fall to early spring). The level of risk varies with proximity of activities to suitable aquatic habitats (risk decreases as activities move away from aquatic habitat). Prescribed fire could also potentially affect turtles using upland habitats during nesting (if fires are ignited in the spring) or overwintering (if fires are ignited in the fall or winter).

The proposed treatments (i.e., mechanical treatments, hand thinning, and prescribed burns) could potentially expose bare soil and destabilize hill slopes along approximately 2,090 acres of suitable habitat for western pond turtle, potentially degrading water quality within aquatic habitats. Use of ground-disturbing equipment could result in soil disturbance which could reduce the quality of upland nesting, estivating, and overwintering habitat. Treatments may result in a reduction in availability of duff and woody debris that provides cover for turtles.

Effects Determination

It is our determination that the Proposed Project may affect, but is not likely to result in a trend toward federal listing, or loss of species viability of western pond turtle.

WESTERN BUMBLE BEE

SPECIES AND HABITAT ACCOUNT

A species and habitat account for western bumble bee is available from the Xerces Society publication Status Review of Three Formerly Common Species of Bumble Bee in the Subgenus Bombus (Evans et al. 2008), which can be obtained from the World Wide Web at: https://xerces.org/wp-content/uploads/2009/03/xerces_2008_bombus_status_review.pdf. A brief summary of biological and habitat characteristics relevant to this analysis are provided below.

Western bumble bees were historically distributed across much of western North America (Thorp and Shepard 2005, Koch et al. 2012). Populations west of the Cascade and Sierra Nevada mountains are experiencing declining numbers, while those to the east of the dividing line are more stable. The reasons for these differences are not known, but may be attributed to introduced parasites (Cameron et al. 2011), pesticides (Henry et al. 2012, Hopwood et al. 2012), agricultural and urban development, and heavy livestock grazing and conifer encroachment into mountain meadows.

Western bumble bee queens overwinter in abandoned rodent burrows at depths from 6 to 18 inches underground and typically emerge about mid-March. The queen then lays eggs and creates a new generation of workers, which reach peak abundance in July and August. Western bumble bee distribution is dependent on access to flowering plant resources, which are most abundant in grassland, meadows, and shrublands (Evans et al. 2008). Recent research suggests that herbaceous flowering plant resources within wet meadow and montane riparian communities are particularly important for bumble bee foraging (Cole et al. 2020). Within upland communities, recent research on bumble bee foraging in chaparral habitats in the Central Sierra Nevada indicates that herbaceous species are preferred forage for most bumble bee species (Loffland et al. 2017), with the potential exception of mountain misery shrubs (*Chamaebatia foliolosa*).

CURRENT CONDITION

Suitable Habitat

The spatial extent of the Analysis Area for western bumble bee is approximately 63,680 acres, extending 0.5 mile beyond the Project Area to encompass habitat that western bumble bee might use, but not so large as to potentially mask Project effects on western bumble bee habitat.

For the purposes of this analysis, suitable habitat for western bumble bee consists of areas that support flowering plants, as well as rodent burrows for nesting and overwintering.

Surveys and Known Occurrences

The distribution of the western bumble bee on ENF lands is unknown. Within the Analysis Area, surveys targeting western bumble bee were conducted in the Power Fire footprint from 2015 to 2019; as well as surveys conducted in support of meadow restoration projects at Upper Onion Valley Meadow from 2018, 2019, 2020 and 2022 (Loffland, C., pers. comm. 2022). Western bumble bees were not detected during these surveys (Loffland, C., pers. comm. 2022). However, it is assumed that western bumble bee could be present within suitable habitat. Given the known state of the species, and results of recent surveys in the Project vicinity, if the species is present, it is likely present in low numbers.

EFFECTS ANALYSIS

Effects to Individuals

Western bumble bees have not been detected in portions of the Analysis Area that have been recently surveyed (Loffland, C., pers. comm. 2022). In general, the forest stands that are proposed for treatment provide very little quality foraging habitat for western bumble bees, as they are conifer dominated stands, with relatively high canopy closures, and a correlated low amount of flowering herbaceous understory. However, areas within these stands that support friable soils and rodent burrows may potentially provide nesting and wintering habitat for western bumble bees.

Potential direct effects to western bumble bees include disturbance of foraging bees (i.e., flushing or displacement of foraging or nesting bees during mechanical fuels reduction, hand thinning, prescribed fire, and aspen restoration). As stated above, foraging habitat in densely forested stands is minimal, and therefore the number of individuals that would be likely to experience disturbance is also low. Disturbance effects would be short-term, and would cease upon completion of activity.

Use of ground-based mastication equipment or tree felling during hand-thinning treatments could directly impact nesting or wintering bees through the collapse or burial of burrows. These impacts would be short-lived, and would primarily affect individuals or nest groups of individuals during the spring through summer of the treatment. In subsequent years renewed rodent activity would be expected to replace the habitat (i.e., via the creation of new burrows). Little information is available on the direct effects of prescribed fire on western bumble bee nesting; however, a recent study in the midwestern United States found no difference in the total number of bumble bee nests between areas burned by prescribed fire and unburned areas immediately post-fire, though the effect varied by species (Tai et al. 2022). Low-intensity prescribed fire may affect the amount of leaf litter and soil cover available on the surface, but may not affect conditions within deeper burrows.

Given that recent survey efforts in the Power Fire and elsewhere in the Analysis Area did not detect the species and that forested habitats represent marginal foraging and nesting habitat and with implementation of Design Criteria, few western bumble bees would likely be directly affected by the proposed forest treatment.

Effects to Habitat

Potential indirect effects to western bumble bees include alteration of nesting and foraging habitat quality from the proposed treatments (i.e., mastication, thinning, prescribed fire, and aspen restoration). Each potential effect is described further below.

Nesting Habitat: Bumble bees typically select nesting habitat that features loose soils with abundant rodent burrows. Nesting habitat quality could be affected by the use of mechanized equipment and prescribed fire, which could compact soils or disturb existing burrow networks. While use of ground-based mastication equipment may disturb soils, such disturbance would be limited to uplands would not generally occur slopes of 40 percent or greater. On some slopes greater than 40 percent, a tethered mastication system may potentially be utilized, where feasible and in accordance with soils standards following site specific review and recommendation by a Forest Service soil specialist. The effects of tethered mastication are not well documented, but are considered similar to typical mastication. One study on mechanized mastication efforts in the western Lake Tahoe Basin found "relatively low or non-existent environmental impacts" related to both compaction and erosion (with increased erosion occurring only in areas where bare ground was present), at least in the short term (Hatchett et al., 2006).

The FPP includes several Design Criteria that would protect soils and reduce the potential for effects to western bumble bee nesting habitat. **DC 7** defines mechanical equipment exclusion zones within 50 feet of SAFs, including wet meadows and the edge of riparian vegetation. In addition, ground cover will be maintained at least at 70 percent in the zone of 50 to 100 feet from the edge of the stream channel (**DC 11**). If the existing ground cover is less than 70 percent, then the existing ground cover will be maintained. Tops, limbs, and small trees within the mechanical exclusion zone can be lopped and scattered to meet ground cover criteria. **DC 9** states that no new landings would be created in the RCA. Reuse of existing landings within the RCA would be allowed where creation of a new landing is likely to result in more resource damage than use of the existing landing within the RCA. Any skid trails or landings within RCAs would be repaired to restore soil infiltration capacity and soil cover to reduce erosion and may include practices such as, reshaping to restore natural surface flow patterns, installation of drainage control features, decompaction, placement of organic material, and seeding on disturbed soil surfaces. Slash would be added to any skid trails while operations are occurring to facilitate incorporation into the substrate and help stabilize soil (**DC 10**).

As described above impacts within nesting habitat would be short-term, and would primarily affect individuals or nest groups of individuals during the spring through summer of the treatment. In subsequent years renewed rodent activity would be expected to replace the habitat (i.e., via the creation of new burrows). Considering the temporary nature of impacts, and with implementation of Design Criteria including DC 7, 9, 10, and 11, indirect effects to nesting habitat are expected to be minimal.

Foraging Habitat: As described previously, under existing conditions, the forest stands proposed for treatment are dense with small trees and do not support extensive floral resources that represent foraging habitat for western bumble bees. Overall, foraging habitat quality would likely be improved following treatments. Shrub cover would be retained in canopy openings to the extent that there is minimal connectivity to overstory trees. In the years following implementation of the Project, forest openings created as a result of the FPP could potentially result in an increase in the density and diversity of shrubs and herbaceous annuals and perennials (Brennan and Keeley 2017), which would benefit western bumble bees through an increase in the abundance and diversity of

flowers. Most flowering herbs and shrubs utilized by western bumble bees are found in open, rather than forested, habitats that would be minimally affected or avoided entirely during implementation of the Project. Implementation of the Project would result in a more open habitat structure, which may potentially result in an increase in the density and diversity of both annual and perennial herbaceous species (Brennan and Keeley 2017), which may benefit western bumble bees through an increase in the abundance and diversity of flowers. Furthermore, prescribed fire, may remove encroaching conifers and improve habitat conditions for western bumble bee within wet meadows (Evans et al. 2008), and result in increased growth and diversity of herbaceous species in shrub-dominated habitats (Loffland et al. 2017). Bumble bees are more abundant in areas with higher diversity of herbaceous plants (Cole et al. 2020); therefore, foraging habitat quality would likely be improved under the Project.

Effects to foraging habitat from prescribed burning are expected to vary based on the timing of the prescribed burn. Spring burning may temporarily reduce existing foraging resources for western bumble bee immediately post-burn, though floral resources would likely recover later in the year and would be expected to increase in the years after burning (Breenan and Keeley 2017). Fall burning would take place during a time period when most floral foraging resources are senescent, and would be less likely to affect western bumble bee foraging habitat.

Foraging habitat quality both in forest habitats and in grassland and shrubland habitats adjacent forest habitats (or in openings in) could be affected by the introduction of non-native invasive plants which could outcompete native plants and homogenize the floral resources available for western bumble bee foraging habitat. The Project includes several Design Criteria to prevent the introduction and spread of non-native plants. **DC 29** requires that invasive plant surveys be conducted prior to implementation, and known invasive plant sites would be flagged and avoided as much as possible during Project implementation. If FPP activities could not be avoided within infestations, risk minimization strategies would be employed, such as working in the infested area last, working in infested areas when propagules are not viable, limiting the number of people or equipment within the infestation, and cleaning equipment and clothing, boots, before moving to un-infested ENF lands. **DC 30** requires post-implementation invasive plant surveys to be conducted in areas of ground disturbance. If a new ENF Priority 1 or Priority 2 invasive plant is detected, it will be treated in accordance with the Forest-Wide Treatment of Invasive Plants Project (ENF 2013). **DC 31** requires that all off-road equipment be cleaned to ensure it is free of all soil, seeds, vegetative matter, or debris before entering ENF lands, and equipment would be inspected before entry and re-entry to the Project site. If deemed necessary, cleaning would occur at a vehicle washing station. **DC 32** requires that previously known invasive plant sites be avoided as described under DC 29, above. With implementation of these Design Criteria, negative effects to western bumble bee habitat from the introduction or spread of invasive plants would be minimized.

Effects Summary

Western bumblebees are assumed to be present in low numbers within suitable habitat in the Project Area.In general, the forest stands that are proposed for treatment provide very little quality foraging habitat for western bumble bees, as they are conifer dominated stands, with relatively high canopy closures, and a correlated low amount of flowering herbaceous understory. However, areas within these stands that support friable soils and rodent burrows may potentially provide nesting and wintering habitat for western bumble bees.

Potential direct effects to western bumble bees include short-term disturbance of foraging bees and collapse or burial of burrows during use of ground-based mastication equipment or tree feeling. Low-intensity prescribed fire may affect the amount of leaf litter and soil cover available on the surface, but may not affect conditions within deeper burrows.

Nesting habitat quality could be affected by the use of mechanized equipment, which could compact soils, or disturb existing burrow networks. Foraging habitat quality would likely be improved in the years following implementation of the Project because forest openings could potentially result in an increase in the density and diversity of flowering shrubs and herbs. Foraging habitat quality both in forest habitats and in grassland and shrubland habitats adjacent forest habitats (or in openings in) could be affected by the introduction of non-native invasive plants which could outcompete native plants and homogenize the floral resources available for western bumble bee foraging habitat.

Effects Determination

It is our determination that the Proposed Project may affect, but is not likely to result in a trend toward federal listing, or loss of species viability of western bumble bee.

BALD EAGLE

SPECIES AND HABITAT ACCOUNT

Detailed species and habitat accounts for the bald eagle are available in the *Pacific Bald Eagle Recovery Plan* (USFWS 1986), which can be obtained from the World Wide Web at: https://www.fws.gov/arcata/es/birds/baldEagle/documents/baldeagle_recoveryPlan.pdf and the *National Bald Eagle Management Guidelines* (USFWS 2007), which can be obtained from the World Wide Web at: https://www.fws.gov/arcata/es/birds/baldEagle/documents/NationalBaldEagleManagementGuidelines.pdf. A brief summary of biological and habitat characteristics relevant to this analysis is provided below.

Bald eagle populations have recovered sufficiently to be removed from listing under the Endangered Species Act, but they continue to be monitored, are a Region 5 Sensitive Species, and continue to be protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act (Eagle Act).

Bald eagle nesting and wintering habitat occurs throughout the Pacific Southwest Region, which includes both the Sierra Nevada and Klamath Provinces. Breeding bald eagles occupy "territories," areas they will typically defend against intrusion by other eagles (USFWS 2007). In the Sierra Nevada, bald eagle nesting territories are normally associated with lakes, reservoirs, rivers, or large streams that provide habitat for prey species (e.g., fish or waterfowl) (Lehman 1979). Bald eagle nests are typically located in uneven-aged (multi-storied) coniferous stands with old growth components (Anthony and Isaacs 1989). Bald eagles typically select large conifers 41 to 46 inches dbh and greater than 100 feet tall for nest trees (Lehman 1980). In California, 73 percent of nest sites were within 0.5 mile of a body of water, and 89 percent were within 1 mile.

The most common food sources for bald eagle in the Pacific region are fish, waterfowl, jackrabbits, and various types of carrion (USFWS 1986). In the winter, major prey may include waterfowl, ungulate carrion, and small mammalian prey (Grubb and Kennedy 1982, Grubb 1995). The kinds of prey selected changes depending on its availability.

CURRENT CONDITION

Suitable Habitat

The spatial extent of the Analysis Area for bald eagles is approximately 63,680 acres, extending 0.5 mile beyond the Project Area to encompass habitat that bald eagles might use, but not so large as to potentially mask Project effects on bald eagle habitat.

For the purposes of this analysis, suitable nesting and roosting habitat is defined as large trees (California Wildlife Habitat Relationship [CWHR] size classes 5 and 6) within 1 mile of large reservoirs and rivers that support fish (e.g., Upper and Lower Bear Reservoir, Salt Springs Reservoir, the Bear River, and the North Fork Mokelumne River). Reservoirs within the Project Area hold ice well into the spring reproductive period, and therefore for bald eagles are not known to nest in the Analysis Area. Roosting sites are typically in mature trees where eagles are somewhat sheltered from wind and weather and are in proximity to aquatic foraging habitat (USFWS 2007).

Surveys and Known Occurrences

Bald eagles are known to occur on the ENF. Nesting has never been recorded in the Analysis Area, but bald eagles have been observed roosting and foraging along the Bear River in 1980 and along Mill Creek- North Fork Mokelumne River in 1989. Non-breeding bald eagles are also regularly seen at Salt Springs Reservoir and Bear Reservoir (Loffland, pers. comm. 2022). Therefore, bald eagle are likely to roost and forage in the Analysis Area.

EFFECTS ANALYSIS

Effects to Individuals

Bald eagles may potentially be present in the Analysis Area; however, they are not likely to breed in the Project Area. Individual bald eagles roosting or foraging in the Project Area may be flushed by heavy equipment, presence of hand-thinning crews, or by prescribed fire. Disturbance-type effects, if they occur, are expected to be brief (e.g., causing an individual to fly out of the immediate vicinity of the disturbance) and slightly negative (e.g., causing a temporary change in habitat use). In the unlikely case that new nests are established over the Project term, **DC 3** and **DC 41** require that if FSS species, including bald eagle, are detected during any phase of the FPP, Project activities in the area would cease, and Forest Service district wildlife staff would be notified, and adjustments to the Project would be evaluated. Adjustments may include the addition of a standard 660-foot LOP around the nest site as recommended by the *National Bald Eagle Management Guidelines* (USFWS 2007). Considering that there are no known nests; that disturbance effects to bald eagle, if present, would be slight and short-term; and with implementation of **DC 3/DC 41**, effects to bald eagle individuals would be minimal.

Effects to Habitat

Indirect effects to bald eagle include alteration of roosting or aquatic foraging habitat. Each effect is described further below.

Roosting Habitat: Bald eagles typically select the largest trees for perching, with an unobstructed view of waterbodies for foraging. Night roosts are typically in the top or mid-section of large live trees with heavy cover of branches. Trees in CWHR size class 5 are typically selected. Mastication, hand thinning, prescribed fire, and aspen restoration treatments are not expected to result in a reduction in foraging and roosting habitat within the Project Area. Larger trees (greater than 12 inches dbh) and snags (greater than 16 inches dbh) would generally be retained, except where they pose a safety risk. Limbs of large trees would be pruned to a height of 10 to 12 feet to prevent ground fires from leaping into the canopy; however, pruning would not affect roosting habitat for bald eagle because roost locations are typically above this height.

Over the long term, vegetation treatments are expected to increase resources available to, and likelihood for growth and survival of tall trees, by reducing inter-tree competition and reducing the potential for adverse effects from insects, disease, and high-severity wildfire. Therefore, the FPP is expected to increase the number and health of large trees over time. Therefore, in the long-term, the Project would result in improved roosting habitat conditions for bald eagle.

Aquatic Foraging Habitat: The FPP could affect aquatic foraging habitat through increased erosion and sedimentation. Ground-disturbing activities during implementation of vegetation treatments could affect soil stability, erosion, and sediment-loading to aquatic habitats. Vegetation removal could potentially expose bare soil and destabilize hill slopes. Exposed, unprotected soil has the potential to move into aquatic systems, particularly with the season's first significant rain or during overland flows following snowmelt. Depending on the fish species and site-specific conditions, effects of increased suspended sediments could include changes in fish behavior (feeding, predator avoidance, migration or movement); reduce food availability (e.g., a decrease in macroinvertebrate populations); result in gill trauma; and increase metabolic costs or energy expenditures (Kjelland et al. 2015). An increase in suspended sediments could in turn affect fish populations that represent prey for bald eagles.

Sediment-related effects are expected to be minimal for several reasons. The Proposed Action, as designed, would generally result in the removal of brush and live trees up 10 inches dbh and snags up to 16 inches dbh. With the potential exception of hazard trees that pose a safety risk during implementation of the treatments, larger trees would remain in place, and root systems would remain largely intact and would continue to stabilize soils. While use of ground-based mastication equipment may disturb soils, such disturbance would be limited to uplands within approximately 179 acres of suitable habitat and would not generally occur slopes of 40 percent or greater. On some slopes greater than 40 percent, a tethered mastication system may potentially be utilized, where feasible and in accordance with soils standards following site specific review and recommendation by a Forest Service soil specialist. The effects of tethered mastication are not well documented, but are considered similar to typical mastication. One study on mechanized mastication efforts in the western Lake Tahoe Basin found "relatively low or non-existent environmental impacts" related to both compaction and erosion (with increased erosion occurring only in area where bare ground was present), at least in the short term (Hatchett et al., 2006). Prescribed fires are expected to be short lived and fire intensity should be low enough to allow some retention of duff layers and vegetation that would prevent soil erosion and expedite recovery.

The potential for sediment-related water quality effects would be minimized through implementation of the following Design Criteria.

- All proposed treatment activities would be implemented consistent with BMPs for erosion control and prevention of sediment transport in accordance with the National Best Management Practices for Water Quality Management on National Forest System Lands (USDA, Forest Service 2012) (**DC 1**) and consistent with RCOs described in the SNFPA (USDA, Forest Service 2004a) (**DC 2**).

- To avoid contamination and resultant degradation of water quality, **DC 6** prohibits the storage of fuel or other toxic materials and maintenance of equipment within RCAs.

- **DC 7** defines exclusion zones where mechanical operations are prohibited for the protection of aquatic resources. Specifically, ground-based mechanical treatments would be excluded within 50 feet from the edge of a perennial or intermittent stream channels and special aquatic features (although equipment may "reach in" to masticate.

- ***G***round cover will be maintained at least at 70 percent in the zone of 50 to 100 feet from the edge of the stream channel (**DC 11**). If the existing ground cover is less than 70 percent, then the existing ground cover will be maintained. Tops, limbs, and small trees within the mechanical exclusion zone can be lopped and scattered to meet ground cover criteria.

- **DC 9** states that no new landings would be created in the RCA. Reuse of existing landings within the RCA would be allowed where creation of a new landing is likely to result in more resource damage than use of

the existing landing within the RCA. Any skid trails or landings within RCAs would be repaired to restore soil infiltration capacity and soil cover to reduce erosion and may include practices such as, reshaping to restore natural surface flow patterns, installation of drainage control features, decompaction, placement of organic material, and seeding on disturbed soil surfaces. Slash would be added to any skid trails while operations are occurring to facilitate incorporation into the substrate and help stabilize soil (DC 10).

- As described in **DC 12**, Forest Service will conduct an annual review of burning treatment plans to assess whether conditions related to sensitive species have changed.

- Ignition of prescribed fires would not occur within 50 feet of any perennial aquatic habitat (however, fire would be allowed to back into the exclusion zone) (**DC 13**).

- Prescribed fire containment lines would be rehabilitated to prevent transport of water and sediment to nearby aquatic systems prior to the onset of winter weather or large summer storm (**DC 14**).

Because the project is designed to retain vegetation consistent with project objectives and the Forest Plan; and with inclusion of Design Criteria for retention of vegetation and soil stabilization throughout the project area and within RCAs, the risk of indirect effects to fish populations from increased sedimentation within aquatic foraging habitats for bald eagle would be low.

Effects Summary

Bald eagles are known to occur on the ENF. Nesting has never been recorded in the Analysis Area, but bald eagles have been observed roosting and foraging along the Bear Reservoir, Bear River, North Fork Mokelumne River, and Salt Springs Reservoir. Reservoirs within the Project Area hold ice well into the spring reproductive period, and therefore for bald eagles are not known to nest in the Analysis Area.

Individual bald eagles roosting or foraging in the Project Area may be flushed by heavy equipment, presence of hand-thinning crews, or by prescribed fire. Disturbance-type effects, if they occur, are expected to be short-term (e.g., causing an individual to fly out of the immediate vicinity of the disturbance) and slightly negative (e.g., causing a temporary change in habitat use).

The FPP could affect aquatic foraging habitat by affecting water quality. These effects would be short-term and temporary, and minimized through implementation of Design Criteria such as implementation of riparian exclusion zones for mechanical equipment and prescribed fire and prohibiting storage of fuel or other toxic materials and maintenance equipment within RCAs.Over the long term, vegetation treatments are expected to improve habitat for roosting eagles by increasing resources available to, and likelihood for growth and survival of tall trees.

Effects Determination

It is our determination that the Proposed Project may affect, but is not likely to result in a trend toward federal listing, or loss of species viability of bald eagle.

GREAT GRAY OWL

SPECIES AND HABITAT ACCOUNT

A species and habitat account for great gray owl is available in the Institute for Bird Populations publication *A Conservation Strategy for Great Gray Owls* (*Strix nebulosa*) *in California* (Wu et al. 2016) which can be obtained

from the World Wide Web at: https://www.birdpop.org/docs/pubs/IBPConservationStrategyVersion1.0.pdf. A brief summary of biological and habitat characteristics relevant to this analysis is provided below.

The core range of the great gray owl in California is centered on the greater Yosemite National Park area with an estimated population in California totaling fewer than 300 individuals (Winter 1986, Greene 1995, Beck and Winter 2000, Sears 2006, Wu et al. 2015). There are records of great gray owls as far south as Tulare County, and to the north from the Modoc, Lassen, Plumas, Tahoe, and Eldorado National Forests, and from Del Norte, Humboldt, Shasta, and Siskiyou counties (Beck and Winter 2000).

In the Sierra Nevada, great gray owls are most commonly found in mixed coniferous forest from 2,300 to 8,000 feet in elevation where such forests occur in combination with meadows or other vegetated openings (Wu et al. 2016). Great gray owls typically nest in large conifer trees or snags, or trees with broken tops. Recently compiled data indicate that great gray owls will nest in oaks at lower elevations, particularly black oaks (*Quercus kelloggii*) or valley oaks (*Quercus lobata*) (Wu et al. 2015). They may also use vacated nests of other large birds.

Great gray owls generally breed in close proximity to large meadow systems; however, recent research indicates 21 percent of nests were almost a 0.5 mile from meadow systems (Wu et al. 2015). At lower elevation, great gray owls are found in more annual and perennial grassland habitat types. At least 12 known reproductive territories lie between 2,000 and 3,500 feet in El Dorado, Amador, and Calaveras counties (Polasik et al. 2016). Great gray owls prefer to nest in stands with dense canopy cover.

In the Yosemite area, males begin establishing nesting territories in March to early April (Beck 1985). After 30 to 36 days of incubation, eggs hatch from mid-May to mid-June. Young begin to fledge in early June to early July but will remain around the nest through August. However, great gray owls will breed earlier at higher elevations (approximately 2 weeks earlier for every 1,000-foot increase in elevation). Prey of great gray owls is primarily pocket gophers and voles (Winter 1986, Reid 1989, Bull et al. 1989).

As described in the ROD for the SNFA Supplementation FEIS (USFS 2004), great gray owl PACs are established and maintained around known great gray owl nest stands. PACs encompass at least 50 acres of the highest quality nesting habitat (CWHR types 6, 5D, and 5M) available in the forested area surrounding the nest, as well as the meadow or meadow complex that supports the prey base.

CURRENT CONDITION

Suitable Habitat

The spatial extent of the Analysis Area for great gray owls is approximately 63,679 acres, extending 0.5 mile beyond the Treatment Areas to encompass habitat that great gray owls might use, but not so large as to potentially mask Project effects on great gray owl habitat. Nesting habitat includes large snags and live conifer or hardwood trees within forest habitats with dense canopy and within close proximity (generally approximately 850 feet) of foraging habitats. Foraging habitat includes meadows, grasslands, and other vegetated openings.

There are approximately 4,980 acres of grassland foraging habitats in the Analysis Area; the Project Area contains approximately 1,112 acres of grasslands (approximately 22 percent of total acreage in the Analysis Area). Grassland habitats in the Analysis Area are typically small and patchily distributed. There are approximately 261 acres of wet meadow foraging habitat in the Analysis Area; the Project Area contains approximately 127 acres of wet meadows (approximately 49 percent of total acreage in the Analysis Area).

Great gray owls typically nest in the vicinity of large meadows (approximately 10 acres or larger (Beck and Winter 2000). While there are several large meadows in the Analysis Area, there are no large meadows in the Project Area. Recent research suggests that nesting may not be as closely tied to meadows as previously thought, and great gray owls may nest as far as 0.5 mile from foraging habitat (Wu et al. 2016).

Surveys and Known Occurrences

Great gray owls are known to occur on the ENF. A review of ENF survey data yielded no information on surveys for great gray owl in the Analysis Area. However, extensive surveys for California spotted owl have been conducted, and no great gray owl nests have been detected during these surveys. There are two incidental records of great gray owl within the Analysis Area. A single individual was observed in July and August of 2012 within the Foster Firs Project Area north of Highway 88 near the North Fork Consumnes River, detected during California spotted owl surveys, but follow up surveys were unable to detect nesting/reproduction of this species at this location. No PAC was established as nesting was not detected. A query of CNDDB (2022) yielded one known record, from 2008, of great gray owl nesting in private forest lands on the Omo Ranch USGS 7.5" quadrangle. However, the specific location information has been suppressed for this record.

EFFECTS ANALYSIS

Effects to Individuals

Great gray owls may potentially be present in the Analysis Area; however, their populations are likely limited by the availability of suitable foraging habitat. There are no known great gray owl nests in the Analysis Area; therefore, the FPP will not directly affect any known nests. In the case that new nests are established over the Project term, **DC 3** and **DC 41** require that if FSS species, including great gray owls, are detected during any phase of the FPP, Project activities in the area would cease, and Forest Service district wildlife staff would be notified, and adjustments to the Project would be evaluated. Adjustments may include the addition of a standard 0.25 mile LOP around the nest site as required by the SNFPA (USFS 2004).

Implementation of fuels reduction activities could result in the disturbance of foraging or roosting owls, if present. Disturbance-type effects, if they occur, are expected to be brief (e.g., causing an individual to fly out of the immediate vicinity of the disturbance) and slightly negative (e.g., causing a temporary change in habitat use). Considering that there are no known nests; that disturbance effects to great gray owls, if present, would be slight and short-term; and with implementation of **DC 3/DC 41**, effects to great gray owl individuals would be minimal.

Effects to Habitat

Indirect effects to great gray owl include alteration of nesting or foraging habitat. Each effect is described further below.

Nesting Habitat: Great gray owls require nesting stands with high canopy cover (typically greater than 80 percent) and prefer to nest in large conifer trees or snags, or in large oak trees. Research on great gray owls nesting on lands managed for private timber production indicates that selective tree harvest is compatible with great gray owl nesting (Wu et al. 2015). Mastication, hand thinning, prescribed fire, and aspen restoration treatments are not expected to result in a reduction in nesting habitat within the Project Area. Larger trees (greater than 12 inches dbh) and snags (greater than 15 inches dbh) would generally be retained, except where they pose a safety risk. Limbs of large trees would be pruned to a height of 10 to 12 feet to prevent ground fires from leaping into the canopy; however, pruning would not affect nesting habitat for great gray owl because nest locations are typically at a height of 30 feet or greater from the ground (Wu et al. 2016). Hardwood trees, including black oaks, would be retained and managed consistent with SNFPA guidelines and direction (USFS 2004).

To further protect nesting habitat for great gray owl, **DC 40** requires that snags greater than 15 dbh would be retained, except where they pose a threat to human health or safety, and would not be actively lit during burning operations. Implementation of **DC 42**, which requires mechanical and hand fuel reduction treatments to be designed to ensure protection and retention of highly suitable habitat for California spotted owl and northern goshawk (which require similar high canopy closure forests for nesting) may also benefit great gray owl.

Low-intensity fire associated with prescribed fire would consume primarily surface fuels (e.g., litter, downed wood, and low-growing vegetation), and typically results in minimal mortality to canopy trees or changes to overstory structure (Kaufmann et al. 2007). In hardwood forests, prescribed fire may also create nesting habitat by injuring trees and creating avenues for pathogens which may form hollows in otherwise healthy trees (Smith and Sutherland 2006). Scarring at the base of a tree may also promote growth of basal and bole cavities (Smith and Sutherland 2006). Snags may be removed as a result of prescribed fire, as dead wood is more susceptible to burning than live trees. The number of snags that would be removed is difficult to determine, in part because the effects of prescribed burning are variable and may create or consume snags dependent on tree species composition, fire intensity and frequency, and other site-specific conditions (Block et al. 2016). Prescribed burning may also generate new snags, but the average diameter of snags post-fire may be lower as any trees killed in prescribed burning tend to be smaller diameter trees. Implementation **DC 40** would prevent the active ignition of snags during prescribed burning operations, reducing the risk that large snags would be consumed.

Over the long term, vegetation treatments are expected to increase resources available to, and likelihood for growth and survival of tall trees, by reducing inter-tree competition and reducing the potential for adverse effects from insects, disease, and high-severity wildfire. Therefore, the FPP is expected to increase the number and health of large trees over time and provide a source from which large snags may be recruited in the future. Therefore, in the long-term, the Project would result in improved nesting habitat conditions for great gray owl.

Foraging Habitat: Great gray owls forage in open grasslands and wet meadow habitats. These habitats, which are present in small, scattered patches within the Project Area, are only incidentally included within the Project boundaries, and are not proposed for treatment. Therefore, the Project will not result in significant effects to grasslands representing potential foraging habitat for great gray owl. Wet meadows would be additionally protected through implementation of **DC 7** and **DC 13**, which require mechanical equipment exclusion zones and prescribed fire lighting buffers within 50 feet of Special Aquatic Features (i.e., wet meadows). Prescribed fire may back into wet meadows, but low-intensity fire may help maintain grassing hunting patches by clearing out the understory and encroaching small conifers. In the years following implementation of the Project, fuel treatments are expected to result in an increase in the density and diversity of annuals and herbaceous perennials (Brennan and Keeley 2017), which may provide enhanced food resources for great gray owl prey (i.e., voles). Therefore, in the long-term, the FPP would result in improved foraging habitat conditions for great gray owl.

Effects Summary

Great gray owls may potentially be present in the Analysis Area; however, their populations are likely limited by the availability of suitable foraging habitat (large meadows).

There are no known great gray owl nests in the Analysis Area; therefore, the FPP will not directly affect any known nests. If great gray owls are detected during any phase of the FPP, Project activities in the area would cease, and Forest Service district wildlife staff would be notified, and adjustments to the Project would be evaluated.

Great gray owls require nesting stands with high canopy cover (typically greater than 80 percent) and prefer to nest in large conifer trees or snags, or in large oak trees. Treatments under the FPP are focused on removal of small trees and understory fuels; large trees and snags would be retained except where they pose a hazard. Over

the long term, vegetation treatments are expected to increase resources available to, and likelihood for growth and survival of tall trees, by reducing inter-tree competition and reducing the potential for adverse effects from insects, disease, and high-severity wildfire.

Great gray owls forage in open grasslands and wet meadow habitats. These habitats, which are present in small, scattered patches within the Project Area, are only incidentally included within the Project boundaries, and are not proposed for treatment.

Effects Determination

It is our determination that the Proposed Project may affect, but is not likely to result in a trend toward federal listing, or loss of species viability of great gray owl.

CALIFORNIA SPOTTED OWL

SPECIES AND HABITAT ACCOUNT

A species and habitat account for California spotted owl is available in the *Conservation Strategy for the California Spotted Owl* (*Strix occidentalis occidentalis) in the Sierra Nevada* (USFS 2019) which can be obtained from the World Wide Web at: https://www.fs.usda.gov/detail/r5/plants-animals/wildlife/?cid=STELPRD3854419. A brief summary of biological and habitat characteristics relevant to this analysis is provided below.

There are three subspecies of spotted owls: the California spotted owl, the northern spotted owl, and the Mexican spotted owl. Both the northern and Mexican subspecies are listed as Threatened by the USFWS. The three subspecies occupy fairly geographically distinct areas, with the California spotted owl in the southern Cascades south throughout the Sierra Nevada mountains, the mountainous regions of southern California, and the central coast ranges at least as far north as Monterey County (Gutiérrez and Barrowclough 2005). The elevation of known nest sites ranges from about 1,000 feet to 7,700 feet.

California spotted owls require both high-quality nesting and roosting habitat and sufficient habitat diversity and heterogeneity to provide for foraging (USFS 2019). California spotted owls use a variety of forest types with high structural diversity; dominated by medium (12 to 24 inches) and large (greater than 24 inches) trees; and that contain a moderate to high level of canopy cover (Blakesley 2003, Blakesley et al. 2005, Chatfield 2005, Seamans 2005). An important predictor of occupancy appears to be large/tall tree-dominated habitat with dense canopy cover, although presence of trees may be more important than canopy cover (Jones et al. 2016 and North et al. 2017 in USFS 2018). Owls select for tall tree cover (more than 160 feet) and against short tree cover (less than 53 feet) (North et al. 2017). Nests can be found inside cavities of live and dead firs and pines, in the top of broken-topped trees and snags, in platform nests which naturally exist in branching structures or which were built by another species, or in mistletoe brooms (Gutiérrez et al. 1992, Blakesley et al. 2005). Breeding season varies by latitude and elevation, but generally begins mid-February and lasts as late as mid-September.

Although they choose more mature conifer forest for nesting sites, foraging habitat can include areas with lower canopy cover (40 percent or less) edge habitat, or areas with a diversity of vegetation types and seral stages that support a variety of prey (USFS 2019). The northern flying squirrel (*Glaucomys sabrinus*) and dusky-footed woodrat (*Neotoma fuscipes*) comprise the two primary prey species of the California spotted owl, with the flying squirrel the predominate prey in the higher elevation conifer forest and the woodrat the predominate prey in the lower elevation forests and woodlands (Williams et al. 1992, Munton et al. 2002, USFS 2009). Additional prey items are other small mammals (especially *Peromyscus* spp.), birds, lizards, and insects (Munton et al. 2002, USFS 2009).

CURRENT CONDITION

Suitable Habitat

The spatial extent of the Analysis Area for California spotted owls is approximately 63,680 acres, extending 0.5 mile beyond the Project Area to encompass habitat that California spotted owls might use, but not so large as to potentially mask Project effects on California spotted owl habitat.

Suitable habitat has been mapped for California spotted owl on the ENF consistent with the definition of suitable habitat as described in the SNFPA (USDA 2001). Suitable habitat in the Analysis Area is defined to includes areas classified in CWHR as Jeffrey Pine (JPN), Lodgepole Pine (LPS), Montane Hardwood-Conifer (MHC), Montane Hardwood Woodland (MHW), Ponderosa Pine (PPN), Red Fir (RFR), Sierran Mixed Conifer (SMC), and White Fir (WFR) with the following size and density classes:

- Size classes 4 (11 to 23.9 inches dbh), 5 (greater or equal to 24 inches dbh), and 6 (multi-layered forest with a distinct layer of size class 5 trees over a distinct layer of size class 4 and/or 3 trees, with a total tree canopy of greater than or equal to 60 percent); and

- Density classes M (moderate canopy cover between 40 and 59.9 percent) and D (dense canopy cover of 60 percent or greater).

As shown in **Table 5** there are approximately 37,531 acres of suitable habitat within the Analysis Area; of this, approximately 16,272 acres lie within the Project Area. Suitable habitat in the Analysis Area is comprised of 31,759 acres of CWHR 4M, 4D, and 5M habitat and 5,772 acres of CWHR 5D habitat. Suitable habitat in the Project Area is comprised of includes 13,403 acres of CWHR 4M, 4D, and 5M habitat and 2,869 acres of CWHR 5D habitat.

Table 5. Suitable Habitat for California Spotted Owl in the Analysis Area and the Project Area.

	Total Size of Analysis Area/Project Area (Acres)	Total Suitable Habitat (Acres)	Acres of CWHR 4M, 4D, and 5M	Acres of CWHR 5D
Analysis Area	63,680	37,531	31,759	5,772
Project Area	25,670	16,272	13,403	2,869

Surveys and Known Occurrences

The ENF conducts periodic surveys for California spotted owl consistent with the Region 5 survey protocol. FPP-specific surveys have not been conducted. Refer to **Table 6** for a list of PACs that have been delineated around known nests in the Analysis Area. Surveys were conducted to update roost and nest information for known PACs (established in 1990s), and survey habitat of unknown occupancy outside of the PACs. Most recent surveys were completed in 2022, one new territory and pair was located. HRCAs and PACs within the Project Area may be adjusted based on this survey information.

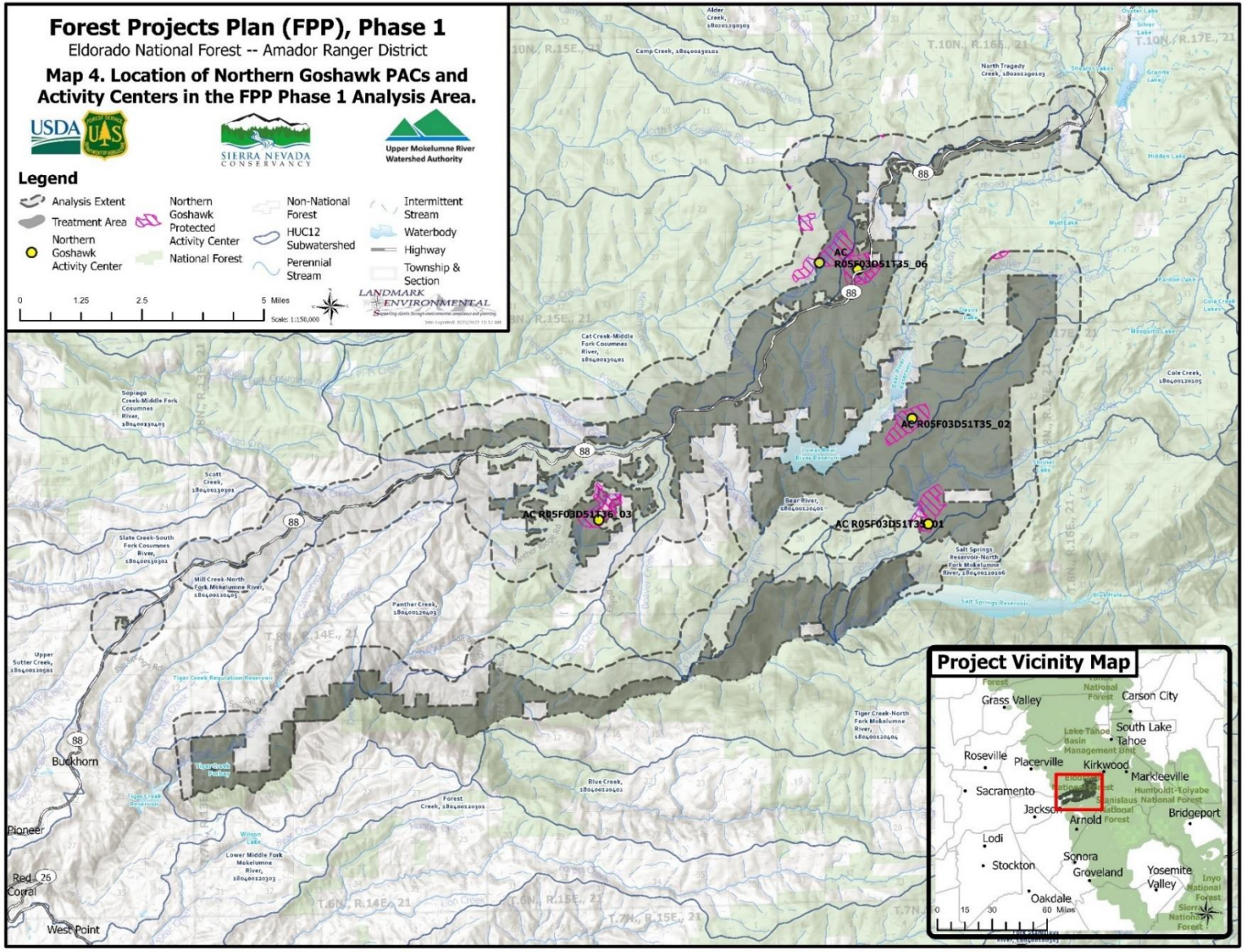
Protected Activity Centers

There are 18 California spotted owl PACS in or intersecting the Analysis Area (refer to **Table 6** and **Map 3**). Fourteen of these PACs (bolded in Table 8) are within the Project Area and would be affected by proposed activities.

Table 6. California Spotted Owl Protected Activity Centers in, or Intersecting the Analysis Area and the Project Area.

PAC Identification Code[1]	Year of Last Survey	PAC Acres within Analysis Area	Project Area		
			Total PAC Acres within Project Area	Acres of CWHR 4M, 4D, and 5M	Acres of CWHR 5D
PAC AMA0001	2015	354	337	224	32
PAC AMA0005	2001	293	126	48	74
PAC AMA0007	2022	303	41	23	0
PAC AMA0009	2022	337	336	230	69
PAC AMA0010	2016	395	277	134	127
PAC AMA0013	2022	317	235	129	76
PAC AMA0015	2022	286	50	46	0
PAC AMA0016	2022	396	396	141	215
PAC AMA0017	2007	304	9	4	2
PAC AMA0021	2015	315	223	64	159
PAC AMA0022	2016	82	0	0	0
PAC AMA0300	2011	337	325	125	127
PAC ELD0039	2004	81	25	20	5
PAC ELD0132	2013	87	0	0	0
PAC ELD0133	2006	87	0	0	0
PAC ELD0138	1992	13	0	0	0
PAC ELD0149	2007	332	256	175	21
PAC ELD0321	2013	352	179	84	78
Total		**4,672**	**2,816**	**1,448**	**987**

[1] A new pair was discovered during surveys required for the Upper Cole Project (Loffland, C., pers. comm 2022), a new PAC is in the process of being delineated but will overlap the Project Area. The exact extent of the PAC within the Project Area is currently unknown.


Forest Projects Plan (FPP), Phase 1
Eldorado National Forest -- Amador Ranger District
Map 4. Location of Northern Goshawk PACs and Activity Centers in the FPP Phase 1 Analysis Area.
USDA
SIERRA NEVADA CONSERVANCY
Upper Mokelumne River Watershed Authority
Legend
Analysis Extent
Treatment Area
Northern Goshawk Activity Center
Northern Goshawk Protected Activity Center
National Forest
Non-National Forest
HUC12 Subwatershed
Perennial Stream
Intermittent Stream
Waterbody
Highway
Township & Section
0 1.25 2.5 5 Miles
Scale: 1:150,000
LANDMARK ENVIRONMENTAL
AC R05F03D51T35_06
AC R05F03D51T35_02
AC R05F03D51T35_03
AC R05F03D51T35_01
Project Vicinity Map
Grass Valley
Carson City
South Lake Tahoe
Roseville
Placerville
Kirkwood
Markleeville
Sacramento
Jackson
Arnold
Bridgeport
Lodi
Stockton
Sonora
Groveland
Yosemite Valley
Oakdale
0 15 30 60 Miles
Buckhorn
Pioneer
Red Corral
West Point

Home Range Core Areas

There are 25 HRCAS in or intersecting the Analysis Area (refer to **Table 7** and to **Map 3**). This includes both the HRCAs associated with the PACS listed in Table 6, as well as HRCAs associated with other PACs that are adjacent to, but outside the Analysis Area. The SNFPA ROD directs that HRCAs be delineated surrounding and including all PACs. HRCAs are delineated by selecting the best 1,000 acres within a 1.5-mile radius of the activity center, including the PAC. The HRCAs were drawn to provide at least of 1,000-acres of suitable habitat within each of the HRCAs. Sixteen HRCAs (bolded in Table 7 below) fall within the Project Area and may be affected by the FPP.

Table 7. California Spotted Owl Home Range Core Areas in, or Intersecting the Analysis Area and the Project Area.

HRCA Identification Code	HRCA Acres within Analysis Area	Project Area		
		HRCA Acres within Project Area	Acres of CWHR 4M, 4D, and 5M	Acres of CWHR 5D
HRCA AMA0001	709	384	33	246
HRCA AMA0004	12	0	0	0
HRCA AMA0005	639	276	132	140
HRCA AMA0007	1196	705	52	360
HRCA AMA0009	1648	1550	118	1041
HRCA AMA0010	639	276	132	140
HRCA AMA0011	1411	1264	126	883
HRCA AMA0013	990	407	141	224
HRCA AMA0015	990	392	149	216
HRCA AMA0016	1111	1092	442	533
HRCA AMA0017	291	0	0	0
HRCA AMA0018	344	5	2	2
HRCA AMA0021	1089	351	206	136
HRCA AMA0022	305	3	1	1
HRCA ELD0039	493	93	21	55
HRCA ELD0093	56	0	0	0
HRCA ELD0131	78	0	0	0
HRCA ELD0132	531	176	73	65
HRCA ELD0133	371	0	0	0
HRCA ELD0138	74	0	0	0
HRCA ELD0148	61	0	0	0
HRCA ELD0149	1044	403	55	278
HRCA ELD0187	3	0	0	0
HRCA ELD0188	224	0	0	0
HRCA ELD0321	1344	791	231	352
Grand Total	**15,655**	**8,169**	**1,915**	**4,673**

Note that there is substantial overlap in acreage between HRCAs, due to the close configuration of PACs within the Project Area.

Effects to Individuals

As shown in **Table 5**, the FPP includes implementation of mechanical fuels reduction, hand thinning, prescribed burns, and aspen restoration within approximately 16,272 acres of suitable habitat, which is approximately 43 percent of all suitable habitat in the Analysis Area. This includes work within 14 PACs and 16 HRCAs. Noise from falling trees, operating chainsaws, and running heavy equipment, could directly affect owls. Activities within 0.25 mile of nests or roosts during the breeding season (March 1 through August 15) are generally considered to be the most impacting, because they can cause reproductive failure or increase mortality in young. The potential for disturbance to individuals or nesting pairs within PACs would be minimized through implementation of **DC 39**, which requires adherence to standard LOPs for all activities within California spotted owl PAC (or activity centers within the PACs) unless surveys conclusively ascertain that nesting/reproduction will not be affected in that particular breeding season by the treatments. The LOP period is March 1 through August 15th for the California spotted owl. Where surveys and biological assessment determine that impacts will not affect reproduction for these species, the LOP may be lifted, or the area affected by the LOP reduced. Based on nesting status, additional mitigation measures, such as (but not limited to): exclusion of portions of the treatment areas until after the breeding season, additional fire lines, and different treatment techniques (lighting techniques, postponing slash work), may be implemented to reduce potential effects to nesting spotted owls. **DC 3** and **DC 41** further require any that incidental detections of California spotted owls (including detection of active California spotted owl nests that were not previously identified during protocol-level surveys), be reported to District wildlife staff. Project activities in the area must cease, and adjustments to the Project evaluated and implemented, if necessary. With implementation of these design criteria, potential disturbance to breeding pairs and active nests and the potential for decreased reproductive success from noise disturbance is minimized.

Outside of the breeding season, Project activities may result in short-term, temporary disturbance and displacement of individuals foraging outside of PACs (e.g., causing an individual to fly out of the immediate vicinity of the disturbance). There are few studies on the direct effects of prescribed fire on California spotted owls, however, the effects of prescribed fire outside of the breeding season are expected to be minimal for several reasons. In general, researchers conclude that low-intensity fire has minimal short-term effects to California spotted owls, considering that they have evolved in a landscape with periodic low- to moderate-intensity fire (Bond et al. 2002, Eyes 2014).

With implementation of Design Criteria to avoid effects to breeding California spotted owls, and considering that effects outside of the breeding season are limited primarily to short-term and temporary disturbance, direct effects to California spotted owls are expected to be minimal.

Effects to Habitat

California spotted owls are old-growth forest specialists and, at the landscape scale, require heterogeneous forest stands that support large live trees and snags with moderate-to-dense canopy cover in the higher tree strata. Dense canopy cover (greater than 70 percent) is of particular importance for nesting sites. Presence of large downed woody debris and thick forest litter is also important as habitat for northern flying squirrel, a key prey species for California spotted owls. The 2019 Conservation Strategy promotes forest restoration toward its natural range of variation (NRV), a model which takes into account the dynamics of a forest ecosystem over time in response to disturbance and succession processes (USFS 2019). Landscape-scale conditions under NRV had a patchwork of relatively open canopy over the majority of the landscape, interspersed with early seral and closed canopy areas (Safford and Stevens 2017 in USFS 2019). Modern forest management practices have resulted in a divergence from NRV, resulting in high stand densities and altered species compositions, compared to historic

conditions (USFS 2019). Increased canopy cover that has developed as a result of fire suppression policies may have benefited California spotted owl by creating more nesting and roosting habitat, but has likely negatively impacted the species by increase the cover of small trees that they select against (North et al. 2017 in USFS 2019). The NRV model supports active management at a rapid pace and scale to promote resilient habitat at a landscape scale while prioritizing conservation of high-quality habitat, particularly around occupied nest sites.

As shown in **Table 8**, the Analysis Area contains approximately 37,531 acres of suitable habitat for California spotted owl.

Table 8. Proposed Treatments within California Spotted Owl Suitable Habitat, by Treatment Type.

Total Acres of Suitable Habitat within Analysis Area	Proposed Activities within Suitable Habitat				Total Acres of Suitable Habitat within Project Area
	Mechanical Fuels Reduction	Hand Thinning	Prescribed Burn	Aspen Restoration	
37,531	13,762[a]	2,124	3,280[a]	136	**16,272**

[a]Includes 3,030 acres where mechanical fuels reduction will be followed by prescribed burns.

There are approximately 16,272 acres of suitable habitat in the Project Area (43 percent of suitable habitat in the Analysis Area). Mechanical fuels reduction will be implemented within 13,762 acres of this habitat. In addition, there will be 2,124 acres of hand thinning, 3,280 acres of prescribed burns (including 3,030 acres that also be mechanically treated), and 136 acres of aspen restoration.

The proposed treatments are intended to improve wildlife habitat by reducing understory ladder and surface fuels to ameliorate wildfire behavior and facilitate the application of prescribed fire through mastication and hand-thinning of shrubs and small trees (up to 12 inches dbh, but generally 10 inches dbh or less). Branches of remaining trees may be pruned up to a height of 8 to 12 feet above the ground (not to exceed 50 percent of total tree height). Hazard trees of all sizes would be removed, as necessary.

In general, mechanical fuels reduction and hand thinning will not result in changes in the acreage of suitable habitat for California spotted owl. While there may be selective removal of trees at the smaller end of size class 4 (which includes trees 11 to 23.9 inches dbh), the majority of trees in size class 4 would be retained, and all trees in size class 5 would generally be retained. Hardwoods would be retained and managed consistent with SNFPA guidelines and directions. Aspen restoration, which would affect a very small area (136 acres), would utilize mechanical or hand thinning to remove encroaching conifers generally less than 12 inches dbh, as well as shrubs, to re-establish the historic aspen stand edge. The effects of aspen restoration are similar to those described for mechanical fuels reduction and hand thinning, and the same design criteria would generally apply. **DC 42** requires that mechanical and hand fuel reduction treatments be designed to ensure protection and retention of highly suitable habitat for California spotted owl. Within existing suitable habitat, maintain canopy closure would be retained at 90 percent of starting canopy closure following mechanical and hand treatments. Implementation of this measure would ensure that reductions in canopy cover would not result in a shift of acreage out of the D and M density. A key finding of a study by North et al. (2017) is that high canopy (provided by cover of tall trees) may be a more important predictor of owl habitat than total canopy cover because the latter can include cover in the lower tree strata (6 to 57 feet), which owls avoid. Therefore, while some reduction in canopy cover as modeled in CWHR may occur, removal of small trees and lower-strata canopy cover, which is the focus of the FPP, would represent an improvement in habitat for California spotted owl.

Low-intensity fire produced by prescribed burns would consume primarily surface fuels (e.g., litter, downed wood, and low-growing vegetation), and typically results in minimal mortality to canopy trees or changes to overstory structure (Kaufmann et al. 2007, cited in Eyes 2017). As reported by Kobzar et al. (2016), prescribed fire is

expected to affect less than 5 percent of trees greater than 10 inches dbh. Therefore, prescribed fire is not expected to reduce suitability of habitat by removing large trees or significantly reducing canopy cover. The potential for effects to large trees (and particularly nest trees) from prescribed fire would be further minimized through implementation of **DC 44**, which requires that prescribed burns be designed to ensure retention of highly suitable habitat for California spotted owl, where it currently exists. Within suitable habitat planned for burning, canopy closure would be maintained at or above 85 percent to 90 percent of starting canopy closure. Prescribed burning may result in small openings (generally less than 0.25 to 0.5 acre in size) provided that the total area of openings created is less than 5 percent of treated area.

An important function of habitat at the landscape scale is to provide foraging habitat beyond that contained in the home ranges and activity centers. Although California spotted owls choose more mature conifer forest for nesting sites, within the larger landscape of their territory they can use a range of habitat types for foraging (Bond et al. 2009, Williams et al. 2011, Eyes et al. 2017). Foraging habitat typically includes mid- to late-seral forest with at least 40 to 50 percent canopy closure (Verner et al. 1992b). Northern flying squirrels are the most important prey species for California spotted owl, and their habitat includes large trees or snags for nesting, thick soil cover, and sparsely distributed large downed woody debris (which is critical, but does not need to be overly dense [Knapp et al. 2014 cited in USFWS 2017]). As described previously, the FPP would not result in removal of large trees; and snags 16 inches or greater would generally be retained (**DC 40**). Furthermore, snags greater than 15 inches dbh will not be actively lit during prescribed burning. Considering implementation of Design Criteria, while the Project would result in removal of some snags, such removals are not likely to result in reductions of overall snag density at the landscape scale.

Soil cover (i.e., litter or duff) and large downed woody debris are important habitat components for small mammals (e.g., flying squirrels), which are an important food source for California spotted owls. Soil cover and density of large downed woody debris may be affected by the proposed fuels reduction treatments. In general, shrubs and ground cover would be retained in canopy openings to the extent that there is minimal connectivity to overstory trees. Several design criteria would be implemented to ensure retention of soil cover and downed wood. **DC 10** and **11** address retention of cover within RCAs. **DC 50** states that downed logs greater than 16 inches in diameter (small end diameter) will be retained during mechanical fuels treatments (i.e., mastication), to the extent practicable; and **DC 47** requires that downed logs greater than 30 inches diameter (large end) will not be lighted during implementation of prescribed burning.

The FPP requires removal of vegetation to achieve desired conditions, including reduction of understory ladder and surface fuels, reduced crowing in stands, fewer small trees, and a higher canopy base height. In general, the Project will not result in changes in the acreage of suitable habitat or in the size of density of trees within suitable habitat for California spotted owl. Treatments may require removal of select large trees (hazard trees), and may potentially result in a localized reduction snags and downed woody debris that are important components of foraging habitat. Implementation of Design Criteria, including DC 10, 11, 40, 42, 44, 47, and 50 would be implemented to retain highly suitable habitat for California spotted owl consistent with SNFPA requirements. Overall, the Project is expected improve habitat for California spotted owls by reducing the cover of small trees while increasing resources available to and likelihood for growth and survival of tall trees with high canopy cover.

A more specific analysis of effects within PACs and HRCAs is provided below.

Effects to PACs

At the activity center scale, habitat structure (particularly near the nest site) is important to occupancy, fecundity, and survival (USFWS 2017) and includes a complex vertical structure with high canopy cover provided by tall trees. The Proposed Project will affect 2,815 acres within 14 PACs, which is 60 percent of the total of 4,672 acres

of PACs in the Analysis Area. **Table 9** provides a summary of treatment types and acreages to be implemented within PACs.

Table 9. Proposed Treatments within California Spotted Owl Protected Activity Centers, by Treatment Type.

PAC Identification Code	Treatments to be Implemented within PACs				Total Acres of PAC to be Treated
	Mechanical Fuels Reduction	Hand Thinning	Prescribed Burn	Aspen Restoration	
PAC AMA0001	234	103	0	0	**337**
PAC AMA0005	65	61	0	0	**126**
PAC AMA0007	41	0	0	0	**41**
PAC AMA0009	336[a]	0	336[a]	0	**336**
PAC AMA0010	272	5	0	0	**277**
PAC AMA0013	235[b]	0	137[b]	0	**235**
PAC AMA0015	50	0	0	0	**50**
PAC AMA0016	396	0	0	0	**396**
PAC AMA0017	0	0	9	0	**9**
PAC AMA0021	223	0	0	0	**223**
PAC AMA0022	0	0	0	0	0
PAC AMA0300	155	170	0	0	**325**
PAC ELD0039	25	0	0	0	**25**
PAC ELD0132	0	0	0	0	0
PAC ELD0133	0	0	0	0	0
PAC ELD0138	0	0	0	0	0
PAC ELD0145	0	0	0	0	0
PAC ELD0149	145[c]	111	31[c]	0	**256**
PAC ELD0321	179	0	0	0	**179**
Project Area Totals	**2,357[d]**	**450**	**513[d]**	**0**	**2,815**
				Total Acres of PACs in the Analysis Area	**4,672**

[a]Includes 336 acres where prescribed burning will be implemented following mechanical fuels reduction.
[b]Includes 137 acres where prescribed burning will be implemented following mechanical fuels reduction.
[c]Includes 31 acres where prescribed burning will be implemented following mechanical fuels reduction.
[d]Includes a total of 504 acres where prescribed burning will be implemented following mechanical fuels reduction.

Mechanical fuels reduction will be implemented in approximately 2,357 acres (84 percent of the PAC acres in the Project Area); hand thinning will be implemented within approximately 450 acres (16 percent of the Project PAC acres); and prescribed burns will be implemented within approximately 513 acres (18 percent of the Project PAC acres). The totals for mechanical fuels reduction and prescribed fire include 504 acres both activities would be implemented (i.e., mechanical fuels reduction followed by prescribed burning).

PACs AMA001, AMA009, AMA0016 and AMA0300 would be the most affected, with treatments being implemented within 95 to 100 percent of the total acreage of the PAC. Treatments would be implemented within between 70 and 77 percent of the area within PACs AMA0010, AMA0013, AMA0021 and ELD0149.

The FPP has been developed consistent with SNFPA 2004 and Eldorado National Forest Plan standards related to California spotted owl goshawk PACs (**DC 38**). The Project, as designed, would generally retain large trees and canopy cover, including areas within PACs. As described previously, while there would be selective removal of

trees at the smaller end of size class 4 (which includes trees 11 to 23.9 inches dbh), the majority of trees in size class 4 would be retained, and all trees (with the potential exception of large hazard trees) in size class 5 would be retained. Some reduction in canopy cover may occur; however, this reduction would be limited primarily to removal in the lower tree strata. Overall, the Project would result in retention of high canopy cover provided by large trees, determined to be a key factor in owl occupancy (North et al. 2017) and a critical component of nesting habitat.

Prescribed burning would be implemented following mechanical treatments within three PACs (AMA0009, AMA0013, and ELD0149). As described previously, prescribed fire would consume primarily surface fuels (e.g., litter, downed wood, and low-growing vegetation) (Kaufmann et al. 2007, cited in Eyes 2017, Kobzar et al., 2016) and is not expected to result in reductions in large trees within PACs. The potential for effects to large trees (and particularly nest trees) from prescribed fire would be further minimized through implementation of Design Criteria, including:

- The District wildlife biologist shall be involved in prescribed burn planning and notified prior to implementation of prescribed burning in California spotted owl PACs. When possible, the biologist and/or staff shall be onsite to take part in, and/or monitor burning and associated effects (**DC 43**).

- To reduce impacts to local populations, no more than four PACs within the FPP shall be burned in a 12-month period (note that only three California spotted owl PACs would be treated with prescribed burns during Phase 1). Burning shall avoid direct impacts to known nest/roost stands by either not burning through them, or clearing material from around known nest and roost trees and other trees/snags greater than 30 inches dbh in the nest stands (**DC 46**).

- Additional hand treatments, including handline construction, tree pruning, and cutting of small trees (less than 6 inches dbh), may be conducted within a 1- to 2-acre area surrounding known nest trees, to the extent necessary, to protect nest trees and trees in their immediate vicinity during prescribed burning (**DC 45**).

- Where the design criteria standards applicable to prescribed burning are not expected to be met, no prescribed burning shall occur within California spotted owl PACs, or applicable portions of PACs, without further survey and analysis (**DC 48**).

Considering that the Project is designed to retain large trees and associated canopy cover and would not result in reductions in acreage of California spotted owl habitat; and with implementation of Design Criteria intended to further protect nest trees and habitat within PACs, the FPP would have minimal effects to the quality of habitat within California spotted owl PACs.

Effects to HRCAs

The Project includes treatment of approximately 8, 169 acres within HRCAs, or 52 percent of the total of 15,655 acres of HRCAs in the Project Area. **Table 10** provides a summary of the acreage of treatments within each HRCA, by treatment type. Overall, the Project would require 7,663 acres of mechanical fuels reduction, 446 acres of hand thinning, and 1,932 acres of prescribed burns within HRCAs. Aspen restoration will be implemented within 41 acres within one HRCA (ELD0321). HRCAs AMA0009, AMA0011, and AMA0016 would see the greatest modification of the HRCA at with 90 percent or more of the HRCA affected.

Table 10. Proposed Treatments within California Spotted Owl Home Range Core Areas, by Treatment Type.

PAC Identification Code	Treatments to be Implemented within PACs				Total Acres to be Treated
	Mechanical Fuels Reduction	Hand Thinning	Prescribed Burn	Aspen Restoration	
HRCAs					
HRCA AMA0001	248	136	0	0	384
HRCA AMA0004	0	0	0	0	0
HRCA AMA0005	216	61	0	0	276
HRCA AMA0007	635	70	0	0	705
HRCA AMA0009	1,550[a]	0	1,509[a]	0	1,550
HRCA AMA0010	216	61	0	0	276
HRCA AMA0011	1,247[b]	1	163[b]	0	1,264
HRCA AMA0013	406[c]	0	184[c]	0	407
HRCA AMA0015	392[d]	0	31[d]	0	392
HRCA AMA0016	1,092	0	0	0	1,092
HRCA AMA0017	0	0	0	0	0
HRCA AMA0018	0	5	0	0	5
HRCA AMA0021	351	0	0	0	351
HRCA AMA0022	2	1	0	0	3
HRCA ELD0020	0	0	0	0	0
HRCA ELD0039	93	0	0	0	93
HRCA ELD0093	0	0	0	0	0
HRCA ELD0131	0	0	0	0	0
HRCA ELD0132	176	0	0	0	176
HRCA ELD0133	0	0	0	0	0
HRCA ELD0138	0	0	0	0	0
HRCA ELD0145	0	0	0	0	0
HRCA ELD0148	0	0	0	0	0
HRCA ELD0149	290[e]	113	29[e]	0	403
HRCA ELD0187	0	0	0	0	0
HRCA ELD0188	1	0	0	0	1
HRCA ELD0321	747[f]	0	16[f]	41	791
Project Area Totals[g]	**7,663[h]**	**446**	**1932[h]**	**41**	**8,168**
				Total Acres of HRCAs in the Analysis Area	**15,655**

[a]Includes 1,509 acres where prescribed burning will be implemented following mechanical fuels reduction.
[b]Includes 147 acres where prescribed burning will be implemented following mechanical fuels reduction.
[c]Includes 184 acres where prescribed burning will be implemented following mechanical fuels reduction.
[d]Includes 31 acres where prescribed burning will be implemented following mechanical fuels reduction.
[e]Includes 29 acres where prescribed burning will be implemented following mechanical fuels reduction.
[f]Includes 13 acres where prescribed burning will be implemented following mechanical fuels reduction.
[g]The total acreages provided in this table are inflated because of overlap between HRCAs.
[h]Overall, both mechanical fuels reduction and prescribed burning will be implemented within 1,913.

Effects within HRCAs would be similar to those described above under landscape-scale effects. Effects to foraging habitat (including presence of large trees and snags, soil cover, and large downed woody debris), which is important at the home range scale, and are also fully described above. In general, the Project will not result in

changes in the acreage of suitable habitat or in the size of density of trees within suitable habitat for California spotted owl. Treatments may require removal of select large trees (hazard trees), and may potentially result in a localized reduction snags and downed woody debris that are important components of foraging habitat. Implementation of Design Criteria, including DC 10, 11, 40, 42, 44, 47, and 50 would be implemented to retain highly suitable habitat for California spotted owl consistent with SNFPA requirements. Overall, the Project is expected improve habitat for California spotted owls by reducing the cover of small trees while increasing resources available to and likelihood for growth and survival of tall trees with high canopy cover.

Effects Summary

There are approximately 37,531 acres of suitable habitat within the Analysis Area; of this, approximately 16,272 acres lie within the Project Area. California spotted owl are known to occur and at least 14 PACs (2,816 acres) and 16 HRCAs (8,169 acres) have been delineated in the Project Area.

Noise from falling trees, operating chainsaws, and running heavy equipment could directly affect owls. Activities within 0.25 mile of nests or roosts during the breeding season (March 1 through August 15) are generally considered to be the most impacting, because they can cause reproductive failure or increase mortality in young. Implementation of Design Criteria, including, but not limited to, LOPs for all activities within PACs during the breeding period would minimize the potential for direct impacts to breeding owls.

Outside of the breeding season, Project activities may result in short-term, temporary disturbance and displacement of foraging owls. In general, researchers conclude that low-intensity fire has minimal short-term effects to California spotted owls, considering that they have evolved in a landscape with periodic low- to moderate-intensity fire (Bond et al. 2002, Eyes 2014).

Mechanical fuels reduction will be implemented within 13,762 acres of suitable habitat; 2,815 acres within PACS, and 7663 acres within HRCAs. In addition, hand thinning will be implemented within 2,124 acres of suitable habitat; and within 450 acres of PACs and 446 acres within HRCAs. In general, mechanical fuels reduction and hand thinning will not result in changes in the acreage of suitable habitat for California spotted owl. While there may be selective removal of trees at the smaller end of size class 4 (which includes trees 11 to 23.9 inches dbh), the majority of trees in size class 4 would be retained, and all trees in size class 5 would generally be retained. Hardwoods would be retained and managed consistent with SNFPA guidelines and directions. Canopy closure would be maintained at 90 percent of starting canopy closure.

Prescribed burns will be implemented within 3,280 acres of suitable habitat, 513 acres of PACs, and 1,932 acres of HRCAs. No more than four PACs would be burned in a year. Low-intensity fire produced by prescribed burns would consume primarily surface fuels (e.g., litter, downed wood, and low-growing vegetation), and typically results in minimal mortality to canopy trees or changes to overstory structure. Prescribed burning may result in small openings (generally less than 0.25 to 0.5 acre in size) provided that the total area of openings created is less than 5 percent of treated area.

Design criteria require retention of highly suitable habitat for California spotted owl, where it currently exists. Within suitable habitat planned for burning, canopy closure would be maintained at or above 85 percent to 90 percent of starting canopy closure. High canopy (provided by cover of tall trees) may be a more important predictor of owl habitat than total canopy cover because the latter can include cover in the lower tree strata (6 to 57 feet), which owls avoid. Therefore, while some reduction in canopy cover as modeled in CWHR may occur, removal of small trees and lower-strata canopy cover, which is the focus of the FPP, would represent an improvement in habitat for California spotted owl.

Effects Determination

It is our determination that the Proposed Project may affect, but is not likely to result in a trend toward federal listing, or loss of species viability of California spotted owl.

NORTHERN GOSHAWK

SPECIES AND HABITAT ACCOUNT

A species and habitat account for northern goshawk is available in the *Northern Goshawk Ecology: An Assessment of Current Knowledge and Information Needs for Conservation and Management* (Squires and Kennedy 2006) which can be obtained from the World Wide Web at: https://www.fs.usda.gov/treesearch/pubs/50153. A brief summary of biological and habitat characteristics relevant to this analysis is provided below.

Northern goshawks occur at northern latitudes worldwide. In North America, the species breed from north-central Alaska to Newfoundland, and in montane forests in the U.S. south to northwestern and western Mexico. Forest types associated with goshawk nest areas vary geographically (USFWS 1998, Kennedy 2003). It is estimated that there are around 600 known goshawk territories on National Forest System lands in the Sierra Nevada, with about 70 territories occurring on the ENF (USDA 2001b). The territories appear to be well distributed across the Sierra; however, occupancy of many territories is unknown. The known goshawk sites appear to be fairly well distributed across the Forest, between 4,000 and 7,000 feet in elevation. The population trend in the Sierra is unknown due to the lack of wide-spread demography studies for this species (USDA 2001b).

In the Sierra Nevada, goshawks breed from the mixed conifer forests at low elevations up to and including high elevation lodge pole pine forests and eastside ponderosa pine habitats. Goshawks winter from the lodgepole pine forest down slope to blue oak savannah (Verner and Boss 1980). Goshawks utilize mixed conifer, ponderosa pine, red fir, subalpine conifer, lodgepole pine, montane riparian, and montane hardwood vegetation types on the ENF.

Studies suggest that goshawks select more mature forest for nesting, with higher canopy cover and larger trees as compared to surrounding forest (e.g., Hayward and Escano 1989, Squires and Rugiero 1996, Daw and DeStefano 2001). Suitable nesting habitat generally includes over story trees greater than 24 inches dbh with a canopy closure greater than 60 percent on gentle north to east facing slopes. Keane (1999) found that in the Lake Tahoe region, goshawk nest sites had greater numbers of large live trees (greater than 40" dbh) and canopy cover (70 percent), and lower numbers of shrub/sapling cover and small live trees (less than 12 inches dbh) than in random plots in the area (Keane 1999 In USDA 2001b).

Goshawk nesting activities are initiated in February. Goshawks tend to build multiple nests within a given area, and may alternate between these sites from year to year. Nest construction, egg laying, and incubation occur through May and early June. Young birds hatch in June and begin fledging in late June and early July and are independent by mid-September.

Important components of foraging habitat include snags (minimum three per acre greater than 18 inches dbh) and logs (minimum 5 per acre greater than 12 inches dbh and greater than 8 feet long) for prey base populations (USFS 1991). Primary prey species include small mammals and small to medium sized birds (Verner and Boss 1980, Fowler 1988).

CURRENT CONDITION

Suitable Habitat

The spatial extent of the Analysis Area for northern goshawk is approximately 63,680 acres, extending 0.5 mile beyond the Project Area to encompass habitat that northern goshawks might use, but not so large as to potentially mask Project effects on northern goshawk habitat.

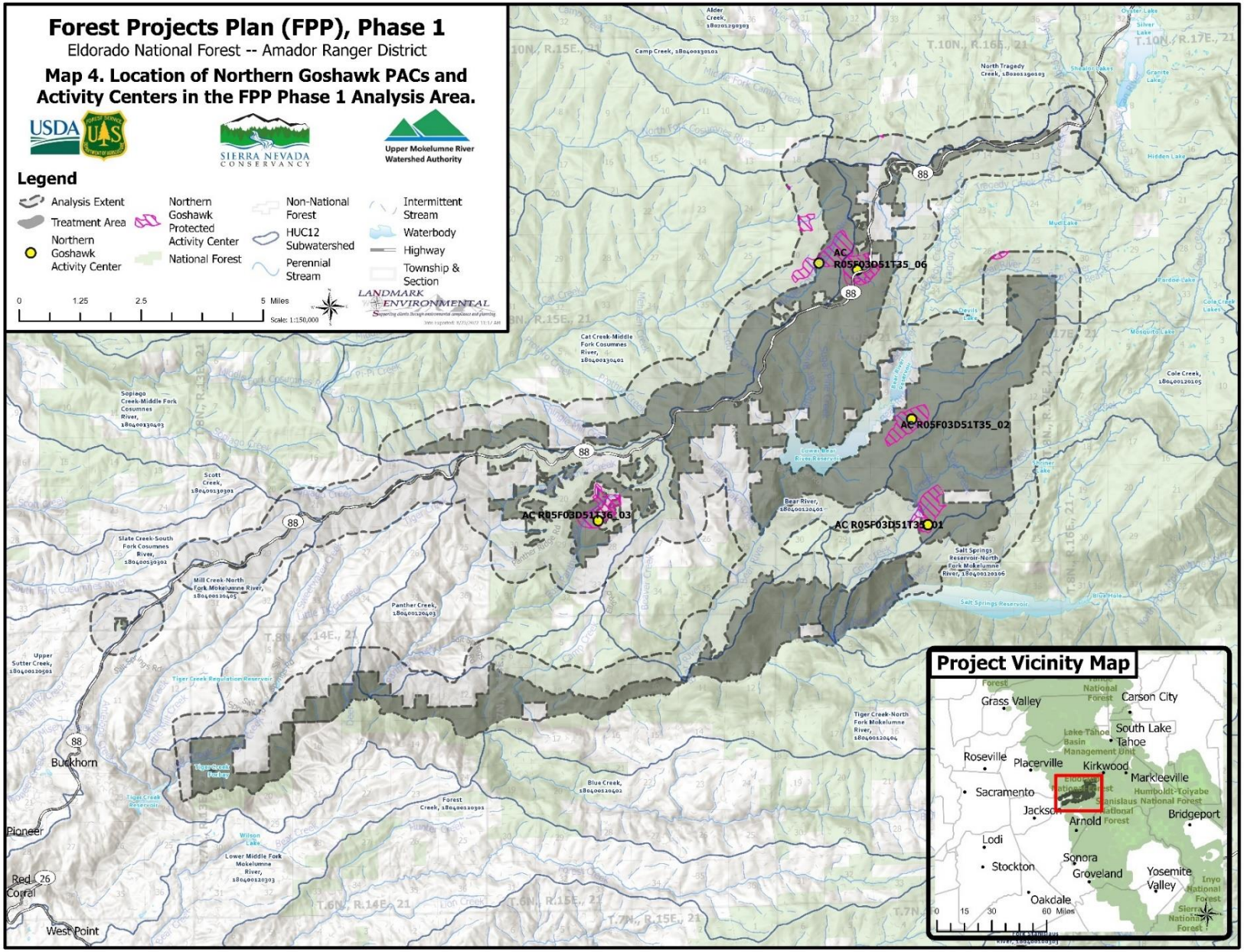
Suitable habitat for northern goshawk overlaps with suitable habitat for California spotted owl when nesting and foraging habitat is combined; nesting habitat for goshawk is more inclusive of vegetation types but generally the analysis of habitat effects are very similar to the spotted owl effects analysis. As shown in **Table 5** there are approximately 37,531 acres of suitable habitat within the Analysis Area and approximately 16,272 acres the Project Area. Suitable habitat in the Analysis Area is comprised of 31,759 acres of CWHR 4M, 4D, and 5M habitat and 5,772 acres of CWHR 5D habitat. Suitable habitat in the Project Area is comprised of includes 13,403 acres of CWHR 4M, 4D, and 5M habitat and 2,869 acres of CWHR 5D habitat.

Surveys and Known Occurrences

The ENF conducts surveys for northern goshawk as required the by the SNFPA and other applicable guidance. No FPP-specific northern goshawk surveys were conducted. Refer to **Table 11** for a list of PACs that have been delineated around known nests in the Analysis Area. Treatments are proposed within five of the seven PACs (bolded in Table 11). Refer to **Map 4** for the location of nests and associated PACs in or intersecting the Analysis Area.

Table 11. Northern Goshawk Protected Activity Centers in, or Intersecting the Analysis Area and the Project Area.

PAC Identification Code	Year of Last Survey	PAC Acres within Analysis Area	Project Area		
			Total PAC Acres within Project Area	Acres of CWHR 4M, 4D, and 5M	Acres of CWHR 5D
PAC R05F03D51T35_01	2022	208	182	77	75
PAC R05F03D51T35_02	2020	225	225	74	136
PAC R05F03D51T35_04	2020	281	203	92	83
PAC R05F03D51T35_05	1993	17	0	0	0
PAC R05F03D51T35_06	2022	205	205	158	25
PAC R05F03D51T36_03	2007	224	145	56	79
PAC R05F03D51T36_14	2013	49	0	0	0
	Total	**1,209**	**960**	**457**	**397**


Forest Projects Plan (FPP), Phase 1
Eldorado National Forest -- Amador Ranger District
Map 4. Location of Northern Goshawk PACs and Activity Centers in the FPP Phase 1 Analysis Area.
USDA
SIERRA NEVADA CONSERVANCY
Upper Mokelumne River Watershed Authority
Legend
Analysis Extent
Treatment Area
Northern Goshawk Activity Center
Northern Goshawk Protected Activity Center
National Forest
Non-National Forest
HUC12 Subwatershed
Perennial Stream
Intermittent Stream
Waterbody
Highway
Township & Section
0 1.25 2.5 5 Miles
Scale: 1:150,000
LANDMARK ENVIRONMENTAL
AC R05F03D51T35_06
AC R05F03D51T35_02
AC R05F03D51T35_03
AC R05F03D51T35_01
Project Vicinity Map
Grass Valley
Carson City
South Lake Tahoe
Roseville
Placerville
Kirkwood
Markleeville
Sacramento
Jackson
Arnold
Bridgeport
Lodi
Stockton
Sonora
Groveland
Yosemite Valley
Oakdale
Buckhorn
Pioneer
Red Corral
West Point

Effects to Individuals

The FPP includes implementation of treatments within approximately 16,272 acres of suitable habitat for northern goshawk (approximately 43 percent of all suitable habitat in the Analysis Area). The Project would affect approximately 960 acres within five northern goshawk PACs (approximately 79 percent of PAC acreage in the Analysis Area).

Foraging northern goshawks may be affected by Project-related noise and human presence, however, such effects would be expected to be minimal and short in duration (e.g., flushing or other similar effects).

The USFS has determined that vegetation management activities occurring within 0.25 miles of an active nest have the potential to affect the breeding behavior or nest success of northern goshawks (USFS 2004). The Project proposes mechanical fuels reduction activities within five PACs, and prescribed fire will also be implemented in one of the PACs (**Table 12**).

Table 12. Proposed Treatments within Northern Goshawk Protected Activity Centers, by Treatment Type.

PAC Identification Code	Treatments to be Implemented within PACs				Total Acres of PAC to be Treated
	Mechanical Fuels Reduction	Hand Thinning	Prescribed Burn	Aspen Restoration	
PAC R05F03D51T35_01	182	0	0	0	**182**
PAC R05F03D51T35_02	225	0	0	0	**225**
PAC R05F03D51T35_04	203	0	0	0	**203**
PAC R05F03D51T35_05	0	0	0	0	**0**
PAC R05F03D51T35_06	204[a]	0	170[a]	0	**224**
PAC R05F03D51T36_03	145	0	0	0	**145**
PAC R05F03D51T36_14	0	0	0	0	**0**
Project Area Totals	**959[a]**		**170[a]**		**960**
Total Acres of PACs in the Analysis Area					**1,209**

[a]Includes 170 acres where prescribed burning will be implemented following mechanical fuels reduction.

The potential for disturbance to nesting pairs within PACs would be minimized through implementation of **DC 39**, which requires adherence to standard LOPs for all activities within northern goshawk PACs (or activity centers within the PACs) unless surveys conclusively ascertain that nesting/reproduction will not be affected in that particular breeding season by the treatments. The LOP period is February 15 through September 15 for the northern goshawk. Where surveys and biological assessment determine that impacts will not affect reproduction, the LOP may be lifted, or the area affected by the LOP reduced. Based on nesting status, additional mitigation measures, such as (but not limited to): exclusion of portions of the treatment areas until after the breeding season, additional fire lines, and different treatment techniques (lighting techniques, postponing slash work), may be implemented to reduce potential effects to nesting goshawks. **DC 3** and **DC 41** further require that if northern goshawks are observed (including active goshawk nests that were not previously identified during protocol-level surveys), Project activities in the area will cease, the District wildlife staff would be notified, and adjustments to the Project evaluated and implemented, if necessary. With implementation of these design criteria, potential disturbance to breeding pairs and active nests and the potential for decreased reproductive success from noise disturbance is minimized.

Considering the FPP would have minimal and short-term direct effects on foraging northern goshawks; and with implementation of Design Criteria to reduce the potential for direct effects to breeding northern goshawks within five PACs, the potential for direct effects to northern goshawk individuals would be minimal. In addition, goshawks may benefit immediately from enhancement of foraging habitat as a result of vegetation management. A discussion of benefits to foraging habitat is provided below.

Effects to Habitat

In the Sierra Nevada, northern goshawks breed in a variety of forest types, typically selecting for areas where tree size and canopy closure is high in relation to the surrounding forest. Foraging habitat should include snags and downed woody debris for prey base populations. An open understory for flight, nearby water, and relatively low slopes are also important breeding habitat characteristics. The FPP, which includes fuel reduction treatments within an estimate 16,272 acres of suitable habitat, would indirectly affect northern goshawks if it were to result in reductions in canopy cover, and removal of trees, snags or large woody debris within nesting and foraging habitat. Changes in vegetation treatments proposed within suitable habitat (CWHR size classes 4, 5, and 6 and density classes M and D) are described fully under the discussion of Project impacts to California spotted owl and briefly summarized here. Overall, considering that the Project is limited to removal of small understory trees; and with incorporation of Design Criteria, changes in habitat would be minimal, and would likely improve habitat for northern goshawks by creating a more open understory for foraging; and promoting the growth and survival of large trees for nesting.

As shown in **Table 5**, fuels reduction treatments would be implemented within a total area of approximately 25,672 acres, of which approximately 16,272 acres (63 percent) contain suitable habitat for northern goshawk. Mechanical fuels reduction and hand thinning would result in removal of trees generally less than 10 inches dbh, although trees up to 12 inches dbh may be removed. Branches of remaining trees may be pruned up to a height of 8 to 12 feet above the ground (not to exceed 50 percent of total tree height). Hazard trees of all sizes would be removed, as necessary. These activities are not expected to result in changes in the overall acreage of habitat for northern goshawk. While there would be selective removal of trees at the smaller end of size class 4 (which includes trees 11 to 23.9 inches dbh), the majority of trees in size class 4 would be retained, and all trees in size class 5 (with the potential exception of select hazard trees) would be retained. Removal of small understory trees is expected to benefit northern goshawks by increasing open space for flight maneuverability during foraging. **DC 42** requires that mechanical and hand fuel reduction treatments be designed to ensure protection and retention of highly suitable habitat for northern goshawk. Within existing suitable habitat, maintain canopy closure would be retained at 90 percent of starting canopy closure following mechanical and hand treatments.

Foraging habitat for northern goshawk should include snags and downed woody debris for prey base populations. Mechanical fuels reduction and prescribed fire could result in a reduction in large-downed wood and snags. Several Design Criteria would be implemented related to the retention of woody debris and snags. **DC 40** requires that snags 15 inches dbh and greater be retained, except where they pose a threat to human health and safety, or perimeter control risk for containment of prescribed fire, and these snags will not be actively lit during burning operations. **DC 47** requires retention of downed logs greater than 30 inches in diameter (large end) by not actively lighting during implementation of prescribed burning and **DC 50** states that downed logs greater than 16 inches in diameter (small end diameter) will be retained during mechanical fuels treatments (i.e., mastication) to the extent practicable. These Design Criteria would ensure the retention of existing snags and downed wood. In addition, the Project is expected to enhance the long-term growth and survival of large trees, providing a source from which downed woody debris may be recruited in the future.

The Analysis Area contains seven northern goshawk PACs (or portions of PACs) totaling approximately 1,209 acres. As summarized in **Table 12**, Project activities would affect approximately 960 acres within five PACs (79

percent of total PAC acres). The Project has been developed consistent with SNFPA 2004 and Eldorado National Forest Plan standards related to northern goshawk PACs (**DC 38**). The FPP, as designed, would generally retain large trees and canopy cover, including areas within PACs. Prescribed burning would be implemented within only one PAC (R05F03D51T35_06) following mechanical treatments. As described previously, prescribed fire would consume primarily surface fuels (e.g., litter, downed wood, and low-growing vegetation) (Kaufmann et al. 2007, cited in Eyes 2017, Kobzar et al., 2016) and is not expected to result in reductions in large trees within PACs. The potential for effects to large trees (and particularly nest trees) from prescribed fire would be further minimized through implementation of Design Criteria, including **DC 43**, which states that the District wildlife will be involved in planning for prescribed burning; notified prior to implementation of burning in a northern goshawk PAC, and will be on site to monitor burning, when possible. Where the design criteria standards applicable to prescribed burning are not expected to be met, no prescribed burning shall occur within northern goshawk PACs, or applicable portions of PACs, without further survey and analysis (**DC 48**). **DC 46** states that no more than four PACs will be burned in a 12-month period, and that burning will avoid direct impacts to the nest stand. **DC 45** states that additional hand treatments will be implemented, as necessary to protect the nest trees during prescribed burning.

Considering that the FPP is designed to retain large trees and associated canopy cover and would not result in reductions in acreage of suitable goshawk habitat; and with implementation of Design Criteria intended to further protect nest trees and habitat within PACs, the Project would have minimal effects to habitat for northern goshawk. Furthermore, over the long term, vegetation treatments are expected to increase resources available to and likelihood for growth and survival of tall trees by reducing inter-tree competition and reducing the potential for adverse effects from insects, disease, and high-severity wildfire. Therefore, the Project would be expected to enhance habitat for northern goshawks over time.

Effects Summary

There are approximately 37,531 acres of suitable habitat within the Analysis Area; of this, approximately 16,272 acres lie within the Project Area. Northern goshawk are known to occur and five PACs are present in the Project Area.

The USFS has determined that vegetation management activities occurring within 0.25 miles of an active nest have the potential to affect the breeding behavior or nest success of northern goshawks (USFS 2004). Implementation of Design Criteria, including but not limited to, LOPs for all activities within PACs during the breeding period, would minimize the potential for direct impacts to breeding goshawks.

Mechanical fuels reduction will be implemented within 13,762 acres of suitable habitat and 959 acres within PACs. In addition, hand thinning will be implemented within 2,124 acres of suitable habitat.In general, mechanical fuels reduction and hand thinning will not result in changes in the acreage of suitable habitat for northern goshawk. While there may be selective removal of trees at the smaller end of size class 4 (which includes trees 11 to 23.9 inches dbh), the majority of trees in size class 4 would be retained, and all trees in size class 5 would generally be retained. Hardwoods would be retained and managed consistent with SNFPA guidelines and directions. Canopy closure would be maintained at 90 percent of starting canopy closure.

Prescribed burns will be implemented within 3,280 acres of suitable habitat and within 170 acres within one PAC. Low-intensity fire produced by prescribed burns would consume primarily surface fuels (e.g., litter, downed wood, and low-growing vegetation), and typically results in minimal mortality to canopy trees or changes to overstory structure. Prescribed burning may result in small openings (generally less than 0.25 to 0.5 acre in size) provided that the total area of openings created is less than 5 percent of treated area.

Design criteria require retention of highly suitable habitat for northern goshawk, where it currently exists. Within suitable habitat planned for burning, canopy closure would be maintained at or above 85 percent to 90 percent of starting canopy closure. Overall, considering that the Project is limited to removal of small understory trees; and with incorporation of Design Criteria, changes in habitat would be minimal, and would likely improve habitat for northern goshawks by creating a more open understory for foraging; and promoting the growth and survival of large trees for nesting.

Effects Determination

It is our determination that the Proposed Project may affect, but is not likely to result in a trend toward federal listing, or loss of species viability of northern goshawk.

PALLID BAT, FRINGED MYOTIS, AND TOWNSEND'S BIG-EARED BAT

SPECIES AND HABITAT ACCOUNT

Three FSS bat species may potentially occur in the Analysis Area: pallid bat (*Antrozous pallidus*), fringed myotis (*Myotis thysanodes*) and Townsend's big-eared bat (*Corynorhinus townsendii*). Because of their similar habitat requirements, the three bats will be grouped for this analysis. A brief summary of biological and habitat characteristics relevant to this analysis are provided below for each species.

Pallid Bat

A species and habitat account for the pallid bat is available in the *Conservation Assessment for the Pallid Bat* (*Antrozous pallidus) in Oregon and Washington* (Gervais 2016), which can be obtained from the World Wide Web at: https://www.fs.fed.us/r6/sfpnw/issssp/documents4/ca-ma-antrozous-pallidus-201606-508.pdf. A brief summary of biological and habitat characteristics relevant to this analysis is provided below.

In California, pallid bats are strongly associated with arid regions, and are found in a variety of habitats including rocky, arid deserts and canyons, shrub-steppe grasslands, karst formations, and high elevation conifer forests (Rambaldini 2005). Johnston and Gworek (2006) found pallid bat activity in the Sierra Nevada mountains greatest where there were open mixed conifer forest near short grassland habitat. Unlike many other species of bats, pallid bats mostly forage on ground-dwelling insects and therefore preferentially forest in open, grassland habitats (Gervais 2016).

Pallid bats can roost in a variety of locations, including rock crevices, tree hollows, mines, caves, man-made structures, and inside large conifer snags, basal hollows, and oak bole cavities (Ellison et al. 2003). Night roosts are usually in more open sites and may include open buildings, porches, mines, caves, and under bridges (Barbour and Davis 1969; Phillpot 1997). Pallid bats are susceptible to disturbance in roost sites (Rambaldini 2005), particularly hibernating individuals.

Fringed Myotis

A species and habitat account for the fringed myotis is available in the *Conservation Assessment for the Fringed Myotis (Myotis thysanodes) in Oregon and Washington* (Gervais 2017b), which can be obtained from the World Wide Web at: http://www.oregonwildlife.org/publication/conservation-assessment-for-the-fringed-myotis-myotis-thysanodes-in-oregon-and-washington. A brief summary of biological and habitat characteristics relevant to this analysis is provided below.

In California, fringed myotis is found throughout the state, from the coast (including Santa Cruz Island to greater than 5,900 feet in elevation in the Sierra Nevada. The majority of known localities are on the west side of the Sierra Nevada.

Fringed myotis roosts in crevices found in rocks, cliffs, buildings, underground mines, bridges, and in large, decadent trees (Weller and Zabel 2001). Radio-tracking studies in the forested regions of northern California have shown that this species forms nursery colonies in predominantly early to mid-decay stage, large diameter snags from 23 inches to 66 inches dbh (Weller and Zabel 2001). Fringed myotis appear to be highly dependent on tree roosts within forest and woodland habitats. Large snags and low canopy cover, typical of mature forest habitat types, offer warm roost sites (Keinath 2004). Fringed myotis are highly sensitive to roost site disturbance (O'Farrell and Studier 1973, 1980).

Foraging habitat includes open habitats that have nearby dry forests and an open water source (Keinath 2004). Humes et al. (1999) found bats to be more active in old-growth and thinned forest stands than in dense, unthinned stands, suggesting that the increased structural diversity benefits bats, including fringed myotis.

Townsend's Big-eared Bat

A species and habitat account for the Townsend's big-eared bat is available in the *Conservation Assessment for the Townsend's Big-eared Bat (Corynorhinus townsendii) in Oregon and Washington* (Gervais 2017a), which can be obtained from the World Wide Web at: https://www.fs.fed.us/r6/sfpnw/issssp/documents4/ca-ma-corynorhinus-townsendii-2017-03.docx. A brief summary of biological and habitat characteristics relevant to this analysis is provided below.

In California, Townsend's big-eared bats occur nearly statewide in many habitat types, except for the highest peaks of the Sierra Nevada mountains (CWHR 2019). Their distribution is strongly correlated with geomorphic features such as natural and man-made caves, buildings, and bridges (Pierson et al. 1999; Ellison et al. 2003a, b; Sherwin et al. 2003, Gruver and Keinath 2006). Caves and mine adits are particularly important as hibernacula, and occasional roosts are found inside large hollow trees (Piaggio 2005).

Foraging habitat includes a wide variety of vegetation types, including agricultural types, dense forests, desert scrub, moist coastal forests, oak woodlands, and mixed conifer-deciduous forests (Pierson and Rainey 1998), in particular along habitat edges (Fellers and Pierson 2002). Townsend's big-eared bats are often found near free-water (Geluso 1978).

CURRENT CONDITION

Suitable Habitat

The spatial extent of the Analysis Area for FSS bats is approximately 63,679 acres, extending 0.5 mile beyond the Project Area to encompass habitat that the bats might use, but not so large as to potentially mask Project effects on FSS bat habitat.

For the purposes of this analysis, FSS bat roosting habitat within the treatment area includes anywhere with large trees and snags. Caves or mines, if present in the Project Area, represent potential roosting habitat Townsend's big-eared bat (it is assumed there are no buildings located directly in treatment areas). Foraging habitat generally includes forests, chaparral, grassland, and open water habitats.

Surveys and Known Occurrences

Pallid bat, fringed myotis, and Townsend's big-eared bats are known to occur on the ENF. While a review of ENF data and CNDDB (2022) yielded no records, it is assumed these species may be present in the Analysis Area.

EFFECTS ANALYSIS

Effects to Individuals

The three FSS bat species addressed in this analysis forage after sunset (Gervais 2016; 2017a, 2017b). Therefore, foraging bats are less likely to be disturbed by daytime work activities than other species. However, these bat species are sensitive to roost site disturbance. Townsend's big-eared bats roost primarily in caves, mines, and buildings which would not be affected by proposed activities.

Pallid bat and fringed myotis roost in large trees and snags, preferring large trees with deformities or loose bark for roosting. The Project is limited to removal of trees 12 inches dbh or smaller; therefore, larger trees and snags providing potential roosting habitat would not be removed. There is some potential for bats to roost in large limbs of mature trees, which would be pruned to a height of 10 to 12 feet above ground during treatments. Removal of limbs could result therefore in mortality of non-volant young. In addition, day-roosting bats may be flushed from tree roosts as a result of noise and human presence during vegetation treatments or other Project activities that require the use of mechanical equipment. However, flushing effects are expected to be minimal and short-term. If a roost of special-status bats is discovered in the Project Area, **DC 3** and **DC 41** would further protect bats by requiring that Project activities in the area cease, a Forest Service biologist be notified, and adjustments to the Project would be made to protect the resource.

Effects to Habitat

The potential indirect effects of the FPP on roosting and foraging habitat for FSS bats are summarized below.

Roosting habitat: The Project will not affect caves or rocky crevices and does not involve removal or alteration of permanent, man-made structures (e.g., bridges or mines) that may support reproductive, roosting, or hibernacula sites for FSS bats, especially the Townsend's big-eared bat. However, pallid bats and fringed myotis commonly roost in cavities in large trees or snags. The proposed treatments include mastication and hand-thinning of shrubs and small trees (up to 12 inches dbh, but generally 10 inches dbh or less) and removal of snags smaller than 16 inches dbh. Aspen restoration would utilize mechanical or hand thinning to remove encroaching conifers generally less than 12 inches dbh, as well as shrubs, to re-establish the historic aspen stand edge. Within all treatment areas, branches of remaining trees may be pruned up to a height of 8 to 12 feet above the ground (not to exceed 50 percent of total tree height), and hazard trees of all sizes would be removed, as necessary. The Project would generally retain large trees that represent potential roosting habitat for bats. Hardwoods would be retained and managed consistent with SNFPA guidelines and directions. Prescribed fire treatments could potentially result in the loss of large snags or trees, if accidentally ignited during burns. To further protect snag roosting habitat, **DC 40** requires that snags greater than 15 dbh would be retained, except where they pose a threat to human health or safety, and would not be actively lit during burning operations. Finally, vegetation treatments are expected to increase resources available to and likelihood for growth and survival of large trees which may then provide roosting structures for FSS bats.

In general, thinning and prescribed fire activities can improve habitat for cavity-roosting bats by reducing clutter in the lower forest strata and creating periodic openings in the forest canopy. Reduced lower-strata density improves access to roost sites, increases space for maneuverability, and may potentially increase solar exposure which is particularly important for reproductive roosts (Boyles and Aubrey 2006, Perry 2011, Buchalski et al.

2013). The indirect effects of prescribed fire, specifically, on habitat for cavity-roosting bats are variable. Fire can create or consume snags, dependent on tree species composition, fire intensity and frequency, and other site-specific conditions. Smith and Sutherland (2006) found that, in hardwood species, repeated low-intensity fire may create habitat over time by injuring trees and creating avenues for pathogens which may form hollows in otherwise healthy trees. Scarring at the base of a tree may also promote growth of basal and bole cavities. The Project, therefore, would have variable effects on FSS bat roosting habitat, depending on the treatment and time scale considered.

Foraging habitat: Pallid bat, fringed myotis, and Townsend's big-eared bats may forage within forests, forest edges, grasslands, chaparral, and over open water habitats in the Project Area. Treatment of forest stands would result in thinning of trees and reduce ladder fuels, which may increase the quantity of suitable foraging habitat for bats by removing dense understory and creating small openings, particularly along forest edges. Many studies have shown an increase in foraging activity in response to both thinning and prescribed burning. The increase is attributed to an increase in space for maneuverability which has, in turn, been tied to increased foraging success (Malison et al. 2010, Perry 2011, Armitage and Ober 2012, Buchalski et al. 2013). This effect may be particularly pronounced for pallid bats, which prefer to forage in open areas as opposed to denser forests. In addition, prescribed fire may enhance insect prey abundance linked to growth of early successional flowering plants.

Effects Summary

Noise and human presence may result in flushing of day-roosting bats. Removal of large trees or snags that pose a hazard or pruning of large limbs could also result in disturbance to roosting bats or mortality of non-volant young bats. These effects would be short-term and temporary; sightings would be reported to a Forest Service wildlife biologist and Project adjustments made, as necessary.

In general, thinning and prescribed fire activities can improve habitat for cavity-roosting bats by reducing clutter in the lower forest strata and creating periodic openings in the forest canopy. Reduced lower-strata density improves access to roost sites, increases space for maneuverability, and may potentially increase solar exposure which is particularly important for reproductive roosts. Treatments may also increase the quantity of suitable foraging habitat for bats by removing dense understory and creating small openings, particularly along forest edges.

Effects Determination

It is our determination that the Proposed Project may affect, but is not likely to result in a trend toward federal listing, or loss of species viability of pallid bat, fringed myotis, and Townsend's big-eared bat.

PACIFIC MARTEN

SPECIES AND HABITAT ACCOUNT

A species and habitat account for the Pacific (Sierra) marten is provided in **Appendix A.** A brief summary of biological and habitat characteristics relevant to this analysis is provided below.

Pacific marten generally occur in eastern Siskiyou and northwestern Shasta Counties through the western slope of the Sierra Nevada to northern Kern County, and on the eastern slope of the Sierra Nevada as far south as central-western Inyo County Kucera et al. (1995) and at elevations of 3,400 feet to 10,400 feet, averaging 6,600 feet. In the southern Cascades and northern Sierra Nevada, Kirk (2007) noted that 85 percent of contemporary marten detections in his analysis occurred above 6,000 feet elevation (despite a reduced survey effort at these higher

elevations), 15 percent of detections were between 3,000 and 6,000 feet, and no detections of marten occurred below 3,000 feet elevation.

Preferred forest types in the Sierra Nevada include mature mesic forests of red fir, red fir/white fir mix, lodgepole pine, subalpine conifer, and Sierran mixed conifer (Freel 1991). CWHR types 4M, 4D, 5M, 5D, and 6 are moderate to highly important for the marten (USFS 2001). Preferred habitat is generally characterized by dense canopy, multi-storied, multi-species late seral coniferous forests with a high number of large (greater than 24 inches dbh) snags and downed logs (Freel 1991). Late- and old-structure forests (with larger diameter trees and snags, denser canopy and more canopy layers, and plentiful downed woody material) are thought to provide ample rest and den sites, protection from avian and mammalian predators, and foraging sites (Bull et al. 2005). Studies in the Sierra Nevada indicate martens have a strong preference for forest-meadow edges, and riparian forest corridors used for travel and foraging (Spencer et al. 1983, Martin 1987). Riparian areas were used more for activity than resting, and mixed conifers were used more for resting than activity. Downed woody debris is an important component of marten habitat, especially in winter, and provides structure that intercepts snowfall and creates subnivean tunnels, interstitial spaces, and access holes (Andruskiw et al. 2008).

Prey species abundance is a critical component of the habitat and includes a variety of mammals, birds, reptiles, fish, insects, seeds, and fruits (Koehler and Hornocker 1977, Soutiere 1979, Hargis and McCullough 1984, Zielinski and Duncan 2004). Marten prey items vary seasonally and appear to depend on availability. Simon (1980) found insects dominating the diet in summer and fall, while Douglas squirrels (Tamiasciurus douglasii) provided the bulk of winter and spring nourishment. At Sagehen Creek, CA, within the Truckee Ranger District, Zielinski (1983) found microtine rodents the most frequent year-round prey. Douglas squirrels, snowshoe hare, northern flying squirrel, and deer mouse were taken almost exclusively during the winter; and squirrels and chipmunks formed the largest component of the diet from late spring through fall.

CURRENT CONDITION

Habitat in the Analysis Area

CWHR is useful in modeling predicted changes in pre-and post-treatment stand density and size classes in relation to habitat suitability for wildlife species such as the Pacific marten. CWHR tree size and density primary metrics used for the Pacific in this analysis, with suitable habitat for marten defined to include forest stands above 5,000 feet msl (refer to **Table 13**). There are 26,876 acres of suitable habitat in the analysis area and 13,041 acres of suitable habitat in the Project Area. Marten habitat is further defined to include areas supporting low cover (greater than 3 meters [10 feet]) including vegetation, logs, and other downed woody debris.

Table 13. Suitable Habitat for Pacific Marten in the Analysis Area and the Project Area.

	Total Size of Analysis Area/Project Area (Acres)	Suitable Habitat (Acres)
Analysis Area	63,680	26,876
Project Area	25,670	13,041

Spencer and Rustigian-Romsos (2012) note that CWHR reliably over-predicts potential marten distribution. They have developed a model predicting the probability of marten year-round occurrence in California using marten detections (N = 102, spanning 1993 to 2011) and eight predictor variables (mean potential evapotranspiration, mean annual precipitation, mean fraction of vegetation carbon burned, mean forest carbon, mean fraction of vegetation carbon in forest, understory index [fraction of grass vegetation carbon in forest], average maximum tree leaf area index, and modal vegetation class) (2012). A review of this model indicates a relatively low

probability for presence of marten throughout most of the Project Area (0 to 0.2), but increasing up to 0.8 in the higher elevation portions of the Project Area (6,800 feet msl or higher).

Surveys and Known Occurrences

A review of ENF wildlife data yielded 32 records (1993 through 2011) for Pacific marten in the Analysis Area. Targeted track plate and camera station surveys were conducted along the Silver Bear Snowmobile Trail within the Project Area. Evidence of presence was detected primarily from tracks or remotely triggered cameras. The majority of the occurrences are located above approximately 6,500 feet and in the Cat Creek-Middle Fork Cosumnes River watershed. There are also several records in the Bear River and Cole Creek watersheds.

No marten dens have been detected and no den buffers have been designated in the Analysis Area.

EFFECTS ANALYSIS

Effects to Individuals

Marten are assumed to be present in forested habitats and riparian corridors in the Project Area, with the probability of presence increasing with elevation. Vegetation treatments would be conducted within 13,041 acres of suitable habitat, or 48 percent of the suitable habitat available in the Analysis Area. Human presence and noise from use of mechanical equipment and construction vehicles, and prescribed fire could potentially result in disturbance and displacement of marten; and use of ground-based mechanical equipment and vehicles could result in direct mortality. In addition, removal of understory vegetation would reduce cover for this species, potentially making them more vulnerable to predation.

Several Design Criteria would minimize the potential for direct impacts to marten. **DC 3** and **DC 41** require that if any FSS species, including marten, are detected during any phase of the FPP, Project activities in the area must cease, and Forest Service district wildlife staff must be notified. Potential adjustments to the Project will be evaluated and may be adjusted accordingly. Martens use riparian forest corridors for travel and foraging, and therefore **DC 7** and **DC 9**, which impose mechanical equipment buffers and restrict construction of landings within RCAs would potentially reduce the potential for direct effects to marten in these areas. Implementation of LOPs within California spotted owl PACs March 1 through August 15 and northern goshawk PACs February 15 through September 15 required by **DC 39,** while not specifically intended for marten, may also minimize disturbance of martens potentially in those areas during the denning season (breeding season for martens is typically May 1 to July 31).

Effects to Habitat

Pacific martens appear to select most strongly for habitat at the landscape scale and the microhabitat scale (e.g., resting and denning sites) (Minta et al 1999, cited in North 2012). At the landscape level, Pacific martens are most often associated with mature old-structure forests with dense canopy (40 to 60 percent) and multiple canopy layers (North 2012, Bull et al. 2005, Freel 1991). However, martens are also known to inhabit younger or managed forests, as long as structural elements found in older forests remain (Porter et al. 2005, cited in North 2012). On the microhabitat scale, resting and denning structures are likely the most limiting habitat elements (Spencer 1983, Martin and Barrett 1991, Zielinski et al. 2004, cited in North 2012, Porter et al. 2005, Purcell et a. 2009). Pacific martens typically use largest available snags, logs, and stumps for resting sites (Martin and Barrett 1991, Purcell et a. 2009, Spencer 1987 and Zielinski et al. 2004 cited in North 2012), and resting sites generally do not occur in areas where canopy cover is less than 30 percent (Spencer et al. 1983, cited in North 2012). Physical complexity resulting from downed woody debris on or near the forest floor is important in providing structure for

denning habitat; as well as providing habitat for prey species on which the marten depends (Andruskiw et al. 2008).

Table 14. Proposed Treatments within Pacific Marten Suitable Habitat, by Treatment Type.

Total Acres of Suitable Habitat within Analysis Area	Proposed Activities within Suitable Habitat				Total Acres of Suitable Habitat within Project Area
	Mechanical Fuels Reduction	Hand Thinning	Prescribed Burn	Aspen Restoration	
26,876	12,325[a]	466	3,077[a,b]	136[b]	**13,041**

[a]Includes 2,947 acres where mechanical fuels reduction will be followed by prescribed burns.
[a]Includes 16 acres where aspen restoration will be followed by prescribed burns.

There are approximately 13,041 acres of suitable habitat in the Project Area (48 percent of suitable habitat in the Analysis Area). Mechanical fuels reduction will be implemented within 12,325 acres of this habitat (**Table 14**). In addition, there will be 466 acres of hand thinning, 3,077 acres of prescribed burns (including 2,947 acres that also be mechanically treated), and 136 acres of aspen restoration. The proposed treatments are intended to improve wildlife habitat by reducing understory ladder and surface fuels to ameliorate wildfire behavior and facilitate the application of prescribed fire through mastication and hand-thinning of shrubs and small trees (up to 12 inches dbh, but generally 10 inches dbh or less). Branches of remaining trees may be pruned up to a height of 8 to 12 feet above the ground (not to exceed 50 percent of total tree height). Hazard trees of all sizes would be removed, as necessary. Proposed activities within suitable habitat may indirectly affect Pacific marten through changes in the structure of forest habitat that result in reduction of overall canopy cover (i.e., below 40 percent) and/or that result in disconnection of movement corridors between suitable habitats. At the microhabitat scale, Pacific marten could be negatively impacted by removal of logs, snags, and coarse woody debris and reduction in canopy cover of trees in the lower strata.

In general, mechanical fuels reduction and hand thinning will not result in changes in the acreage of CWHR suitable habitat for Pacific marten. While there may be selective removal of trees at the smaller end of size class 4 (which includes trees 11 to 23.9 inches dbh), the majority of trees in size class 4 would be retained, and all trees in size class 5 would generally be retained. Hardwoods would be retained and managed consistent with SNFPA guidelines and directions. Aspen restoration, which would affect a very small area (136 acres), would utilize mechanical or hand thinning to remove encroaching conifers generally less than 12 inches dbh, as well as shrubs, to re-establish the historic aspen stand edge. Effects of aspen restoration are similar to those described for mechanical fuels reduction and hand thinning, and the same design criteria would generally apply. **DC 42,** which requires that mechanical and hand fuel reduction treatments be designed to ensure protection and retention of highly suitable habitat for California spotted owl, while not specific to marten, may benefit marten indirectly by maintain canopy closure at 90 percent of starting canopy closure following mechanical and hand treatments. Implementation of this measure would ensure that canopy cover within suitable habitat is not significantly reduced. In addition, a Forest Service wildlife biologist will review prescribed burn plant to ensure conditions for FSS species, including marten, have not changed and to ensure consistency with FWS consultation determinations.

As stated previously, downed woody debris is important both for foraging success and for subnivean rest sites in winter, Pacific marten would be negatively impacted by removal of logs, snags, and coarse woody debris and reduction in canopy cover of trees in the lower strata. While there would be a reduction in these habitat elements immediately post-Project, shrubs and ground cover would be retained in canopy openings to the extent that there is minimal connectivity to overstory trees. In addition, downed logs greater than 16 inches in diameter (small end diameter) will be retained during mechanical fuels treatments (i.e., mastication) to the extent practicable (**DC 50**),

and downed logs greater than 30 inches diameter (large end) would not be actively lit during implementation of prescribed burning (**DC 47**).

While the Project will make use of natural barriers and roads for fire containment lines to the degree possible, some construction of new fire lines will be necessary. Both machine and hand-constructed fire lines will require removal of vegetation, duff and litter within a 4- to 6-foot wide area. Studies indicate that large open areas which lack ground cover may pose a predation risk for the marten (Drew 1995). For example, Slauson et al. (2016) found that marten in the Sierra Nevada avoid open ski runs that are wider than 66 feet. Hargis and McCullough showed that marten did not cross meadows greater than approximately 50 meters (164 feet) wide unless scattered trees and cover are available. These studies suggest that narrow 4- to 6-foot clearings required for construction of fire lines will have minimal effect on movement of marten.

Martens are known to use riparian forest corridors for travel and foraging (Spencer et al. 1983, Martin 1987). Effects related to thinning in the lower canopy levels and effects to connectivity may be mitigated in part by implementation of management requirements that would limit treatments within riparian buffers along perennial stream habitat. Measures such as **DC 7**, **DC 9, DC 11,** and **DC 13** that restrict mechanical thinning, ignition of prescribed fire and creation of landings within riparian buffers and require retention of cover in RCAs would result in greater retention of lower-strata forest structure and cover in these areas, which could be used by Pacific marten as movement corridors.

Effects Summary

Implementation of the Project could result in disturbance to Pacific marten, but Design Criteria would minimize these potential effects by requiring Project adjustments if any new nests are discovered. Because Pacific marten prefer many of the same habitat characteristics and tend to den in similar forest stands to California spotted owls and goshawks, Design Criteria that specify LOPs for these species would also likely minimize effects to Pacific marten. Foraging or resting marten may be disturbed by ground-disturbing equipment, hand crews, or prescribed fire, but these effects are expected to be short term. Short-term disturbance effects may effect individuals, but would not affect long term reproductive potential.

The Project entails treatments that are targeted towards removing small trees and ladder fuels in the understory and would not result in changes in the amount or suitability of high canopy closure forested habitat for Pacific marten, though there may be effects to ground cover and total amount of woody debris that are known to be important elements for marten dispersal and foraging. Potential impacts would be reduced through implementation of Design Criteria to retain large snags, protect large downed woody debris, and to maintain mechanical equipment exclusion zones and prescribed fire ignition buffers within riparian habitats that are especially important habitat components for marten dispersal. Overall, the Project is expected improve habitat for Pacific marten in the long-term by reducing the cover of small trees while increasing resources available to and likelihood for growth and survival of tall trees with high canopy cover. Overall habitat quality may be improved by increasing small scale heterogeneity, increasing prey availability, and promoting forest resilience to insect outbreaks, drought, and high-intensity wildfire.

Effects Determination

It is our determination that the Proposed Project may affect, but is not likely to result in a trend toward federal listing, or loss of species viability of Pacific marten

V. CUMULATIVE EFFECTS

The spatial boundary for analyzing the potential cumulative effect to FSS wildlife species is the same as the Analysis Area and encompasses approximately 63,680 acres.

In order to understand the contribution of past actions to the cumulative effects of the Proposed Project, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects and is consistent with National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008).

The Action Area is comprised primarily of rural lands that support forestry, hydroelectric power and water supply facilities, and recreation. Much of this land is federally owned and managed by the Forest Service; in addition, lands that are part of the Pacific Gas & Electric Company's (PG&E's) Mokelumne River Project are operated and maintained under a license from the Federal Energy Regulatory Commission (FERC). Land disturbances that have been documented in the cumulative effects area in the past include timber harvest, road construction and maintenance, recreation (including camping, hiking, biking, and boating), operations and maintenance of hydroelectric facilities, introduction of non-native species, and past wildfires.

Potential future disturbances include climate change, timber harvest activities on private lands, and Forest Service forest management projects. Each potential cumulative effect is discussed further below.

Climate Change: Climate change effects on precipitation and mean temperature have been difficult to predict with considerable variation between different models. The most common prediction among the most recent models for California is temperature warming by about 9 degrees F by 2100, with precipitation remaining similar or slightly reduced compared to today. Because of the unknown in scale, direction, and rate of future climate change, current management of sensitive species on the ENF would focus maintaining viable populations throughout the species known range. Climate change is also expected to exacerbate the risk of stand-replacing wildfire, increasing both fire frequency and intensity (North et al. 2021).

Timber Harvest Activities: State and private activities in the Analysis Area are limited primarily to management of and timber harvest on private forestlands. The State of California reviews timber harvest operations on private lands consistent with the California Forest Practice Act and the California Environmental Quality Act (CEQA) via the Timber Harvest Plan (THP) review process. The THP review process is conducted by the Department of Forestry and Fire Protection (CAL FIRE). As the lead agency, CAL FIRE is charged with reviewing each THP to determine whether the project is feasible and complies with existing laws and regulations. CAL FIRE also must determine whether the plan will result in significant impacts on the environment and on special-status species, such as CRLF. To make these determinations, CAL FIRE consults with other agencies including (but not limited to) California Department of Fish and Game, the California Regional Water Quality Control Board, the California Geologic Survey, as well as to each county planning commission. A review of CAL FIRE's website indicates that 10 THPs covering approximately 650 acres have been approved in the past 5 years for projects on lands within the Action Area. Eight of the plans are for timber projects on lands owned by Sierra Pacific Industries, the remaining two are individually owned.

Forest Service Management Projects: The following future projects are considered in this analysis:

- Upper Cole Forest Health Project (currently on hold): Proposes to treat at least 500 acres to reduce hazard fuels, improve forest health, enhance watershed conditions, re-establish sustainable landscape by using commercial and pre-commercial thinning, understory burning, and road re-construction.

- Forestwide Eldorado National Forest Over Snow Vehicle (OSV) Use Designation Project: The Project proposes to designate OSV uses, make temporary OSV closures permanent in accordance with the SNFPA, identify select OSV trails for grooming, groom the designated trails, and implement a new snow depth requirement to prevent damage from OSV use. The Silver Bear OSV area falls within the cumulative Analysis Area.
- Amendment of the ENF LRMP pertaining to lands donated by PG&E: PG&E donated 29 acres of land on the North Fork of the Mokelumne River (APN 025-060-016) to be conserved in perpetuity.

Of the three projects, only the Cole Forest Health Project proposes treatments similar to the FPP; the effects, although much smaller in scale, would be similar to the effects of the FPP. The Forestwide OSV Project would likely benefit species by formalizing OSV trails and clearly defining usage, as well as closing temporary trails. Donation of land along the North Fork Mokelumne River may potentially benefit FSS species over the long terms.

Some species are expected to benefit from the reduction in competing vegetation and access to sunlight. For other species, the combined actions of the projects considered may represent a minor and short-term cumulative effect on the availability and suitability of habitat. Over the longer term, fuels reduction treatments are expected to benefit forest habitat and species by enhancing the growth and survival of large trees and restoring historical fire regimes. In the event of wildfire, the projects may cumulatively reduce the risk of high intensity stand-reducing fire. This project would not noticeably contribute to adverse cumulative effect for any the TES species, and in most cases will either improve habitat conditions and/or protect species and their habitat from loss through wildfire and other causes.

VI. DETERMINATION SUMMARY

- It is our determination that the Proposed Project will not affect Pacific lamprey, hardhead, Pacific marten, fisher, and wolverine.
- It is our determination that the Proposed Project may affect, but is not likely to result in a trend toward federal listing, or loss of species viability of:
    - western pond turtle;
    - western bumble bee;
    - bald eagle;
    - northern goshawk;
    - California spotted owl;
    - great gray owl
    - pallid bat;
    - fringed myotis bat;
    - Townsends' big-eared bat; and
    - Pacific marten.

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APPENDIX A. SPECIES ACCOUNTS