

**United States Department of the Interior
Bureau of Land Management**

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*Final
Programmatic Environmental Assessment*

**HAZARD REMOVAL AND VEGETATION MANAGEMENT
PROJECT**

February 2019



**It is the mission of the Bureau of Land Management to
sustain the health, diversity, and productivity of the public
lands for the use and enjoyment of present and future**

Table 1. Hazard Removal and Vegetation Management Programmatic EA: At a Glance

Project Information/ Proposed Action(s)	What is included in the pEA	What is not included in the pEA
Programmatic EA (pEA)	Analyzes a suite of treatments near critical infrastructure to address mortality, forest and woodland health, and excess fuel loadings. Field Offices (FO) may use the analysis in the pEA after completing a Determination of NEPA Adequacy (DNA) or tiered, site-specific analysis, if the proposed action in is consistent with the activities analyzed in the pEA, and appropriate cultural resource and biological surveys are completed.	The pEA does not authorize site-specific treatments, FOs must complete a DNA or tiered, site-specific analysis and complete a Decision Record (DR) before authorizing ground-disturbing activities.
Geographic Scope	Forest and woodlands in the northern California and Central California BLM Districts with the exception of the Bishop Field Office. Treatments in special designations, such as Areas of Critical Environmental Concern (ACECs), National Monuments, National Conservation Areas, and Wild & Scenic Rivers will be included only if they are consistent with the values for which the area was designated, and consistent with the protections prescribed by the Resource Management Plan (RMP). Project area is approximately 551,000 acres.	The Geographic Scope excludes designated Wilderness Areas and Wilderness Study Areas (WSAs). Western juniper and piñon juniper types are excluded. The California Desert District and the Bishop Field Office is not included in the project area.
Riparian Areas/ Riparian Reserves	Where riparian areas/reserves intersect critical infrastructure, dead tree falling/removal and thinning may be implemented when beneficial to meeting aquatic conservation strategies, water quality, and to protect the riparian from high intensity wildfire.	Does not propose removing large wood critical to instream complexity – that wood will be left to meet these objectives. Wood in excess of what is needed for in-stream complexity could be removed.
Dead/Dying Trees	Proposes dead and dying tree felling in both action alternatives. Both action alternatives also propose removal of dead wood in excess of what is needed for coarse woody debris targets. The definition of a dead/dying tree is a standing tree that has been damaged by forces such as fire, wind, ice, insects, disease, or drought, and that in the judgment of an experienced forester, is likely to die within a few years.	Neither action alternative would require retention of standing dead trees near critical infrastructure because of the public safety. The second action alternative would not allow for the felling and/or removal of green trees.

Project Information/ Proposed Action(s)	What is included in the pEA	What is not included in the pEA
Green Tree Thinning	First action alternative allows for dead/dying tree removal and green tree thinning to achieve canopy retention levels of 40 to 60 percent depending upon the size of the residual trees. Second action alternative does not allow for any green tree removal, only dead/dying tree felling and removal. BLM retains the authority within rights-of-way to approve green tree thinning prescriptions.	Green tree thinning requires retaining a minimum of 40% canopy cover, so the pEA does not allow for the complete removal of vegetation near critical infrastructure (powerlines, roads, etc.). FOs can choose to retain higher canopy closure to meet other resource objectives. If a proposed action does not maintain 40% canopy cover, additional environmental review and authorization will be required.
Prescribed Fire	First action alternative analyzes the use of understory burning and pile burning. Second action alternative analyzes for pile burning only.	Neither action alternative would authorize prescribed fire without a written, approved Prescribed Fire Plan.
Rights-of-way	Proposed actions and analysis of effects to streamline proactive vegetation management projects to promote healthy forest and woodland structure within and near various rights-of-way types such as roads, powerlines, substations, geothermal and oil/gas facilities, pipelines, communication towers, and weather stations (see Table 2-1).	No policy or guidance is provided within the pEA regarding routine operations and maintenance that is already authorized under individual rights-of-way grants. The pEA has no effect on these authorizations.
Project Design Features	The pEA includes a substantial list of project design features (PDFs) that will reduce environmental effects to resources of concern.	FOs must follow the PDFs as applicable to the site-specific environmental review for an individual action. As part of adaptive management, PDFs may be modified in the future to reduce environmental effects and may or may not result in a lower level of effects than disclosed in this pEA.

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1. PURPOSE AND NEED FOR ACTION

1.1 Background

The California State Office of the Bureau of Land Management (BLM) has completed this Programmatic Environmental Assessment (pEA) evaluating management options to address widespread tree mortality near critical infrastructure (e.g., roads, private property, recreation areas, energy/water infrastructure, etc.). According to the U.S. Forest Service (USFS), approximately 129 million trees have died due to drought and bark beetles from 2014 to 2017 in California (USFS 2018). Even with record-breaking rains in the winter of 2016-2017, the effects of five consecutive years of severe drought, increase in bark beetles, and rising temperatures have led to continued tree die-off throughout the state.

Tree mortality near critical infrastructure poses risks to public health and safety directly as falling hazards and by increasing surface fuel loads. As dead trees decay, they are more likely to fall in whole or in part causing injury to individuals using public lands or damaging infrastructure and increasing surface fuel loads. Increased fuel loads result in more rapid spread of fire and higher fire intensity. As a result of the unprecedented levels of tree mortality from drought and rising temperatures, falling trees and the resulting increased fuel loading are hazards to public health and safety (TMTF 2017).

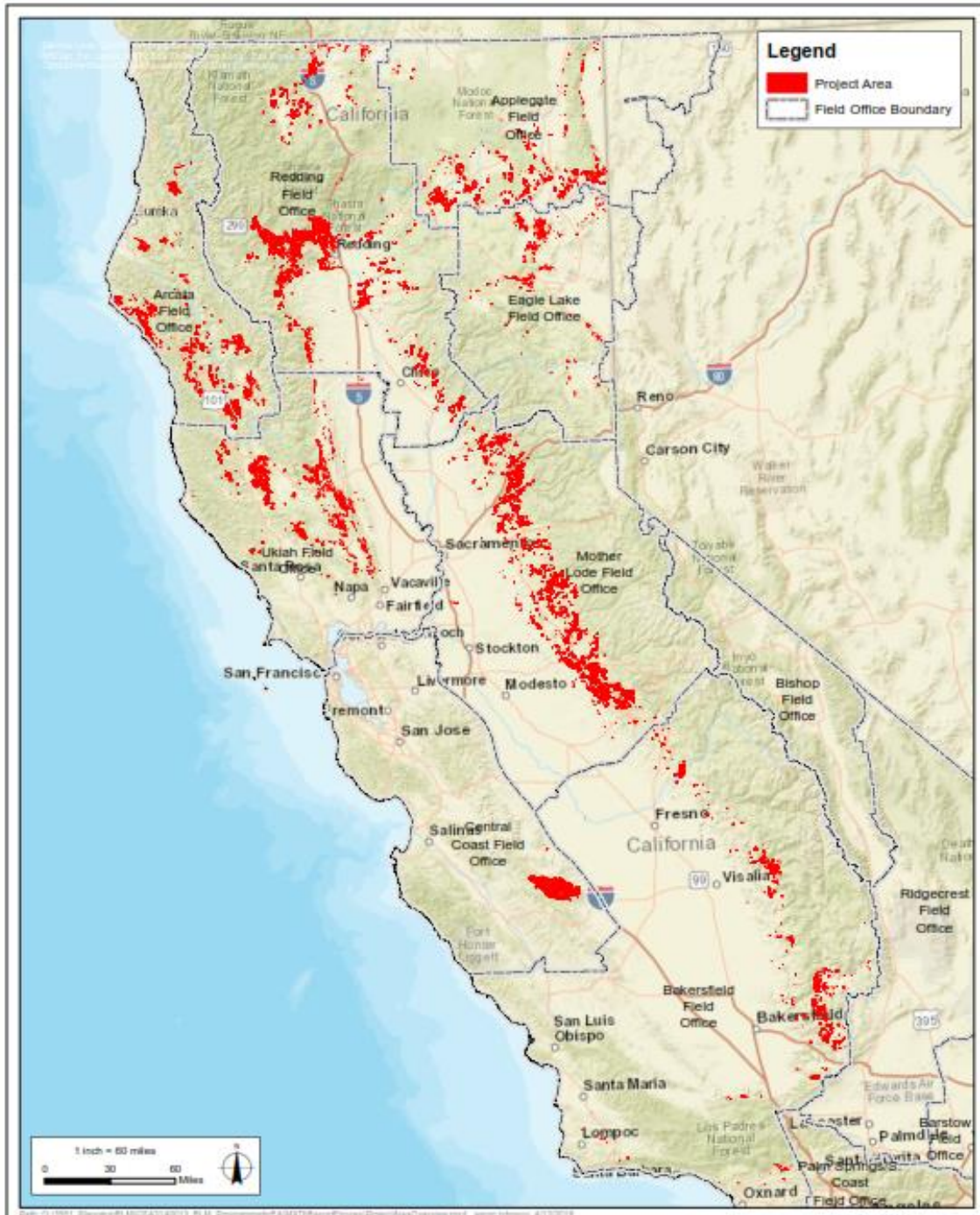
In a September 12, 2017 Memorandum, Secretary Zinke directed line officers in the Department of the Interior to do the following in response to increased fire risk: “1) use our existing policies more aggressively; 2) think differently about how those policies may be applied; 3) look for opportunities to partner with adjacent agencies, state and local governments, tribes, and private landowners to maximize resources; 4) look carefully at your existing management plans and ask if you are doing all you can today to address the threats of tomorrow; and 5) ensure that our landscapes are restored and maintained to meet our mission.” Consistent with Secretary Zinke’s direction, the BLM-California State Office has completed this pEA to evaluate management options for addressing tree mortality near critical infrastructure.

This pEA analyzes hazard removal and vegetation management within forests and woodlands managed by the BLM in the Northern California (NorCal)¹ and Central California (CenCal)² Districts, excluding the Bishop Field Office (Figure 1). Specifically, this pEA analyzes these activities within 200 feet of critical infrastructure (e.g., roads, private property, recreation areas, energy/water infrastructure, etc.). Lands within the project area include a mixture of a “checker board” of federal, state, county, and private ownership, as well as larger contiguous blocks of BLM-managed public lands, totaling approximately 551,000 acres under the administration of the BLM. These lands are referred to as the “project area” throughout the pEA.

¹ Includes the Applegate, Arcata, Eagle Lake and Redding BLM Field Offices.

² Includes the Bakersfield, Central Coast, Motherlode and Ukiah BLM Field Office

Figure 1. Overview of Project Area



amec foster wheeler

Project Area Overview
BLM HVRM Programmatic EA
California

FIGURE
1

1.2 Purpose and Need for Action

There is an immediate need for the BLM to remove hazards to people and critical infrastructure associated with dead and dying trees and excess fuel loading. There is a long-term need to manage vegetation adjacent to critical infrastructure to reduce tree and shrub densities, fuel loads, and protect the largest healthiest trees as tools for minimizing future tree mortality from drought, insects, disease, and fire. Density management studies and principles of ecosystem restoration support the need for promoting a healthy forest and woodland structure that retains large trees, protects species diversity, returns the role of fire, and includes small and mid-sized trees for wildlife habitat (Oliver et al. 1996; Rambo & North 2009). This is accomplished by removing the excess trees and shrubs that can carry high severity fire into the overstory.

The purpose of this action is to identify the appropriate tools to address this need in a way that is consistent with the principles of forest ecology and is compatible with the BLM's requirement under the Federal Land Management and Policy Act to manage the public lands in a manner "that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use." (43 U.S. Code [USC] 1701(a)(8)).

Management of these risks should meet the following criteria:

- Protect human health and safety;
- Maintain or enhance forest and woodland health and functionality;
- Comply with all applicable laws, regulations, and land use plans;
- Respond to the needs of neighboring land managers and owners; and
- Allow the BLM to partner with those neighbors when it is consistent with federal law and policy.

1.3 Decision to be Made

This pEA does not authorize site-specific hazard tree removal or vegetation management treatments. It provides a comprehensive hazard removal and vegetation management treatment framework and analysis for the BLM California State Office. After the conclusion of the 30-day public comment period for this pEA and incorporation of relevant substantive revisions, the BLM will publish a Final pEA. If the range of potential impacts are determined to be "less than significant" (40 Code of Federal Regulations [CFR] § 1508.27), the BLM will then publish a Finding of No Significant Impact (FONSI).

The BLM will decide whether to allow specific types of hazard removal and vegetation management within the project area (Figure 1), on no more than 20 percent of the BLM-managed lands within a watershed during a 10-year period, to meet the purpose and need of this action. If the BLM decides to adopt such an approach, the BLM will also decide which PDFs are needed to

implement the approach. The decision on this pEA would not preclude the use of other treatments or consideration of future projects.

The BLM would use the following procedures to authorize site-specific treatments:

1. A Field Office (FO) would propose and develop individual projects consistent with proposed action, project design features and decisions for this pEA.
2. Project-specific Determinations of NEPA Adequacy (DNA) would be completed prior to project decisions to assure that the effects of the activities proposed do not exceed the effects disclosed in this pEA.
3. If the DNAs determine that effects would exceed the effects disclosed, separate NEPA analysis would be required.
4. Project proposals and Decision Records (DR) would be written and posted on the BLM's e-planning website.
5. Decision records are subject to a 15-day protest period for each project under the Forest Management Regulations (43 CFR Part 5003), and subject to Administrative Remedies in accordance with these regulations.

1.4 Conformance with Land Use Plans

The project area includes 10 Resource Management Plans (RMPs) in the BLM NorCal and CenCal Districts. Implementation of individual projects taken under this pEA will be consistent with the goals, objectives, and management direction in the applicable RMP for any specific project. Prior to issuing a DR for an individual project, the BLM will evaluate the proposed project and confirm that it is consistent with the applicable RMP for the area.

2. PROPOSED ACTIONS

This pEA analyzes two action alternatives and a No Action alternative in detail. Both action alternatives incorporate Project Design Features (PDFs) designed to reduce or eliminate potential effects from project activities. The No Action alternative represents current conditions and trends, establishes a baseline for analysis, and serves as a reference point in discussing project activity. Additionally, other action alternatives and issues were considered, but not analyzed in detail. These are summarized in Appendix A.

The BLM developed the action alternatives to meet the purpose and need, based on existing environmental conditions, experience and public feedback on individual project proposals within the project area. The actions described in Sections 2.2 and 2.3 below represent a general overview of practices that would be permitted under each Alternative. Section 2.4 describes the use of project design features that would be applied to avoid or minimize impacts to specific resource concerns, such as federally listed species, sensitive plants and animals, cultural resources, soils, or water.

2.1 Alternative 1 (No Action)

The “No Action” alternative is defined as not implementing any aspect of the action alternatives. The No Action alternative serves as a baseline or reference point to represent current conditions and trends and as a baseline for analysis of environmental effects of the action alternatives. The No Action alternative is not a “static” alternative. Case-by-case projects to address hazard removal or vegetation treatments within 200 feet of critical infrastructure are being undertaken by both BLM and by entities that hold rights-of-way (e.g. utilities, road departments) under separate NEPA analyses. These case-by-case projects are scattered throughout the state. In these cases, individual projects are evaluated by resource specialists and project-specific PDFs are identified during project planning.

2.2 Alternative 2 (Proposed Action)

The Proposed Action includes a full suite of treatments, such as dead and dying tree removal, vegetation management, prescribed fire using a range of tools (e.g., manual felling, pile burning, understory burning, mechanical treatments, mastication, etc.) and some associated temporary infrastructure (i.e., landing areas, temporary roads).

The Proposed Action would authorize treatments within conifer forests and oak woodlands (excluding pinyon and juniper woodlands) across approximately 551,000 acres in central and northern California. Treatments would not exceed more than 20 percent of the BLM-managed public land within any one watershed over a 10-year period. The watershed level that will be used to track this metric is the HUC 10 as defined by the National Hydrology Dataset³. There are 336

³ The Pfafstetter Coding System delineates drainage areas (watersheds) in a hierarchical fashion, with "Level 1" watersheds at continental scales, subdivided into smaller Level 2 watersheds, which are divided into Level 3 watersheds, and so on. The average size of a HUC 10 watershed in California is 110,000 acres.

HUC 10 watersheds within the proposed project area, with varying amounts of potential treatment area. In individual watersheds, this 20 percent threshold represents a range of treatment areas from less than 1 acre to up to 8,500 acres. Due to budget and staffing limitations, the BLM estimates that between 2,500 and 20,000 acres of treatment will occur on an annual basis under this programmatic EA. This may double the amount of treatment acres conducted on BLM lands from the average of 20,000 acres currently being treated annually to 40,000 acres for all forestry-related activities.

2.2.1 Location of Proposed Hazard Removal and Vegetation Management

Within the areas described above (551,000 acres), hazard removal and vegetation management would only be done within 200 feet of critical infrastructure on BLM-managed public lands. The acres potentially treated within a watershed would vary significantly because the amount of forest and woodland habitat and amount of critical infrastructure varies from watershed to watershed.

Table 2-1. Critical Infrastructure Definitions

General Type of Infrastructure	Examples of infrastructure where treatments may occur 200 feet from the edge or within the feature
Roads ¹	Routes designated for use by motorized vehicles, county-maintained roads, official rights-of-way, private land ingress and egress routes
Energy infrastructure ¹	Powerlines, substations, geothermal and oil/gas facilities, pipelines
Recreation areas	Developed sites, including designated campgrounds, parking areas, trailheads, boat launches, shooting areas, non-motorized maintained hiking trails ²
Water facilities	Water diversion, distribution, storage, and supply features
Other infrastructure ¹	Communication towers, weather stations
Historic features	Buildings, structures, cemeteries
Private property ³	Where private land borders BLM land

¹-Hazard tree removal or other activities authorized under specific ROW grants will continue as authorized; this pEA analyzes for vegetation management activities that are not routinely part of ROW grant authorizations.

²-Dispersed use hiking trails would only have dead and dying tree felling/slash disposal while concentrated use trails may need more treatments (see REC-4 in Appendix B).

³-Unimproved and undeveloped private property bordering BLM lands will be the lowest priority for treatment

Dead trees would be cut down within the distance of one tree height (at a minimum based on trees present at that site) away from critical infrastructure, as defined above. The horizontal distance of one tree height can vary from 40 to 200 feet depending on the productivity of the soils and tree species. Treatments to reduce fuel loads and improve forest health (e.g., tree thinning) may be undertaken in a horizontal distance of up to 200 feet from critical infrastructure. For every mile of linear features, this 200-foot treatment zone equates to approximately 48 acres. This treatment zone near or within critical infrastructure is considered the “treatment area” as defined within this pEA. Treatment techniques are described below.

2.2.2 Hazard Removal

The BLM would remove or authorize the removal of dead or dying trees within 200 feet of critical infrastructure. For this pEA, a dying tree is defined as a standing tree that has been severely damaged by forces such as fire, wind, ice, insects, disease, or drought and that in the judgment of an experienced forester is likely to die within one to three years. The BLM would fall (cut) dead or dying trees (Phase 1) followed by the BLM or authorized party removing the trees and/or slash (limbs and tops) through hauling away, mastication on site, or pile burning (Phase 2).

During the removal phase, the BLM would retain down wood to meet key wildlife habitat values when possible and would only remove excess wood to prevent fuel loading (PDF WILD-5). In some situations, especially areas with high tree densities, these actions may cause damage to understory vegetation or residual live vegetation. In those situations, the BLM may address that damage by conducting subsequent or concurrent vegetation management of the remaining green trees in order to address the need to maintain or improve tree health and forest structure. Vegetation management is discussed below.

2.2.3 Vegetation Management

Vegetation management differs from hazard removal by allowing for the thinning of trees that are not defined as dead or dying. Vegetation management also includes reducing shrub densities and reducing fuel loading through removal and/or prescribed fire. Vegetation management prescriptions would be based on the vegetation community and the treatment objectives. All treatments would be designed to provide healthy, structurally complex forests and functional plant communities that would provide for species conservation and forest and woodland health, while minimizing future hazards (either to safety, infrastructure or ignition risk of wildfires). Site-specific vegetation management prescriptions for treatments would address BLM plant community goals and take into account anticipated vegetation responses based on factors such as landscape position, slope, aspect, soil types, and anticipated climate change. All treatments are limited to within 200 feet of critical infrastructure. All prescriptions would adhere to the PDFs listed in Appendix B.

2.2.3.1 Forest Vegetation Management

Stand density, structure (vertical and horizontal), and composition are three characteristics typically manipulated in vegetative treatments to restore forest stands. Density and composition affect individual tree growth, health, and resistance to drought and disease. High density stands would be thinned mainly in the mid and lower tree layers. Some codominant/dominant trees may also be removed to meet stand heterogeneity objectives. Variation, arrangement, and intensity of thinning levels would be applied by carefully considering the age and developmental trajectory of the stand. For example:

1. Young and mid-sized stands (e.g., less than 21 inches average diameter breast height [dbh]) would be moderately thinned to accelerate the growth of the remaining trees, thus developing them into structurally diverse, more open stands dominated by large trees that are more resilient to fire, insects, disease, wind, etc. Post-treatment canopy closure of young and mid-sized stands would be greater than 40 percent.
2. Mature-sized stands (greater than 21 inches average dbh) would be lightly thinned to reduce fuel loads and protect the large overstory tree layer from stand replacing fire. Post-treatment canopy closure of mature sized stands would be greater than 60 percent.

The treatments would be done with the following objectives:

- Develop multi-storied stands through cultivation of both shade-tolerant and shade-intolerant species including hardwoods. Maintain a diversity of tree and shrub species
- Develop spatial heterogeneity (fine-scale mosaic) through variable density thinning that includes a mixture of small gaps (less than 0.25 acre openings) to provide early-seral plant, fungal, and wildlife habitat
- Decrease fuel continuity to reduce risk of large-scale fire event
- Design treatments to prevent direct and indirect impacts to federally listed and BLM sensitive species
- Reduce potential for nonnative plant encroachment
- Create vertical and horizontal structural diversity that will benefit a variety of wildlife and botanical species

2.2.3.2 Woodland Vegetation Management

Oak woodlands provide habitat for wildlife and pollinators, add landscape complexity, provide gaps that impede the spread of fire, and often provide a transition between forests and shrub/grass communities (Holland 1988). A broad range of unique stand structures and habitat types are apparent in California oak ecosystems and each requires different management. Some stands are single stemmed trees with broad canopies that are widely spaced (savannah), and others are more densely spaced, forming continuous canopies of single and multiple stemmed oaks (woodland). Oak stands that were historically dominated by white and/or black oak but now have encroachment by young conifers, young oaks, other hardwoods, or shrubs would be treated to restore historical stand densities and stand structures.

The purpose of these treatments is to improve stand growth and maintain health and vigor of existing trees by reducing moisture stress, improving structural diversity, and reintroducing fire as an ecological process. The treatments would be done with the following objectives:

- Reduce conifers and woody shrubs in areas dominated by large oaks
- Reduce stand basal area to historic (if known) or the older cohort stand density, while retaining some younger oaks for recruitment
- Improve habitat conditions for specific neotropical migrant birds and woodpeckers, and in some areas forage conditions for deer and elk

- In areas where conifers are natural associates within oak woodlands, leave a wide spacing (less than 10 trees/acre) of recruitment age conifers with special consideration for ponderosa pine and sugar pine
- Retain oaks in all age/size categories, including seedlings/saplings
- Retain legacy conifers
- Retain down wood, snags, and other unique legacy features
- Restore fuel loading and arrangement to levels characteristic of low- and mixed-severity fire regimes as appropriate for the site, topography, and adjacent stand conditions
- Decrease fuel continuity to reduce risk of large-scale fire
- Reduce nonnative vegetation and promote fire-dependent species regeneration through prescribed fire
- Reduce stand densities to promote shrub and herbaceous species diversity
- Reduce potential for nonnative plant invasion and spread
- Design treatments to prevent direct and indirect impacts to federally listed and BLM sensitive species

2.2.3.3 *Riparian Vegetation Management*

Where riparian areas intersect the treatment area, vegetation management will be designed to meet the following objectives:

- Maintain and restore physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.
- Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems
- Maintain and restore water quality to meet objectives (criteria) and numeric and qualitative threshold standards established by the US EPA and Regional Water Quality Control Boards for beneficial uses designated for specific water bodies in the project area or downstream of the project area.
- Maintain and restore the sediment regime under which aquatic ecosystems evolved, including the timing, volume, rate, and character of sediment input, storage, and transport.
- Maintain and restore the species composition and structural diversity of plant communities in riparian areas, vernal pools, and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to support amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.
- Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

PDFs, as described in Appendix B, will be used to amend harvest prescriptions within riparian areas that intersect the 200-foot treatment zone near critical infrastructure.

2.2.4 Manual and Mechanical Methods

Implementation of the treatments described above would include a variety of manual and mechanical methods for removal of biomass (e.g., trees, other vegetative material) and management of fuels generated from treatments. Multiple methods may be used in the same treatment area (e.g. mastication with ground based extraction of merchantable trees and utilization of biomass). These methods are described in detail in Appendix C.

2.2.4.1 Prescribed Fire

For the purposes of this pEA, the two forms of prescribed fire proposed are pile burning and understory burning. The use of prescribed fires depends upon a wide range of variables and is specific to each situation and plant community. A written, approved Prescribed Fire Plan would be completed prior to ignition of a prescribed fire. Prescribed fire can only be used within 200 feet of critical infrastructure. The majority of burning under this pEA is likely to be pile burning. Prescribed fire techniques are described in detail in Appendix C.

2.2.4.2 Access for Treatments

In order to facilitate the removal of wood products (e.g., logs, firewood, biomass), a suite of options are proposed to provide access, while minimizing new disturbance, correcting poor road drainage, reducing compaction, revegetating disturbed areas, and reducing current and future erosion on roads and landings. Only temporary roads would be established; no permanent new road construction is proposed. No new temporary roads would be constructed in federally listed habitat as per the species-specific PDFs as described in Appendix B. Further, no new culverts or culvert replacements are proposed under this pEA; any culvert replacement needed would require preparation of additional NEPA-compliant documentation prior to being authorized, unless such activities are allowed in conformance with established RMPs or other previously prepared NEPA documents. Roads and landings used for the removal of wood products are described in detail in Appendix C.

2.2.4.3 Maintenance of Treatment Areas

Treatment areas may need future maintenance to maintain the effectiveness of the original implementation. All of the actions authorized in the pEA would be further authorized for maintenance with two exceptions: No additional thinning of greater than 7 inches dbh green trees will occur after the initial treatments and no reopening of temporary roads will be allowed. Before maintenance treatment is conducted, coordination with BLM resource specialists will occur so impacts to resources can be mitigated. No methods beyond those described in this project description will be utilized. Sensitive surface and sub-surface resources should be re- flagged as part of planning for maintenance treatments.

2.3 Alternative 3 (Reduced Proposed Action)

Alternative 3 would involve a reduced set of methods compared to Alternative 2 (Proposed Action). This alternative would not include any green tree thinning or understory burning. Under this alternative, dead and dying trees would be felled and their removal would be permitted by most means/measures described above (e.g., mastication, pile burning, etc.). However, in this scenario, no understory burning would be allowed. Further, this alternative would not include vegetation management (e.g., green tree thinning). Although less comprehensive than Alternative 2 (Proposed Action), it has been determined that Alternative 3 would satisfy the Purpose and Need of the Action because it addresses the short-term need to remove hazards associated with dead and dying trees and the hazardous fuels; therefore, this alternative will be carried forward for detailed analysis in the pEA.

2.4 Project Design Features

Incorporation of PDFs is integral to minimize environmental effects of project activities. Both alternatives would incorporate the PDFs developed for this pEA, as applicable to the site-specific environmental review for an individual action. The site-specific review will determine the resources of concern and select the appropriate PDFs to be used during project implementation. For example, treatments in Threatened and Endangered Northern Spotted Owl habitat will be designed according to PDF WILD-7 in order to avoid adverse impacts to this species.

As part of adaptive management, PDFs may be modified in the future to reduce environmental effects, incorporate new information, achieve new regulatory requirements, and may or may not result in less effects than disclosed in this pEA. A complete set of PDFs is presented in Appendix B.

3. AFFECTED ENVIRONMENT

3.1 Introduction

The description of the affected environment includes the current condition of each resource and the relevant characteristics that may be subject to impacts of the action alternatives and No Action alternative. Where a supplemental authority, such as a statute, regulation, or executive order should be considered as part of the environmental analysis, it is included in this section.

3.2 Resources Dismissed from Analysis

The following resources were dismissed from further analysis because they are not present within the project area or are present but not affected to a degree requiring detailed analysis. These resources are not discussed further in this pEA. The rationale for dismissal is provided in Appendix D.

- Environmental Justice
- Farmlands (Prime and Unique)
- Geology
- Livestock Grazing
- Mineral Resources
- Rangeland Health Standards
- Socioeconomics
- Wild Horse and Burro Management Areas
- Wilderness

The BLM considered the following resources but did not analyze them in full detail, often because the project's design or implementation of PDFs would eliminate or reduce effects on the resource to a level not warranting full analysis. This discussion is provided in Appendix D.

- Air Quality/Climate Change/Greenhouse Gas Emissions
- Lands/Realty
- Special Designations (e.g., ACEC, NCA, Wild and Scenic Rivers)
- Travel Management
- Water Resources

3.3 Resources Fully Analyzed

The following resources are or may be present in the BLM NorCal and CenCal Districts and may be affected by the No Action or action alternatives.

3.4 Forest Structure and Fuel Loading

The current forest structure and fuel loading within the project area is based on elevation, soils, land use/ownership patterns, timber harvesting, fire suppression, wildfires, insect outbreaks, droughts, rainfall, temperature changes, and the vegetation communities present within a region. All these elements create a patchwork of forest stands with varying canopy and understory composition and tree density. These same elements would come into play over the next decade as the proposed action is implemented. With the focus of the proposed action only on those areas within 200 feet of critical infrastructure, the current conditions and impact analysis in this pEA are focused on the forest edges present within these areas around critical infrastructure, but the broader patterns within these forest types illustrate the issues present in these more limited areas.

According to the USFS, the main factors contributing to tree mortality in California are drought-induced water stress, bark beetles, and tree density (Oliver et al. 1996; USFS 2016). Although drought is the trigger that creates thousands of stressed trees across a landscape, individual tree stress is exacerbated by high tree densities (Oliver et al. 1996; Christensen et al. 2016). Both water stress and bark beetles are exacerbated in stands with high densities.

It is during water-stressed periods that trees become suitable hosts for bark beetles. Moisture-stressed trees have less effective defense mechanisms against bark beetles, which can multiply at a rapid pace in these favorable conditions. The beetles bore through the tree's bark and lay eggs. The larvae hatch and feed on the tree's living tissue, eventually cutting off the tree's ability to transport nutrients.

As dead trees decay, they are more likely to fall, in whole or in part, potentially causing injury to individuals using public lands or damaging infrastructure. Whether naturally occurring or the result of hand cutting, fallen trunks and limbs add to surface fuel loads. Increased fuel loads result in more rapid fire spread and higher fire intensity. As a result of the unprecedented levels of tree mortality from drought and rising temperatures, falling trees and the resulting increased fuel loading are now greater hazards to public health and safety.

As mentioned previously in Section 1, 129 million trees in California have died due to drought and bark beetles from 2014 to 2017. Although California received record-breaking rains in the winter of 2016-2017, the effects of five consecutive years of severe drought, increases in bark beetles, and rising temperatures have led to continued tree die-off. To date, there are 142,480 acres with drought-induced tree mortality mapped on BLM lands in California (USFS 2018). Some of the mapped tree mortality is in close proximity to critical infrastructure.

Based on an analysis by the USFS, California is at risk of losing at least 25 percent of standing live forest due to insects and disease, over 5.7 million acres, or 12 percent, of the total forested area in the state by 2027 (Krist Jr et al. 2014; Forest Climate Action Team 2018). The current tree mortality ranges between less than 5 dead trees per acre to more than 40 dead trees per acre throughout the project area. Generally, the higher densities of dead trees occur at lower elevations,

while the higher elevations have lower densities of dead trees. Table 3-1 illustrates the data available on tree mortality from 2017 surveys. This table only presents the data available and covers only a limited portion of the project area. It illustrates the range of tree mortality and the forest types with tree mortality, but is not comprehensive.

Table 3-1. Total Acres by Forest Type of Tree Mortality (# trees per acre) in the Project Area

Forest Cover Type	Total Acres by Density of Dead Trees			
	0-5 Trees/Acre	5-15 Trees/Acre	15-40 Trees/Acre	40+ Trees/Acre
<i>Moist Forest</i>				
Cottonwood-Willow		3		
Douglas-fir-Tanoak-Pacific Dogwood	20	8		
Pacific Douglas-fir	202	10		1
Pacific Ponderosa Pine-Douglas-fir	622	248	117	30
Pacific Ponderosa Pine	590	769	51	22
Red Alder	5			
Redwood	63			
<i>Moderate and Dry Forest</i>				
Sierra Nevada Mixed Conifer	1,043	156	58	57
Interior Ponderosa Pine	941	105	18	1
Jeffrey Pine	40			
Knobcone Pine	33	21		
White Fir	385	49		
<i>Oak Woodland</i>				
Blue Oak-Gray Pine	48	37	3	
California Black Oak	151	153	3	7
California Coast Live Oak	60	8	15	45
Canyon Live Oak	375	283	48	112
Oregon White Oak	86	28		1

Source: (USFS 2018).

There are 30 forest and woodland cover types within the project area, based on data provided by BLM. For the purposes of this pEA, forest types occurring in the 551,000-acre project area have been divided into the general categories of moist forest, moderate/dry forest, and oak woodland.

Moist forests within the project area (37%) exist on moist sites and are predominately located in the coastal areas of northwest California and at the higher elevations of the Klamath Mountains, Cascade Range, and Sierra Nevada Range. Forest cover types are dominated by conifers and include Pacific Douglas-fir, White Fir, Redwood, and Douglas-fir-Tanoak-Pacific Dogwood. Moist forest ecosystems undergo many centuries of stand development and change after major

disturbances, such as severe wildfire or windstorm, before achieving the massiveness and structural complexity of old-growth forests (Franklin & Johnson 2012). Historically, moist forests experienced large, infrequent (only every few centuries) wildfires, which included extensive areas where fire severity resulted in stand-replacement conditions. However, today only a small percentage of moist forests remain in the old growth stage of stand development. Years of fire suppression and past timber harvest practices have changed much of stand structure of moist forests in the project area. Currently, the moist forests are dominated by dense, young, single layer stands that are low in biodiversity, with few canopy gaps or down woody debris (USFS 1990; Franklin & Johnson 2012). These stands lack the heterogeneous structure and species diversity of stands that have gone through natural succession. As a result, many of these moist forests are at higher risk of insect and disease outbreaks and susceptible to the spread of large scale wildfire.

Moderate/dry forests within the project area (19%) tend to exist on xeric sites and are predominately located at lower elevations and on the eastern side of the of the Klamath Mountains, Coastal Range, Cascade Range, and Sierra Nevada Range. Moderate/dry forest types are dominated by conifers and include Knobcone Pine, Jeffrey Pine, Aspen, Western White Pine, and others. Historically, moderate/dry forests were characterized by frequent (as often as every 3 years or up to several decades) wildfires, with low to mid-severity fires and low tree densities of drought-resistant species with many large individuals (USFS 2018). Composition and structure of existing moderate/dry forests have been dramatically altered by decades of fire suppression, grazing by domestic livestock, timber harvesting, and plantation establishment resulting in (1) many fewer, old trees of fire-resistant species, (2) denser forests with multiple canopy layers, (3) denser forests with continuous high fuel levels, and, consequently, (4) more stands being highly susceptible to stand-replacement wildfires and insect epidemics (Franklin & Johnson 2012).

Oak woodlands are prevalent throughout the project area (42%) in the lower elevation foothills. Oak woodland types include the Oregon White Oak, California Black Oak, Blue Oak-Gray Pine, and Coastal Live Oak types. Historically, oak woodlands had an open structure, relatively free of understory tree and shrub species, and was maintained by frequent, low-severity surface fires (USFS 2018). Since the 1800s, fire suppression, grazing, mining, and logging have greatly influenced the structure of these plant communities. Perhaps most notably, a century of fire suppression in these communities has led to encroachment by shade-tolerant conifer species. Shade-intolerant species such as Douglas-fir grow rapidly and can overtop and cause the growth of oak species in woodland communities to stagnate. This encroachment has altered the structure of these communities and greatly increased the fuel load, ignition risk, and potential for stand replacing wildfires. For example, un-encroached oak woodlands contain natural fuel beds of annually dried oak leaf litter and herbaceous species that are conducive to the spread of frequent, low-intensity surface fires. However, in encroached oak woodlands, the surface fuel beds become shaded by conifers and reduces flammability, but crown fire risk increases as encroaching conifers become ladder fuels (Cocking et al. 2015). These effects shift the oak woodland community away from frequent, low-severity fire patterns to infrequent, mid to high-severity fire patterns.

Since the treatment areas are restricted to within 200 feet of critical infrastructure, any treatments are limited to essentially forest edges which have increased sunlight and are not part of the interior canopy of these forest stands. This edge effect often results in a dense growth of early successional species and increased fuel loads that allow fire to spread rapidly to interior forest and wildlands, particularly if these areas do not receive regular stand density management. Thus, recent tree mortality in these areas has led to even greater fuel loads and ignition risk close to human activity and critical infrastructure. One study showed that 60% of wildfires in the conterminous US occurred within 200 meters (656 feet) of a road (Morrison 2007). Human-induced fires near roadways can be ignited in a variety of ways including cigarettes, sparks from electrical lines, dragging tow chains, broken catalytic converters, and vehicle collisions. Another study found that a positive correlation exists between lightning fire frequency and road density due to increased availability of flammable fine fuels near roads (The Wilderness Society 2018). With this in mind, the outer fringes of these communities can serve as potential wildfire ignition sources and allow fire to spread further into the interior canopy.

3.5 Vegetation and Native Plants

Vegetation communities, rare communities, and native rare plants are discussed in following sections. All the communities in the project area are forest and woodland communities and the dominant tree species are described above. There are three broad categories of communities: mesic forest, moderate/dry forest, and oak woodlands.

3.5.1 Upland Communities

Moderate/dry forests are primarily closed canopy conifer forests where the understory is generally limited due to lack of sunlight. As discussed in the previous section, this is largely due to fire suppression in the last several decades that has led to a denser forest structure. In dry forests, this has led to understories of higher density that can carry ladder fuels to the canopy, increasing the risk of high-intensity stand-replacing fires (Peterson et al. 2005). Stands can be fairly low species diversity and even-aged or more diverse in species and mixed age. Canopy openings, which were more common before fire suppression, allow for increased diversity in the understory due to increased sunlight within a larger closed canopy forest.

Oak woodlands are primarily open canopy or savannah communities that are often a mix of oaks with other hardwoods and conifers. Although these woodlands historically (pre-settlement) had a sparse overstory and an understory dominated by fire-tolerant grasses and forbs (Devine et al. 2007), today these woodlands typically have dense and diverse understories with more shrubs. In particular, conifers have encroached into the understories and started altering canopy species as well.

Moist forests were historically fairly open, old-growth forests but are currently mostly younger dense forests with a high risk of high intensity wildfires. These forests occur in upland areas in the wetter parts of California.

In these upland communities, the diversity of shrub, grass, and herbaceous species are important components providing wildlife habitat, important plants for pollinators, and other ecosystem services. These upland areas can grade slowly or quickly to riparian areas.

3.5.2 Riparian Communities

Riparian communities are found immediately around any water resource, although riparian areas usually refer to those communities found adjacent to streams. Riparian communities are areas of critical importance, as they are at the intersection of terrestrial and aquatic ecosystems and provide a wide range of ecosystem services. Riparian vegetation provides shade and large wood to streams and cover for fish. Streamside vegetation provides bank stability and shade to maintain cool water temperatures in perennial streams during summer months (Beschta et al. 1987). Riparian areas also provide terrestrial insects for fish food. Riparian corridors are important for terrestrial and aquatic wildlife (especially birds), help to mitigate flooding and recharge aquifers, provide stormwater filtering, and help to regulate temperature in streams. They also serve an important role in nutrient cycling in the broader context, as they are extremely productive environments with a high density and diversity of plants and animals. In addition, in arid environments, they tend to be areas with high concentrations of rare species and cultural resources.

There are many streams and associated riparian communities in the project area. Common riparian communities and dominant tree species are presented under moist forests in Section 3.4 above. The majority of moist forests within the project area include ponderosa pine and Douglas-fir as dominant trees. However, these moist forests cover broad areas, and the riparian zones are much more narrow zones. The riparian zones often have higher concentrations of tree species typical of riparian zones. For example, in a Ponderosa pine-Douglas-fir community, those two tree species would be found within the narrower riparian zone, but also cottonwoods, willows and sycamores would be more prevalent within the riparian zone.

There are two types of management zones administered in riparian communities within the project area: Riparian Reserves and Stream Management Zones (SMZs). These are discussed in more detail below.

Riparian Reserves were identified as part of the Northwest Forest Plan (USFS & BLM 1994, 2000), which includes some BLM lands in northern California (Applegate, Arcata, Redding, and Ukiah FOs). The widths of the Riparian Reserves also vary depending on the aquatic resource they surround (i.e., small wetland versus large lake), varying from 100 feet to 300 feet slope distance from the stream channel on both sides in width. Typically, Riparian Reserves are intended to maintain and restore riparian functions, maintain water quality and stream dynamics, and contribute toward the conservation and recovery of ESA-listed fish species and conservation of BLM sensitive species. Riparian Reserves have differing management objectives and management direction depending on the federal agency administering them. Since the Riparian Reserves in the project area span four BLM FOs, each RMP provides the specific management for Riparian Reserves within their respective FO.

The USFS defines **Streamside Management Zones (SMZs)** as designated zones adjacent to ephemeral, intermittent, and perennial channels and around water bodies, wetlands, springs, seeps and other wet areas (USFS 2000). SMZs are typically inclusive of Riparian Reserves, riparian habitat conservation areas, floodplains, and other areas identified to protect riparian corridors. There are no specified widths for SMZs, as they are developed on a project-specific basis. Factors considered include stream class, channel aspect and stability, and slope. SMZs are designed as a management tool for the maintenance and improvement of water quality.

Throughout freshwater systems, stream temperature has effects on aquatic species. Throughout the western US, temperature is of particular concern for listed and rare salmonid species. Riparian trees and large woody debris providing shade within the stream are key regulators of stream temperature. Riparian basal area and tree height have been shown to be good predictors of shade (Groom et al. 2011).

3.5.3 Rare Communities

For the purposes of this EA, rare vegetation communities are defined as S1 and S2 ranked communities according to the California state ranking system for rare elements (CDFW 2018). The S1 rank indicates critically imperiled communities that are extremely rare or are otherwise vulnerable and the S2 rank indicates imperiled communities that are very rare or otherwise vulnerable. There are two S1 and seven S2 ranked vegetation communities found within the project area. These include four types of riparian forest, two types of cypress forest, one type of dune forest, one type of walnut woodland, and one type of hemlock forest. These communities and their CNDDDB-derived acres within the project area are summarized in Appendix E.

3.5.4 BLM Sensitive Plants

BLM sensitive plants are those species with either limited distributions and/or low numbers that have threats to their survival and are occurring on enough BLM lands that BLM management can contribute to the species status. Generally, BLM sensitive plants are state-listed plants and those identified as 1A, 1B, 2B (CDFW 2018; CNPS 2018). There are 182 BLM sensitive plant species within the project area. Several species are documented on less than one acre within the project area and the majority of species are documented on less than 50 acres in the project area. The complete list of BLM sensitive plant species found within the project area and the area documented in CNDDDB data is included in Appendix E.

3.6 Invasive Plants and Weeds

Invasive plants include noxious weeds as well as other plants that are not native to the United States and are defined on the National Invasive Species Council's website under Executive Order 13751 at <https://www.doi.gov/invasivespecies/executive-order-13751>. The California Department of Food and Agriculture's Code 5004 defines noxious weeds, available at http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=FAC§ionNum=5004. Within the project area, many invasive plants exist and can increase in treatment areas.

As reported by Dr. Joe DiTomaso, a weed specialist at UC Davis, there are approximately 4,200 native plant species in California, 1,200 non-native plant species, and 200 plant species that are both invasive and non-native. The species that are both invasive and non-native are of greatest concern. Each FO maintains a priority list of invasive plants within its boundaries.

The California Department of Food and Agriculture (CDFA) maintains a California Noxious Weeds List and a Pest Rating List that identifies species of statewide concern that commonly cause management problems or that negatively impact agriculture, respectively. This weeds list can be found at https://www.cdfa.ca.gov/plant/ipc/encycloweedia/winfo_weedratings.html and the Pest Rating list can be found at http://ucanr.edu/sites/plantpest/Regulatory_Information/Pest_Ratings/.

The California Invasive Plant Council (Cal-IPC) maintains an inventory of invasive plants in California that are of regional or statewide concern and are common management problems, available at <https://www.cal-ipc.org/plants/inventory/>. The Cal-IPC inventory focuses on invasive plant species that tend to have ecological effects in wildland areas.

- High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- Moderate – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- Limited – These species are invasive, but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Appendix E provides some examples of invasive plants likely to be problematic within the project area. Some of those are species that occur in the forest and woodland areas where treatments will occur, others occur along roads and other open areas (e.g., parking lots, transmission lines), and both types might be problematic during and following treatments.

The distribution of invasive, non-native plants in a given region is a moving target because plants are continually expanding or contracting in reaction to management or natural influences (e.g., changes in rainfall, winter freezes). Deliberate and unintended introductions, climate, vulnerability of a particular niche within an ecosystem, and land uses interact together to influence distribution changes.

3.7 Soils (Compaction, Erosion and Sedimentation)

Soil properties are important drivers for determining vegetation and forest types and, ultimately, wildlife that will occur in various wildland areas. Throughout the project area, soil resources vary greatly in their properties and their resulting influences on the surrounding environment. Forest and woodland managers take into account the susceptibility of soils to compaction, soil erosion by wind and water, and sediment deposition processes. Different soil types provide different soil conditions and nutrient composition which are often tied to corresponding vegetation types. As described in Section 3.4, there are 30 forest and woodland types within the project area and each forest type is supported by its own soil types.

3.7.1 Compaction

Detrimental soil compaction in forests and woodlands generally results from use of heavy equipment during road and landing construction and from forestry activities such as ground-based yarding. In the process of compaction, pore spaces between soil particles become compressed. Higher soil moisture makes soils more prone to compaction because water is squeezed out of pore spaces and spaces between soil particles compress during compaction. The soil then becomes denser; less water and air can infiltrate down through the soil profile in the reduced pore space. Compaction also limits root penetration and thus may curb plant access to soil nutrients and induce slower plant growth. The compacted surfaces of roads also contribute to soil erosion by forcing water to run overland rather than naturally infiltrate at the point of raindrop impact. In turn, erosion will often lead to sedimentation, as displaced sediment is transported and deposited into nearby streams.

Soil erosion can also occur during and after high-intensity wildfires. Such fires have the potential to remove soil from the ground surface with its own high intensity winds, to volatilize soil nitrogen, incinerate soils organic compounds, and aerosolize the remaining dust-like soil particles into the atmosphere.

3.7.2 Erosion

Soil stability and related hazards depend primarily on soil properties, climate, and slope. As wind erosion primarily occurs in flat, dry, bare areas, it is not a concern within the forested and mountainous BLM lands which make up the project area. Thus, the potential effects of wind erosion are not being carried forward for detailed analysis. Erodibility by water is calculated using the K factor, an index which quantifies the relative susceptibility of the soil to sheet and rill erosion. Soil properties affecting K factor include texture, organic matter content, structure, and saturated hydraulic conductivity, and values range from 0.02 for the least erodible soils to 0.64 for the most erodible. Organic matter reduces the potential for detachment and increases water infiltration into the soil, thereby reducing runoff and thus erosion (Michigan State University Institute of Water Research 2002). Existing soils in the project area were assessed using the USDA's "Potential Erosion Hazard" rating for forest roads and trails, which indicate the hazard of soil loss from unsurfaced roads and trails (USDA NRCS 2016). Soil erosion K factor, slope, and content of rock

fragments are used to develop potential erosion hazard ratings. The hazard rating is described as "slight," "moderate," or "severe." Table 3-2 describes these soil potential erosion hazard ratings in the project area.

Table 3-2. Soil Erosion Hazard Within the Project Area by Field Office

Field Office	Severe ¹	Moderate ²	Slight ³	Not Rated*	Grand Total
Northern California District					
Applegate Field Office	17,354	11,100	1,654	2,295	32,403
Arcata Field Office	57,400	831	241	34,582	93,054
Eagle Lake Field Office	11,943	8,552	862	720	22,077
Redding Field Office	144,927	3,049	2,253	15,573	165,802
Northern California District Total	231,624	23,532	5,010	53,170	313,336
Central California District					
Bakersfield Field Office	28,881	206	78	5,249	34,414
Central Coast Field Office	24,270	33	177	225	24,705
Mother Lode Field Office	57,414	3,187	92	62,657	123,350
Ukiah Field Office	53,131	114	114	1,969	55,328
Central California District Total	163,696	3,540	461	70,100	237,797
Grand Total	395,320	27,072	5,471	123,270	551,133

Source: (USDA NRCS 2016, 2018)

¹ Significant erosion is expected, forest roads or trails require frequent maintenance, and costly erosion-control measures are needed.

² Some erosion is likely, the roads or trails may require occasional maintenance, and simple erosion-control measures are needed.

³ Little or no erosion is likely.

*Not Rated areas consist of land types that are unavailable for soil erosion hazard assessment, including but not limited to water, landfills, and rock outcrops.

Soils with high erosion potential are most predominant within the Redding Field Office jurisdiction, with a total of 144,927 acres rated severe for erosion hazard. Additionally, a majority of the lands within the project area under the jurisdiction of the Bakersfield and Ukiah Field Offices are rated as severe for erosion hazard. Of the 313,366 acres of project area lands within the Northern California District, a total of 213,624 acres are categorized as having a severe erosion hazard. Within the Central California District, 163,696 acres of the 237,797 acres of project area lands are considered severe for erosion potential. A total of 395,320 acres or approximately 72% of the 551,133-acre project area are rated severe.

3.7.3 Sediment Deposition in Streams

Soils with high erosion potential are likely to transport silt and sediment into receiving streams, sometimes leading to detrimental effects to water quality. Streams in California that have been affected by contaminants, including sediment, are designated by the California State Water

Resources Control Board (SWRCB) on the Clean Water Act (CWA) Section 303(d) list. Currently affected streams surrounded by highly erodible soils are most likely to be adversely impacted by sedimentation.

Table 3-3 describes streams within the project area that the State Water Resources Control Board has designated on the CWA Section 303(d) 2014-2016 Integrated List as impaired due to excessive sediment. Seven stream segments in the project area totaling 26.47 miles are listed for sedimentation impacts on the Section 303(d) list. Within the Northern California District of the project area, the Elk River is currently impacted by sediment along a stretch of approximately 16 miles. The stream with the greatest length of sedimentation impacts in the Central California District of the project area is Austin Creek within the Upper Russian River, with 6.5 miles of impacted stream. Additionally, the Geyserville Area of the Middle Russian River and Forsythe Creek within the Upper Russian River have approximately 2 and 1 miles, respectively, of impacted streams within the project area.

Table 3-3. Streams Within the Project Area Affected by Sediment

District	Stream Name	Affected Area (miles)
<i>Northern California District</i>	Arcata Field Office	16
	Eureka Plain HU, Elk River	16
	Klamath River HU, Middle HA, Scott River to Trinity River	0.1
<i>Central California District</i>	Central Coast Field Office	0.5
	Panoche Creek (Silver Creek to Belmont Avenue)	0.5
	Ukiah Field Office	10
	Russian River HU, Middle Russian River HA, Geyserville HSA	2
	Russian River HU, Lower Russian River HA, Austin Creek HSA	0.5
	Russian River HU, Upper Russian River HA, Coyote Valley HSA	6.5
	Russian River HU, Upper Russian River HA, Forsythe Creek HSA	1
Grand Total		26.5

Source: (California EPA 2006). ¹Hydrologic Unit ²Hydrologic Area ³Hydrologic Sub-Area

3.7.4 Fire

Depending on the intensity, effects from wildfires have the potential to change the properties of the affected soil. Intense fires may lead to soil hydrophobicity, which occurs when minerals within the soil become coated with a layer of organic material, decreasing the ability of the soil surface to absorb water (Erickson & White 2008). Combustion of organic materials and loss of vegetation can cause destabilization of the soil surface (Ross et al. 2012). Wildfires can also result in an increase in soil temperature due to blackening or darkening of the surface and loss of vegetation cover. These changes in soil properties may lead to alterations in soil nutrients and as a result, change the type and quantity of vegetation regrowth. Overall, fire effects on soils is generally

dependent on the severity of the fire (Erickson & White 2008). Refer to Section 3.4 for discussion of ignition risk and fuel loading within the project area.

3.8 Fish and Wildlife

Since the project area is limited to forest and woodlands, as described in Section 3.5, there is good quality wildlife habitat throughout the project area. The riparian communities discussed in Section 3.5 serve as important wildlife habitat for many species, primarily amphibians and birds. They also serve as migratory corridors for a wide range of species and contain important plant diversity for both invertebrate (i.e., pollinators) and vertebrate wildlife. However, since treatment areas are limited to 200 feet from critical infrastructure, the wildlife commonly found in these areas would be those that prefer edge habitats and thrive in the urban-wildland interface. This would include deer, small mammals, many types of birds, and small predators. There is too much diversity represented in the project area to summarize all wildlife species potentially occurring in the project area.

Migratory birds use areas throughout central and northern California for migration habitat, nesting habitat, and wintering habitat. The forests and woodlands included in the project area provide some of these habitats for numerous migratory birds. The complete list of birds protected under the Migratory Bird Treaty Act is available at <https://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php>. In addition, the USFWS maintains a list of birds of conservation concern based on species that might be at risk for listing under the Endangered Species Act. That list is available at <https://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>.

3.8.1 Special Status Species

This section summarizes the special status fish and wildlife species that are state-listed species, state species of concern (CDFW SSC), and BLM sensitive species (BLM) that have potential to occur in the project area. The complete list is also provided in Appendix E. Federally listed fish and wildlife species are not included here and are discussed in Section 3.9.

The northernmost portion of the Project Area includes areas within the Northwest Forest Plan (Arcata and Redding FOs). Under that plan, BLM has committed to managing and providing additional protections for species referred to as “survey and manage” species. These are all species found in forests and woodlands. While not identified by species in this section, many of the survey and manage species are also BLM sensitive species and discussed below.

3.8.1.1 Amphibians

A total of twelve special status amphibian species have the potential to occur within the project area. Species are listed and discussed below.

- California giant salamander (*Dicamptodon ensatus*) – CDFW SSC

- Foothill yellow-legged frog (*Rana boylei*) – CDFW SSC, State Candidate, BLM
- Kern Canyon slender salamander (*Batrachoseps simatus*) – State Threatened
- Limestone salamander (*Hydromantes brunus*) – State Threatened, BLM
- Pacific tailed frog (*Ascaphus truei*) – CDFW SSC
- Red-bellied newt (*Taricha rivularis*) - CDFW SSC
- Relictual slender salamander (*Batrachoseps relictus*) - CDFW SSC
- Shasta salamander (*Hydromantes shastae*) – State Threatened, BLM
- Southern torrent salamander (*Rhyacotriton variegatus*) - CDFW SSC
- Tehachapi slender salamander (*Batrachoseps stebbinsi*) – State Threatened, BLM
- Yellow-blotched salamander (*Ensatina eschscholtzii croceator*) – BLM
- Western spadefoot toad (*Spea hammondi*) – CDFW SSC, BLM

Tehachapi slender salamanders, Shasta salamanders, red-bellied newts, Kern Canyon slender salamanders, and yellow-blotched salamanders spend most of their time in forested habitats in California. Tehachapi slender salamanders are confined to a few locations in the Piute and Tehachapi Mountains within talus slopes of hardwood-conifer forests but can also be found in valley-foothill riparian habitats with talus slopes (Morey 2005). Shasta salamanders are primarily associated with limestone crevices and caverns within valley-foothill hardwood-conifer, ponderosa pine, and mixed conifer forests (Morey 1990). Red-bellied newts are typically found in redwood forests, but may also occupy mixed conifer, valley-foothill, montane hardwood, or hardwood-conifer forests and migrate to streams for breeding and egg-laying (Marangio 1990). Kern Canyon slender salamander is isolated to valley-foothill hardwoods, hardwood-conifer, or mixed chaparral areas of the Kern River Canyon (Morey & Basey 1990). Yellow-blotched salamanders are typically found in evergreen and deciduous forests, in areas where woody debris are present, and in close proximity to creeks or streams (Nafis 2018a).

Southern torrent salamanders, California giant salamanders, Pacific tailed frogs, foothill yellow-legged frogs, and relictual slender salamanders prefer riparian, wetland, and aquatic habitats in California. The southern torrent salamander prefers cold, well-shaded permanent streams and seepages within shady coniferous, montane riparian, or hardwood-coniferous forests (Marangio 2005). California giant salamanders are often found in or near cool, rocky streams and springs within humid coastal coniferous montane or riparian woodlands (Kucera 1997). Pacific tailed frogs require low-temperature perennial waters surrounded by mature conifer-dominated forests (Morey 2000a). Foothill yellow-legged frogs also prefer perennial streams, with rocky substrates and partial shading, surrounded by chaparral, open woodland, and forest (Hammerson 2010a). Relictual slender salamanders occur in drainages and swales surrounded by riparian woodlands, mixed conifer forests, or oak woodlands with abundant ground substrates (rocks, litter, woody debris) (Kucera 2015).

Western spadefoot toads can be found in a range of habitats including grasslands, woodlands, chaparral, and foothills. This species breeds primarily in temporary pools and slow-moving streams (Santos-Barrera et al. 2004).

The limestone salamander is the only species primarily associated with shrubland habitat. It occurs in shrubby chaparral habitats with limestone outcrops, caverns, or talus formations (Basey & Morey 2000).

3.8.1.2 Reptiles

A total of seven special status reptile species have the potential to occur within the project area.

- Coast horned lizard (*Phrynosoma blainvillii*) - CDFW SSC, BLM
- Northern California legless lizard (*Anniella pulchra*) - CDFW SSC
- Southern Sierra legless lizard (*Anniella campi*) - CDFW SSC
- Two-striped gartersnake (*Thamnophis hammondi*) - CDFW SSC, BLM
- Western pond turtle (*Actinemys marmorata*) - CDFW SSC
- Southwestern pond turtle (*Actinemys marmorata pallida*) - BLM
- California mountain kingsnake (*Lampropeltis zonata*) – BLM

Coast horned lizards occur in a variety of habitat types, including shrubland, grassland, coniferous forests, and deciduous forests in areas with scattered shrubs and ant colonies, which is their main food source (Hammerson 2010b). The Southern Sierra legless lizard is found near springs in canyons that open up to the Mojave Desert (Hammerson 2016a). The Northern California legless lizard prefers areas with sandy soils with oak, pine-oak, chaparral, woody riparian areas, or desert-scrub (Hammerson 2016b). Two-striped gartersnake can be found in a variety of habitats near semi-permanent water sources surrounded by dense vegetation (Kucera 2000). Western pond turtles are primarily associated with permanent to semi-permanent water bodies with structural components (logs, rocks, etc.) and a variety of vegetation (Morey 2000b). Southwestern pond turtles require structural components and exposed banks for basking and can be found in a variety of water sources (Nafis 2018b). California mountain kingsnakes occur in a variety of habitat types, including coniferous forests, woodlands, chaparral, and coastal sage scrub (Hollingsworth & Hammerson 2007).

3.8.1.3 Fish

A total of six special status fish species have the potential to occur within the project area.

- Clear lake hitch (*Lavinia exilicauda chi*) – State Threatened, BLM
- Red Hills roach (*Lavinia symmetricus* subsp. 3) – CDFW SSC, BLM
- San Joaquin roach (*Lavinia symmetricus* subsp. 1)– CDFW SSC
- Rough sculpin (*Cottus asperimus*) - State Threatened, BLM
- Pacific lamprey (*Entosphenus tridentatus*) – CDFW SSC, BLM
- Wall Canyon sucker (*Catostomus murivallis*) - BLM

Clear lake hitch (*Lavinia exilicauda chi*) is a large minnow endemic to Clear Lake that was listed as state threatened in 2014. This fish spawns in tributaries of Clear Lake each spring (Center for Biological Diversity 2012). Red Hills roach and San Joaquin roach are subspecies of California

roach (*Lavinia symmetricus*) and occupy different habitats and areas of California. Red Hills roach occurs in creeks with serpentine soils and stunted vegetation within Horton Creek and other small streams near Sonora in the San Joaquin River drainage (Hammerson 1999). San Joaquin roach occurs in small, warm, intermittent streams with deep-bottomed pools in tributaries of the San Joaquin River drainage (Hammerson 1991). Rough sculpins can be found in creeks and rivers with sand or gravel bottoms and deep water (NatureServe 2014). Pacific lamprey occur in lakes, rivers, and creeks and are primarily found near shallow banks, eddies, and backwaters (Page & Burr 1991). The Wall Canyon sucker is only known to occur in the creeks of Wall Canyon and Mountain View (Caltrans 2016).

3.8.1.4 Bats

Nine special status bat species have the potential to occur within the project area:

- Fringed myotis (*Myotis thysanodes*) - BLM
- Long-eared myotis (*Myotis evotis*) - BLM
- Pallid bat (*Antrozous pallidus*) - CDFW SSC, BLM
- Small-footed myotis (*Myotis ciliolabrum*) - BLM
- Spotted bat (*Euderma maculatum*) - CDFW SSC, BLM
- Townsend's big-eared bat (*Corynorhinus townsendii*) - CDFW SSC, BLM
- Western mastiff bat (*Eumops perotis californicus*) - CDFW SSC, BLM
- Western red bat (*Lasiurus blossevillii*) - CDFW SSC
- Yuma myotis (*Myotis yumanensis*) - BLM

Western mastiff bat and pallid bat are typically found near rocky areas with open space nearby for foraging (Ahlborn 1990a; Harris 1990a). Spotted bats are most often found near rocky and cliff habitat for roosting near water used for foraging (Harris 2000a). Western red bat typically roost in trees and shrubs and forage in open areas or along edge habitat (Harris 1990b). Townsend's big-eared bat roost in caves, mines, buildings, or man-made structures and forage along edge habitat areas (Harris 2000b).

The small-footed myotis can be found in a variety of habitats including grasslands, canyons, and woodlands. The small-footed myotis typically roosts in cliffs, mines, caves, tunnels, beneath tree bark, and manmade structures (Arroyo-Cabrales & Álvarez-Castañeda 2017a). The long-eared myotis is commonly found in mixed coniferous forests and typically roosts in tree cavities and stumps (Arroyo-Cabrales & Álvarez-Castañeda 2017b). The fringed myotis can be found in woodlands, ponderosa pine forests, desert, and grassland habitats. The fringed myotis roosts in caves, mines, buildings, and crevices (Arroyo-Cabrales & de Grammont 2017). The Yuma myotis is primarily associated with bodies of water, in habitats ranging from woodlands to desert. The Yuma myotis roosts in caves and a variety of manmade structures (Arroyo-Cabrales & Álvarez-Castañeda 2008).

3.8.1.5 *Predators*

Five special status predator species have the potential to occur within the project area:

- American badger (*Taxidea taxus*) - CDFW SSC
- Fisher (West Coast DPS) (*Pekania pennanti*) - CDFW SSC, BLM
- Humboldt marten (*Martes caurina humboldtensis*) - CDFW SSC
- Mountain lion (*Puma concolor*) – State fully protected
- Sierra Nevada red fox (*Vulpes vulpes necator*) – State Threatened

American badgers are primarily found in grasslands, shrublands, chaparral, or areas mixed with the habitats (Ahlborn 1990b). Humboldt marten and fisher both may be found in mature, mixed-aged coniferous forests with dense canopy closure and little human disturbance. Both species may prey upon small mammals, but may also eat birds, insects, fruit, or carrion. Both species use cavities in live or dead trees, burrows, crevices, or caves for denning (Ahlborn 1990c, 1990d). The Sierra Nevada red fox may be found in a variety of habitats, including alpine dwarf shrub, wet meadow, coniferous forests, aspen woodlands, montane riparian, or montane chaparral. The species dens in rock outcrops, hollow logs, and burrows (Johnson & Harris 2000). The mountain lion can be found in a variety of habitats, ranging from forests to desert. Mountain lions have shown a preference for dense vegetation but may also be found in areas of minimal coverage (Nielsen et al. 2015).

3.8.1.6 *Small Mammals*

Nine special status small mammal species have the potential to occur within the project area:

- Big-eared kangaroo rat (*Dipodomys venustus elephantinus*) - CDFW SSC
- Nelson’s antelope squirrel (*Ammospermophilus nelsoni*) – State Threatened, BLM
- Oregon snowshoe hare (*Lepus americanus klamathensis*) - CDFW SSC
- Pygmy rabbit (*Brachylagus idahoensis*) - CDFW SSC, BLM
- San Joaquin pocket mouse (*Perognathus inornatus*) - BLM
- Sierra Nevada mountain beaver (*Aplodontia rufa californica*) - CDFW SSC
- Sonoma tree vole (*Arborimus pomo*) - CDFW SSC
- Tulare grasshopper mouse (*Onychomys torridus tularensis*) - CDFW SSC, BLM
- Western white-tailed jackrabbit (*Lepus townsendii townsendii*) - CDFW SSC

Western white-tailed jackrabbit, pygmy rabbit, Nelson’s antelope squirrel, big-eared kangaroo rat, and Tulare grasshopper mouse are primarily found in grasslands, shrublands, chaparral, or areas mixed with the habitats (Duke & Hoefler 1990; Hoefler 1990; Ahlborn 2005; Reid 2006)(Duke & Hoefler 1990; Hoefler 1990; Ahlborn 2005; Reid 2006). Oregon snowshoe hares prefer areas of dense vegetation in high elevations within riparian or coniferous habitats (Hoefler & Duke 1990). The San Joaquin pocket mouse is typically found in grasslands, savannas, and desert shrublands (Cassola 2016). Sierra Nevada mountain beaver requires dense deciduous riparian and open brushy forests, near water, with deep, friable soils that allow for burrowing (Polite 1990). Sonoma tree

voles are found in mature Douglas-fir, redwood, or mixed evergreen forests (Brylski & Harris 1990).

3.8.1.7 *Raptors*

A total of seven special status raptor species have the potential to occur within the project area.

- Bald eagle (*Haliaeetus leucocephalus*) – State Endangered, BGEPA, BLM
- Burrowing owl (*Athene cunicularia*) - CDFW SSC, BLM
- California spotted owl (*Strix occidentalis occidentalis*) - CDFW SSC, BLM
- Golden eagle (*Aquila chrysaetos*) - CDFW FP, BGEPA, BLM
- Great gray owl (*Strix nebulosa*) – State Endangered
- Northern goshawk (*Accipiter gentilis*) - CDFW SSC, BLM
- Swainson's hawk (*Buteo swainsoni*) - CDFW SSC, BLM

Bald and golden eagles are protected under the federal Bald and Golden Eagle Protection Act as well as being BLM sensitive species. Northern goshawks and great gray owls both require dense forest cover for roosting and nesting. Northern goshawk use either coniferous or deciduous forest, while great gray owls prefer coniferous forest. Both species require occasional open areas for hunting and snags or dead trees for nesting (great gray owl) and hunting perches (northern goshawk) (Gaines 1981; Polite & Pratt 2005). Bald eagles are typically found near water with abundant fish for prey and often nest in the largest tree in an area (Polite & Pratt 1999). Golden eagles prefer secluded cliffs with overhanging ledges and large trees (Zeiner et al. 1990). Burrowing owls are found in open areas, grasslands, and shrublands with prairie dog colonies or other small mammal burrows, which are used for nesting burrows (Polite 1999). Swainson's hawk can be found in open grasslands, shrublands, or cropland where foraging occurs, with singular large trees scattered that are used for nesting (Polite 2006). California spotted owls require mature forests with large snags and similar habitat as the northern spotted owl discussed below in Section 3.9, although they are different subspecies and occur further south than the northern spotted owl (Zeiner et al. 1990).

3.9 Federally Listed Species

The project area is distributed over a large geographic area in California. While limited to forest and woodlands, it is spread across many ecoregions. The list of potential federally listed species was created initially by examining CNDDDB data against the project area parcels, which were then reviewed by biologists familiar with federally listed species to identify any missing potential species. Then the lists were reviewed to identify those species that had potential to occur in forest and woodland areas and further refined by eliminating species that were vernal pool or wetland obligates as those areas would not be affected by the proposed action. Appendix E includes a table of species originally identified but then eliminated from analysis, as well as the lists of plants and animals identified which had the potential to be impacted by the proposed action. These species are described more in this section.

3.9.1 Plants

There are 11 federally-listed plant species that have the potential or are known to occur in the project area and that may be affected by the Proposed Action (Table 3-4). These species cover a range of habitats across the project area, although many are associated with grasslands or other open areas. Most are very localized.

Table 3-4. Federally-Listed Plant Species Present in the Project Area

Common Name	Federal Status	Counties	Habitat
El Dorado bedstraw	FE	El Dorado	Black oak and live oak woodlands
Gentner's fritillary	FE	Siskiyou	Dry, open portions of oak woodlands
Layne's butterweed	FT	El Dorado, Yuba, and Tuolumne	Open rocky areas of chaparral plant communities with gabbro or serpentine soils
Pine Hill ceanothus	FE	El Dorado	On gabbro soils in chaparral plant communities; occasionally disturbed chaparral sites
Pine Hill flannelbush	FE	El Dorado	Rocky areas of chaparral plant communities and in black oak woodlands near or on Pine Hill
Red Hills vervain	FT	Tuolumne	On moist serpentine soils near streams, springs, or seeps; typically in pine or oak woodlands between 837-1,310 feet
San Benito evening-primrose	FT	San Benito, Fresno	Found below 4,500 feet in stable areas with minimal erosion, small slopes, and minimal surface gravel
San Joaquin adobe sunburst	FT	Tulare	Grasslands on low hills and transition zones between grasslands and blue oak woodlands between 390-2,600 feet
San Joaquin woollythreads	FE	Fresno	Grasslands between 2,000-2,600 feet or on the valley floor with saltbrush scrub habitats between 200-850 feet
Springville clarkia	FT	Tulare	Between 1,080-4,000 feet, found on uphill slopes of roadbanks, decomposing granite domes, and in sunny openings of blue oak woodlands
Stebbins' morning-glory	FE	El Dorado, Nevada	Open areas in chaparral plant communities on gabbro or serpentine soils, may be disturbance dependent

Sources: (CDFW 2018; USFWS 2018k, 2018j, 2018f, 2018b, 2018c, 2018d, 2018e, 2018a, 2018g, 2018h, 2018i)

FE: Federally endangered

FT: Federally threatened

3.9.2 Terrestrial Wildlife

There are eight federally-listed terrestrial wildlife species that include six birds, one invertebrate, and one mammal (Table 3-5). These species occur in a range of habitats. Some such as the gray wolf, have a wide range of habitat use while others are habitat specialists, such as the marbled murrelet. Many of these terrestrial wildlife species use riparian habitats. Five of the birds also have critical habitat occurring in the project area

Table 3-5. Federally-Listed Terrestrial Wildlife Species and Critical Habitat with Potential to Occur in the Project Area

Common Name	Federal Status	Critical Habitat	Range*	Habitat
California condor	FE	Yes	Kern (CH), Tulare (CH), San Benito, Monterey, Santa Barbara, and Ventura counties	Large, remote areas with minimal disturbance and support populations of large mammals; large trees, snags, isolated rocky outcrops, and cliffs are utilized for roosting
Least Bell's vireo	FE	No	Tehama, Ventura counties	Riparian woodland habitats are required during breeding season (March-September), preferably with early successional habitats
Marbled murrelet	FT	Yes	Del Norte, Humboldt (CH), Mendocino (CH), and Trinity counties (and Santa Cruz)	Mostly on the ocean, but moves inland to nest, typically occurring in old-growth forests with large trees, multiple canopy layers, and a moderate to high canopy closure; known to use redwood and Douglas-fir forests
Northern spotted owl	FT	Yes	Northern California, including Humboldt (CH), Lake (CH), Mendocino (CH), Napa (CH), Sonoma (CH), Siskiyou (CH), Shasta (CH), Tehama (CH), and Trinity (CH) counties	Mature or old-growth forests with large trees or snags with cavities, broken tops, mistletoe platforms, high canopy cover, multilayered and multispecies canopy cover, open space below the canopy, and accumulation of woody debris on the ground
Southwestern willow flycatcher	FE	Yes	Kern (CH)	Riparian habitats from sea level to 8,500 feet; breeding habitats are typically expansive mosaics of dense shrubs and trees with saturated soils near surface water (April-September); nests near the ground in dense vegetation, under a low-density canopy
Western yellow-billed cuckoo	FT	Yes	Northern and central California with Butte (CH), Kern (CH), and Tehama (CH) counties	Riparian habitats, typically cottonwood or willow woodlands; nesting habitat typically large patches (10 hectares or more) with a multilayered canopy
Valley elderberry longhorn beetle	FT	No	Central Valley in Sacramento and Solano Counties, also on BLM land in Colusa County (Bear Creek)	Riparian forests where the host plant (elderberry [<i>Sambucus</i> spp.]) is present

Table 3-5. Federally-Listed Terrestrial Wildlife Species and Critical Habitat with Potential to Occur in the Project Area (Continued)

Common Name	Federal Status	Critical Habitat	Range*	Habitat
Gray wolf	FE	No	northern California (Modoc, Shasta, Siskiyou, Tehama, and Trinity counties)	Habitat generalist with territories of 200 to 400 square miles; use areas based on prey abundance, den availability, ease of travel, snow conditions, topography, and human presence

Sources: (USFWS 2011, 2018o, 2018s, 2018n, 2018l, 2018p, 2018m, 2018q, 2018r; CDFW 2018)

FE: Federally endangered, FT: Federally threatened

*CH indicates critical habitat is designated in that county within the project area.

3.9.3 Aquatic Wildlife

There are five federally-listed aquatic species that occur in streams for part of their life cycle within the project area, including one crayfish and one frog also using adjacent riparian habitat (Table 3-6). The other species are three species of fish (salmonids with multiple listed ESUs and DPSs). The frog and salmon have critical habitat within the project area.

Table 3-6. Federally-Listed Aquatic Species and Critical Habitat with Potential to Occur in the Project Area

Common Name	Federal Status	Critical Habitat	Range	Habitat
California red-legged frog	FT	Yes	Coastal drainages throughout state	Elevations between sea level and 5,200 feet; uses riparian, aquatic, and upland habitat
Shasta crayfish	FE	No	Pit River, Fall River, and Hat Creek drainages in Shasta County	Spring-fed bodies of water with clean and firm substrate of sand or gravel, little fluctuation in temperature, and large volcanic rocks
Chinook salmon - Central Valley spring-run ESU	FT	Yes	Sacramento River	Cold water habitats through spring and summer, with spawning in the fall
Chinook salmon - Sacramento River winter-run ESU	FE	Yes	Sacramento River	Spawns in the summer but requires clean water with temperatures 42.5-57.5 degrees Fahrenheit
Chinook salmon – California coastal ESU	FT	Yes	Glenn, Lake, Sonoma, Mendocino, Humboldt, and Trinity counties	Cold water habitats in coastal streams and rivers

Table 3-6. Federally-Listed Aquatic Species and Critical Habitat with Potential to Occur in the Project Area (Continued)

Common Name	Federal Status	Critical Habitat	Range	Habitat
Coho salmon - southern Oregon / northern California ESU	FT	Yes	Del Norte, Humboldt, Mendocino, and Trinity counties	Spawning migration between October and March; spawning habitat has substrate of small to medium-sized gravel, typically located near a riffle; juvenile rearing habitat includes slow moving water, deep pools, dense shade, and cover such as woody debris
Coho salmon – central California coast ESU	FE	Yes	Humboldt, Mendocino, Sonoma, Marin, San Francisco, San Mateo and Santa Cruz counties	Spawning migration between September and January; spawning from November to January, or into March further south; juvenile rearing habitat is at the head of a riffle, below a pool, with medium-sized gravel.
Steelhead - Central Valley DPS	FT	Yes	Central Valley (Butte, Shasta, Sacramento, San Joaquin, Stanislaus, Tehama, Yuba, counties)	Spawning (December-April) in small streams and tributaries with cool water, gravel substrate, well oxygenated water, and water depths 6-24 inches
Steelhead - northern California DPS	FT	Yes	Northern California (Humboldt, Mendocino counties)	Spawning (December-April) in small streams and tributaries with cool water, gravel substrate, well oxygenated water, and water depths 6-24 inches
Steelhead - south-central California coast DPS	FE	Yes	Southern California coast (Santa Cruz, Santa Clara, Monterey, San Benito, and San Luis Obispo counties)	Spawning (December-April) in small streams and tributaries with cool water, gravel substrate, well oxygenated water, and water depths 6-24 inches

Table 3-6. Federally-Listed Aquatic Species and Critical Habitat with Potential to Occur in the Project Area (Continued)

Common Name	Federal Status	Critical Habitat	Range	Habitat
Steelhead - central California coast DPS	FE	Yes	Central California coast (Mendocino, Sonoma, Napa, Marin, San Francisco, San Mateo, Solano, Contra Costa, Alameda, Santa Clara, and Santa Cruz counties)	Spawning (December-April) in small streams and tributaries with cool water, gravel substrate, well oxygenated water, and water depths 6-24 inches

Sources: (CDFW 2018; NOAA 2018c; USFWS 2018v; NOAA 2018a, 2018b, USFWS 2018u, 2018t, 2018w, 2018x, 2018y, 2018z)

FE: Federally endangered, FT: Federally threatened

*CH indicates critical habitat is designated in that county within the project area.

3.10 Cultural Resources

Cultural resources include the following categories that may be affected by the Proposed Action: prehistoric resources; historic-period archaeological resources; historic-period built environment resources; isolated artifacts, and Native American traditional cultural properties and other areas of special interest.

The BLM Field Office archaeologists, archaeological contractors, and other qualified entities have surveyed 134,441 acres for the presence of cultural resources, representing over 24 percent of the project area. These inventories have recorded 2,815 cultural resources. Their attributes have been tabulated by each of the eight BLM Field Offices and are summarized in Table 3-7. Redding and Applegate Field Offices appear to have the highest density of cultural resource areas within inventoried project areas.

3.10.1 Prehistoric Resources

Evidence for prehistoric occupation before this time is scant, but suggests the potential for occupation in the project area as early as 13,400 years calibrated (cal) Before Present (BP) (Far Western 2016). Given there are currently more than 70 different recognized tribes with interest in the project area, the diversity of these sites in terms of cultural adaptations and recorded prehistoric resources is phenomenal. These prehistoric populations were hunters, fishers, and gatherers, exploiting food resources that were subject to seasonal variations, as well as longer term climatic fluctuations.

Archaeologists studying different cultural adaptations throughout the state have developed chronologies explaining the changes in prehistoric site artifacts and distribution over the various geomorphic provinces that fall within the project area, striving to illustrate the manner in which Native Californians responded to environmental change, human demographic fluctuations, migration of human groups into the area from other regions of western North America, and increasing linguistic, economic and social complexities. These chronologies vary throughout the project area, given the variations in prehistoric cultural development. A generalized chronological culture sequence that encompasses the variability throughout the 551,000-acre project area is provided in the Cultural and Paleontological Resources Report available on the BLM's NEPA ePlanning webpage at <https://goo.gl/v3WCAe>.

Cultural resource investigations aimed at the identification of cultural resources have been accomplished in varying degrees over the project area by BLM archaeologists, archaeological contractors, and other qualified entities since 1970, with most investigations occurring between 1981 and 2013. Investigations in the project area continue to the present, as the BLM conducts surveys related to environmental review/compliance as well as proactive surveys to support the BLM's cultural resource program (in compliance with laws such as Section 110 of National Historic Preservation Act). BLM surveys have led to the recordation of 2,815 cultural resources in the project area. Categories of sites have been developed during previous investigations, with up to eight different prehistoric categories (Far Western 2016). The present assessment of the cultural resources in the project area has proposed a much more rigorous classification of over 203 categories including prehistoric and historic-period cultural resources. The area of prehistoric resources is greatest in the Applegate, Mother Lode, Ukiah and Redding Field Offices. Prehistoric resources represent 1,559.82 acres and 21 percent of all recorded cultural resource areas within the project area. Please refer to the in the Cultural and Paleontological Resources Report available on the BLM's ePlanning webpage for more details including methodology.

Table 3-7. Cultural Resources Inventory – Field Office Summary by Area

Inventory Characteristic (Area In Acres)	Field Office						
	Applegate	Arcata	Bakersfield	Central Coast	Eagle Lake	Mother Lode	Redding
Field Office Project Area	32,403	93,055	34,415	24,705	22,077	123,349	165,802
Inventory Area	3,201.94	9,563.13	7,470.54	564.26	6,464.19	43,087.55	44,883.95
Field Office Area Inventoried (%)	9.9	10.3	21.7	2.3	29.3	34.9	27.1
Cultural Resources	257.74	107.30	257.37	32.40	78.78	1,760.28	4,571.15
Cultural Resources/ District Inventory Area (%)	8.0	1.1	3.4	5.7	1.2	4.1	10.2

¹ Includes Prehistoric and Prehistoric/Historic Archaeological Resources

² Includes Historic Archaeological and Architectural Built Resources

³ No chronological indication provided

Of the 1,004 prehistoric resources (including a prehistoric component only, combined prehistoric and historic components, and prehistoric isolates) that can be characterized by this typology, is the Redding Field Office (31 percent) and Mother Lode Field Office (20 percent) have the greatest number of resources, respectively. Lithic scatters are most common (23 percent), followed by bedrock milling features (13 percent), and simple habitation sites (11 percent). Fifty prehistoric component resources (either exclusively prehistoric, or recorded with a subsequent historic period occupation) are listed or determined eligible for listing on the National Register of Historical Places (NRHP). Additional detail is provided in the Cultural and Paleontological Resources Report available on the BLM's NEPA ePlanning website at <https://goo.gl/v3WCAe>.

3.10.2 Historic-Period Resources

Subsequent settlement of the project area by Euroamerican populations was encouraged by the exploitation of rich natural resources, beginning with cattle ranching following the Spanish Colonial Period in the late 18th and early 19th century, Mexican Republic-Rancho Period in the early-to-mid-19th century, fur trapping in the early 19th century, and the American Period starting with the advent of the Gold Rush in 1848. Historic period archaeological sites and standing built architecture are evident within the project area reflecting these extractive industries. Main categories of historic-period activity are: transportation; mining; logging and lumbering; agriculture/ranching; urbanization; infrastructure; and mining/extraction economy. Over 80 percent of the 1,811 historic period resources (including artifact isolates) are recorded in the Redding Field Office area. Over half of these are related to gold and copper mining activities. Of those resources that are characterized as exclusively "mining," 58 percent are located in the Redding Field Office and 30 percent are in the Mother Lode Field Office. Additional detail is provided in the Cultural and Paleontological Resources Report available on the BLM's NEPA ePlanning website at <https://goo.gl/v3WCAe>.

3.10.3 Traditional Cultural Properties

According to BLM policy (BLM Manual 8110.22 D and BLM Handbook 1780 X-3 and 4), properties of traditional cultural or religious importance to Native Americans (including "traditional cultural properties" as discussed in National Register Bulletin No. 38) can be found to meet NRHP criteria and thus should be located, described, and evaluated at the same stage in the Section 106 compliance process as the field inventory for historic properties. Properties of traditional cultural or religious importance must meet one or more NRHP criteria (i.e., must be historically significant) in order to be determined eligible for the NRHP.

Properties of traditional cultural or religious importance are specific, definite places that figure directly and prominently in a particular group's cultural practices, beliefs, or values, when those practices, beliefs, or values: (i) are widely shared within the group; (ii) have been passed down through the generations; and (iii) have served a recognized role in maintaining the group's cultural identity for at least 50 years. While an individual member of a group may attach importance to a place that does not meet this definition, e.g., a personally important place, such places should not be considered to be properties of traditional cultural or religious importance.

Though they have not been systematically inventoried throughout the project area, Native American traditional cultural properties and other areas of special interest have been identified within the Project Area through consultation and ethnographic studies. These include Native American place names, fishing and hunting areas, etc. identified throughout the BLM Northern and Central California Districts. In May 2018 the BLM sent letters requesting government-to-government consultation regarding the HRVM pEA project to more than 70 federally recognized tribes with interest in the project area.

Greater detail regarding these resources is provided in the Cultural and Paleontological Resources Report available on the BLM's ePlanning webpage at <https://goo.gl/v3WCAe>.

3.11 Paleontological Resources

The BLM is required to manage paleontological resources and assess (and mitigate as appropriate) project-related impacts to them under NEPA, FLPMA, and other authorities.

Instruction Memorandum (IM) BLM IM 2016-124 provides the BLM's guidelines for implementing the Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands (BLM 2016) for surface geology based on the potential that significant paleontological resources occur in a geologic unit. The PCYC system allows BLM employees to make initial assessments of paleontological resources to plan for multiple uses of public lands, consider disposal or acquisition of lands, analyze potential effects of a proposed action under NEPA, or conduct other BLM resource-related activities.

BLM IM 2009-011 provides guidelines for assessing potential impacts to paleontological resources in order to determine mitigation steps for BLM projects under FLPMA and NEPA. It is the policy of the BLM that potential impacts from BLM projects be identified and assessed, and proper mitigation actions be implemented when necessary to protect scientifically significant paleontological resources. Paleontological resources removed from public lands require a Paleontological Resources Use permit for collection. Significant paleontological resources collected from public lands are federal property and must be deposited in an approved repository. Generally, the project proponent is responsible for the cost of implementing mitigation measures including the costs of investigation, salvage and curation of paleontological resources.

This IM together with the IM 2016-124 provide guidance for the assessment of potential impacts to paleontological resources, field survey and monitoring procedures, and recommended mitigation measures. This guidance expands and clarifies the guidance in BLM Handbook H-8270-1 (General Procedural Guidance for Paleontological Resource Management).

A systematic inventory of paleontological resources throughout the project area does not currently exist. Two inventories of existing data for paleontological resources and potential fossil yield classification have, however, been completed in the Bakersfield Field Office (San Diego Natural History Museum 2017) and the Redding and Arcata Field Office (Sub Terra Consulting 2017). A more detailed description of the paleontological resources affected environment including the

results of these inventories are provided in the Cultural and Paleontological Resources Report available on the BLM's NEPA ePlanning website at <https://goo.gl/v3WCAe>.

3.12 Recreation

The vast majority of the public's interaction with BLM-managed lands is through outdoor recreation activities. Visitors participate in such activities as rafting, hiking, biking, back-country driving, hunting, fishing, camping in the project area. Other activities include visits to heritage sites, national monuments, wild and scenic rivers, wilderness areas, national trails, and national conservation areas. In 2017, recreational visits on BLM-managed public lands within the entire field offices in the NorCal and CenCal Districts averaged about 11 million visits per year (BLM 2018). This is an increase from 2016, when there were about 10 million visits (BLM 2018). Considering just the recreation areas that overlap with the project area, recreational visits were approximately 680,000 in 2017 and 610,000 in 2016.

The BLM has established a three-tier classification for lands used and managed for recreation: Special Recreation Management Areas (SRMAs), Extensive Recreation Management Areas (ERMAs), and Public Lands not Designated as Recreation Management Areas.

SRMAs and ERMAs provide a wide variety of recreation opportunities for both motorized and nonmotorized recreation activities. They may include developed campgrounds, trails, interpretive sites, visitor centers, Off-highway vehicle (OHV), long term visitor areas, and other facilities.

The BLM manages approximately 89,100 acres for recreation in the project area. Of this, approximately 59,300 acres are managed as SRMAs and 7,400 acres as ERMAs. There are approximately 22,400 additional acres managed for OHV use that do not fall within a SRMA or ERMA. Approximately 50 percent of the SRMA acres are within the Redding Field Office, followed by the Ukiah Field Office (22 percent), Eagle Lake Field Office (14 percent), and the Bakersfield Field Office (12 percent). One hundred percent of the ERMA acres are within the Bakersfield Field Office. The vast majority of the OHV acres not located with a SRMA or ERMA are within the Central Coast Field Office (88 percent) and the Redding Field Office (12 percent).

3.13 Lands with Wilderness Characteristics

The Federal Land Policy and Management Act (FLPMA) directs the BLM to maintain an updated inventory of various resources on public lands, including lands with wilderness characteristics (LWC). Lands have wilderness characteristics if they meet the following criteria:

- *Size:* An area must be a roadless area of 5,000 acres of contiguous BLM-managed lands, or if less than 5,000 acres, must be contiguous with BLM-managed lands that have been formally determined to have wilderness or potential wilderness values.
- *Naturalness:* Lands and resources exhibit a high degree of naturalness when affected primarily by the forces of nature and where the imprint of human activity is substantially unnoticeable.

- *Outstanding Opportunities for Solitude or Primitive and Unconfined Types of Recreation:* Visitors may have outstanding opportunities for solitude or primitive and unconfined types of recreation when the sights, sounds, and evidence of other people are rare or infrequent where visitors can be isolated, alone, or secluded from others; where the use of an area is non-motorized, non-mechanical means; and where no or minimal recreation facilities are encountered.
- *Supplemental Values:* The area may contain ecological, geological, or other features of scientific, educational, scenic, or historical values (not required to be present).

BLM has been working to update its original LWC inventories since 2011. Within the project area for this pEA, updated inventories have been completed within the Arcata, Bakersfield, Central Coast, and Redding Field Offices. Approximately 24,781 acres of inventoried LWCs overlap with forested lands within the project area within the Arcata, Bakersfield, Central Coast, and Redding Field Offices, almost all of which is within the Redding Field Office.

For the remaining lands within the project area that have not had updated LWC inventories, the upper bound of *potentially* impacted LWCs was estimated by looking for areas at least 5,000 acres in size that overlap with forested lands. While this simple GIS exercise does not replace a formal inventory, it at least excludes lands that would not meet the size criterion for LWC. Based on this analysis, up to 19,400 acres in additional lands in the project area could *potentially* have wilderness characteristics, although it is likely that many of these lands would not meet the additional criteria of naturalness and outstanding opportunities for solitude or primitive recreation that are necessary for wilderness characteristics.

It is assumed that most of the projects covered by this pEA will not occur in LWC. The Proposed Action limit projects to within 200 feet of critical infrastructure and to treating no more than 20 percent of BLM-managed public land in any watershed over a 10-year period. By definition, LWC are relatively undeveloped – they are lands where human impacts are substantially unnoticeable.

4. ENVIRONMENTAL EFFECTS

4.1 Introduction

This section provides the basis for the comparisons of the alternatives and the reasonably foreseeable environmental consequences to the human environment. This analysis considers both the direct effects that are caused by the action and would occur at the same place and time, and the indirect effects that are caused by the action but would occur later in time or offsite (40 CFR 1508.8).

These effects will be analyzed and described in context by describing and identifying what would take place if no action is taken, considering the present conditions on the land that were produced by past actions, and what effects are and will take place from other present and reasonably foreseeable future actions. This analysis of the effects of taking “no action” then provides the context for analyzing the “incremental effect” of taking action under each of the action alternatives, by then showing how the action alternative will change the conditions on the ground. This is the “incremental impact” that constitutes the “cumulative impact” as defined in CEQ’s regulations. (40 CFR § 1508.7).

The timeframe for cumulative impacts analysis is 10-years. Short-term or direct cumulative effects would occur at the time of treatment (a few days to a few weeks), whereas long-term or indirect cumulative effects may occur over several years. Past, present and reasonably foreseeable future actions considered for cumulative impacts include:

Table 4-1. Past, Present and Reasonably Foreseeable Future Actions

Hazard Removal	<p>Through the California Governor’s Tree Mortality Task Force, a total of 1,227,333 dead trees have been removed by the USFS, BLM, state agencies, local governments, CalTrans and utility companies from 2015 through February 2018 (TMTF 2017). The Task Force is expecting to conclude many of the dead tree projects in the next year or two. The TMTF map viewer discloses the mortality projects.</p> <p>Following the 2017 fires across California, utilities, CalTrans, county road departments, and others began identifying and felling hazard trees along easements, right of ways and on private property that are hazards to public safety.</p>
Vegetation Management and Prescribed Fire	<p>Mechanical, manual and prescribed fire treatments of vegetation on roughly 20,000 acres of BLM land per year for forestry and fuel management (including prescribed fire) in areas not related to the proposed actions (e.g., primarily away from 200 feet near critical infrastructure) is expected to continue at the same rate over the next 10 years.</p> <p>USFS lands in the same watersheds as the project area but at higher elevations may be treated over the next 10 years, with between 250,000 and 500,000 acres treated per year (Forest Climate Action Team 2018).</p>

Table 4-1. Past, Present and Reasonably Foreseeable Future Actions (Continued)

<p>Vegetation Management and Prescribed Fire (Continued)</p>	<p>CalFire conducts a Vegetation Management Program (VMP) that focuses on the use of prescribed fire, and some mechanical means, for addressing wildland fire fuel hazards and other resource management issues on State Responsibility Area (SRA) lands.</p> <p>There will continue to be a certain amount of pipeline and transmission line and other utility lines that will continue vegetation management in their existing ROWs. In addition, approximately 20,000 acres of forestland are harvested or managed per year on private land plus an additional 10,000-50,000 acres receive emergency treatments (i.e., hazard trees, high fire risk) per year on private land (Forest Climate Action Team 2018).</p>
<p>Recreation</p>	<p>Dispersed recreational activities occur throughout the project area. Visitors participated in such activities as rafting, hiking, biking, back-country driving, hunting, fishing, and camping in the project area. The BLM manages approximately 89,100 acres for recreation in the project area.</p> <p>In 2017, recreational visits on BLM-managed public lands within the entire field offices in the NorCal and CenCal Districts averaged about 11 million visits per year (BLM 2018)(BLM 2018). This is an increase from 2016, when there were about 10 million visits. Considering just the recreation areas that overlap with the project area, recreational visits were approximately 680,000 in 2017 and 610,000 in 2016. Current trends in visitation are likely to continue at the same rate over the next 10 years.</p> <p>Wildland fire management within National Park Service units is conducted to support resource management objectives. Fire activities may include using fire as either a natural process or as a management tool and is guided by the National Park Service Reference Manual 18 – Wildland Fire Management.</p> <p>The California Department of Parks and Recreation is currently implementing their Inventory, Monitoring, and Assessment Program (IMAP), which helps the Department evaluate the vegetation, wildlife, and physical natural resources of the State Park System. Individual projects began in 2000 and continue today.</p>

4.2 Forest Structure and Fuel Loading

4.2.1 Environmental Effects of the No Action Alternative (Alternative 1)

Under the No Action Alternative, dead and dying tree removal and vegetation management may be done in limited areas but not to the level analyzed within this environmental assessment. The BLM treats approximately 20,000 acres per year across California of forestry/fuels/wildlife related projects that may include some treatment near critical infrastructure but it is not the focus of these treatments (Table 4-1). Without shifting some of these treatments to focus on dead trees near critical infrastructure, or perhaps increasing the annual acres treated, impacts from and fallen dead trees would occur in areas of critical infrastructure. A dead tree could fall on an electrical line, which would likely cause a wildfire from sparks igniting with dead, down, and dry fuels below the powerline. Public health and safety would be at risk with standing dead trees adjacent to trails, homes, roads, and campsites. This risk will increase as the trees decay over time. Further, impacts to site-specific resources, such as historic sites and rare plant populations, could also be affected by falling dead trees.

Under the No Action Alternative, the current hazards would persist and the effects would be detrimental to public safety and infrastructure. There would be a progressive increase to fuel loading in these areas, tree and shrub densities would increase over time, thus increasing the potential for fires to spread both from within critical infrastructure areas into wilderness areas and vice versa. As discussed in Section 3.4, more than half of wildfires occur within 650 feet of a road (Morrison 2007). Recent drought and stress associated with climate warming, combined with decades of fire exclusion, have dramatically increased the size and intensity of wildfires and bark beetle infestations in California (Forest Climate Action Team 2018).

4.2.2 Environmental Effects of the Proposed Action (Alternative 2)

The Proposed Action would treat vegetation on up to 20 percent of the BLM-managed lands within a watershed (HUC 10) during a 10-year period in order to remove hazards to people and critical infrastructure associated with dead and dying trees and excess fuel loading near critical infrastructure. The proposed amount of dead and dying tree removals, vegetation management, and prescribed burning would reduce tree and shrub densities, fuel loads, and protect the largest healthiest trees adjacent to critical infrastructure. These actions would help minimize future tree mortality from drought, insects, disease, and fire by increasing individual tree vigor, reducing surface and ladder fuels, and potentially preventing severe wildfire in the treatments areas.

If a biomass utilization outlet is unavailable, the excess biomass from thinning treatment is typically either masticated and put back on the forest floor or piled and burned. North et al. (2009) detail the carbon emissions associated with implementing certain treatments as well as the carbon implications of hauling forest material offsite and milling. While masticating excess biomass and spreading the material back on the forest floor helps recycle nutrients, it can potentially increase fire intensity for the first few years until the material decays. This temporary increase in fuel loading could increase fire intensity and/or fire risk until the woody debris decays into less flammable organic matter. This can occur as quickly as one year or as long as five years, depending on depth, rainfall, and location. Masticated material also represents a short-term carbon source. Pile burning of material immediately releases carbon emissions back to the atmosphere with attendant implications for emission of greenhouse gases and criteria air pollutants. However, pile burning is necessary to remove thinned materials in remote locations, locations where markets for thinned materials are nascent, or where costs and/or resource impacts of removal and transport are high. A wider range of alternative disposal methods must emerge to reduce pile burning as an alternative.

4.2.2.1 Dead and Dying Tree Removals

Removal of hazards that are dead or dying trees would have a direct beneficial impact to reduce fuel loading and ignition risk. The removal of these trees would reduce the likelihood that ignitions of high intensity fires near critical infrastructure would be carried into forest stands in the surrounding areas. Likewise, forest stands would have less dead and down fuel to connect with if these fuel loads are decreased near critical infrastructure, reducing the likelihood of fires spreading

from these areas. Fuel loading increases as the amount of dead and dying trees increases. Unless the dead biomass is removed, a significant amount of dry woody fuel is added to the forest floor, which significantly contributes to high intensity wildfires that are harder to control and can have negative impacts on forest structure (Stephens et al. 2018). Given the focus on 200 feet around critical infrastructure (i.e., where people are most commonly found) and the fact that most ignitions occur where people regularly occur, reducing the fuel loading in this limited area reduces the ignition risk for high intensity wildfires disproportionate to the size of the area.

Pile burning, mastication of limbs and tops, cable and ground-based yarding, and hauling are the primary means for removing the dead and dying trees. Yarding and hauling the dead and dying trees effectively reduces the fuel loads but can result in damage to residual trees if stand densities remain high. Pile burning disposes of limbs and tops but cannot dispose of material larger than 8 to 12 inches in diameter because consumption of this material is difficult to achieve. Mastication changes the fuel structure from vertical to a layer of horizontal chips on the soil surface. Mastication accelerates the decay of this material but, in the interim, it does leave some fuel on site temporarily.

4.2.2.2 *Vegetation Management and Prescribed Fire*

Both vegetation management and prescribed fire would be used to improve forest structure and reduce fuel loading, especially in the understory. These activities are still restricted to the 200-foot buffer around critical infrastructure, so the improvements to the entire forest stand are limited to these areas. However, as discussed above, reducing fuel loading in these areas greatly reduces ignition risk.

Planned outcomes for forest communities include reducing stand density, retaining a mix of large and small tree structure, and increasing species diversity. These, in turn, improve individual tree growth, health, and resistance to drought and disease (Fettig 2012; Stephens et al. 2012). In general, dense stands would be thinned mainly in the mid and lower tree layers. Variation, arrangement, and intensity of thinning levels would be applied by carefully considering the age and developmental trajectory of the stand. Objectives include developing multi-storied stands with a mix of species and spatial heterogeneity, to include horizontal and vertical variation with small gaps. Objectives also include protecting sensitive resources and minimizing potential for invasive plants. For more details, see Section 2.2.3.

Planned outcomes for oak woodland include factoring in the wide variation in oak communities, in terms of canopy tree spacing and diversity and the level of removal of conifers and other young saplings. A primary goal for oak woodland treatments is to improve vigor of existing trees, improve structural diversity, and restore historical stand densities and stand structures. Objectives include reducing encroachment of conifers and shrubs, reducing basal area, retaining oaks in a range of age and size classes, and restore fuel loading to minimize risk of catastrophic wildfires. Objectives also include protecting sensitive resources and minimizing potential for invasive plants. For more details, see Section 2.2.3.

Forests in the project area have historically experienced frequent fire of lower intensities because they were considerably less dense than they currently are and had large fire resistant trees. Susceptibility to drought and insect infestations is partly a result of fire suppression, logging of large trees, and increased density. Therefore, vegetation management in the smaller size classes and prescribed fire would be beneficial to forest structure and fuel loading because it would diversify the horizontal and vertical structure of the forest and improve forest resilience to drought and wildfire. In addition, understory burning is a historical feature on the landscape in many of these areas that experienced frequent fire in the past (Stephens et al. 2018).

In addition to reducing fuel loading, a major benefit of the Proposed Action is to reduce moisture stress (i.e., resistance to drought) and to reduce stand density and increase stand diversity (i.e., resilience against diseases and pests). The increased growth to residual trees promotes a larger tree structure into the future that would not be attained in the same amount of time without thinning. This would reduce future tree mortality and create a stand that is more fire resistant. These benefits would not be realized across entire forest stands (interior areas) but would triage treatment to areas associated with high ignition risk (within 200 feet of critical infrastructure).

Without factoring in biomass utilization benefits from excess biomass removed during treatment, a recent study in the Sierra Nevada found that prescribed fire and mechanical understory-thin treatments resulted in stands that sequestered the equivalent amount of carbon removed from the forest during treatment within ten years (Wiechmann et al. 2015b). The understory treatments in this study were expected to sequester their lost carbon within 15 to 20 years if stand growth continued on the same trend. All treated areas within the study experienced positive net ecosystem productivity over the ten years of the study (2002 – 2011), while the control plots had net negative ecosystem productivity over that same period, despite not experiencing a significant disturbance event. The results indicate that these treatments were successful in shifting the carbon in the stand from smaller trees into larger, healthier trees, and these larger trees had more access to needed resources to continue to grow while the unhealthy control stand was unable to continue growing and sequestering carbon.

Prescribed fires also represent immediate release of emissions to the atmosphere, with some of the carbon sequestered back into the soil as charcoal (Wiechmann et al. 2015a). Recent research in California is beginning to shed more light on how the distribution of pyrogenic carbon in trees versus the forest floor varies with fire severity. For example, a recent study found that new measurements of particulate pollution from western US wildfires were significantly higher than previous estimates, and that prescribed burning produces less particulate emissions than wildfires (Liu et al 2017).

Dore et al. (2012) observed the interaction of productivity and environmental conditions during their research on the effects of treatment and fire on an existing ponderosa pine stand in Arizona. The researchers found that treated forests were better able to sustain their carbon sequestration rates under significantly hotter and drier conditions than the untreated stands. Even when a drought hit the study area in the third year following the implementation of their treatments, the authors

observed that during the drought the treated site had higher carbon uptake than the untreated site, despite the fact that the treated site had fewer trees and leaf area. This is significant given findings that drought not only impacts tree growth (and therefore carbon sequestration rates) during the drought itself, but also that growth rates post-drought can remain stunted for one to four additional years (Anderegg et al. 2015). If the same pattern holds true in treated versus untreated stands as found in Dore et al. (2012), then the treatment benefits could extend beyond drought periods.

4.2.2.3 Access for treatments

For all treatment activities, access to the treatment area is necessary. Access areas themselves would not change forest structure or fuel loading; however, construction of new access roads, trails, and landings may increase fragmentation. All these features require complete removal of trees and cause some soil compaction, which slows down forest recovery after use is completed. There are a number of PDFs that would minimize the potential impacts from access roads and trails. For example, implementation of the Proposed Action would incorporate the use of existing access roads, skid trails, and landings rather than create new roads and trails, when feasible (see ME-1). Project planning would also ensure selective placement of these features to minimize disturbance (see ME-8) and closure of these features after treatment to minimize negative impacts of these access areas (see RL-11, LR-6, VRM-7). Any indirect impacts from these access points would be short-term, but could take a few years to fully recover.

PDFs related to Forest Structure:

General: G-1 through G-4

Tree Diseases: TD-1 through TD-11

Mechanized Equipment: ME-1, ME-8, ME-20

Fuels and Prescribed Fire: FIRE-5, FIRE-15, FIRE-16

Roads and Landings: RL-6

4.2.3 Environmental Effects of the Reduced Action (Alternative 3)

Similar effects from dead and dying tree removals, pile burning, mastication, and access for treatments would occur under the Reduced Action as the Proposed Action. Negative impacts from access for treatments would be reduced as those activities would occur less often. Benefits that reduce fuel loading and ignition risk would be much lower since both green tree thinning, shrub reduction, and understory burning would not be done under the Reduced Action. This alternative would not reduce green tree densities or shrub cover. Areas would continue to be susceptible to drought, insects and disease, as well as density dependent mortality. Damage to residual trees and shrubs is expected in areas where dead and dying tree removal is conducted because the fallen trees crush vegetation and equipment used for extraction can also crush or damage the residual trees.

4.2.4 Cumulative Impacts

Other agencies and utility companies would continue their ongoing programs, as described in Cumulative Impacts of the No Action Alternative below, for managing dead and dying trees, reducing fuel loads, and improving forest structure within forest stands in areas near the project area. These actions would reduce fuel loads, reduce ignition risk, and improve forest stand health. On the other hand, continued fire suppression and increased stress from drought, diseases, and pests are likely to continue as well as a measurable risk of stand-replacing wildfires throughout the regions of California where the project area is distributed. Overall, the trends are likely negative for forest structure across broad areas due to the regional trends in forest health and fuel loading with localized benefits from agencies undertaking forest management.

4.2.4.1 Cumulative Impacts of the No Action Alternative

Under the No Action Alternative, the current treatments by BLM and other entities throughout the state would continue, which has not been sufficient to reduce fuel loading and dead/dying trees near critical infrastructure. BLM currently treats approximately 20,000 acres annually, and USFS treats approximately 250,000 acres per year for dead trees. Approximately 20,000 acres for forestland per year of private land are harvested/managed in some fashion plus an additional 10,000-50,000 acres per year on private land receive emergency treatments. Despite these efforts to impact the forest fuel loads and density issues, many more acres need to be targeted for treatment to reduce regional fuel loading and risk of high intensity risk. The current ignition risks and wildfire risks would continue under the No Action alternative, as well as the risk of future tree mortality. Considering past, present, and reasonably foreseeable future actions, overall cumulative effects to forest structure on BLM lands would continue to be negative.

4.2.4.2 Cumulative Impacts of the Proposed Action

Under the Proposed Action, dead and dying trees would be felled and/or topped and vegetation management (thinning) and prescribe fire would occur on 2,500 to 20,000 acres each year on BLM lands in the state of California. This would potentially double the amount of treatment acres conducted on BLM lands from the average of 20,000 acres currently being treated to 40,000 acres treated annually. The effects of the Proposed Action would be beneficial and contribute to reducing the overall negative regional trends of increased tree mortality and decreased stand health. Most of the benefits would accrue in small areas and reduce fire risk near critical infrastructure. It would contribute in a small way to the overall acres benefitting from treatment throughout the project area from all parties in portions of northern and central California. This would enhance vegetation management in the context of wildfire management on a regional scale – a beneficial long-term impact of the Proposed Action. The reduction in risk of large, high intensity wildfires would also benefit forest structure by preventing stand-replacing fires that can take decades for full recovery.

4.2.4.3 Cumulative Impacts of the Reduced Action Alternative

Because the Reduced Action Alternative would provide a smaller set of treatments (dead and dying tree removal and pile burning) in the project area, methods would provide minimal benefits to forest structure, drought resilience, and fuel loading. The beneficial effects would have a much smaller counterbalancing effect on regional negative trends in forest structure and fuel loading. Because of the dispersed to concentrated nature of the tree mortality it is impossible to predict the exact acres that may be treated under this alternative.

4.3 Vegetation and Native Plants

4.3.1 Environmental Effects of the No Action Alternative (Alternative 1)

Under the No Action Alternative, vegetation and native plants in upland and in riparian areas would not receive any management related to green thinning and understory burning. Only hazardous and/or dead trees are treated on a case-by-case basis by the BLM. Thus, understory vegetation in upland areas would not receive any treatment and would continue to have high plant density, with slower growth of trees due to competition for resources, such as water and nutrients. In critical infrastructure areas, impacts from minimal removal of dead trees and no reduction in tree density would continue to with increased ladder fuels. This results in a continued high risk of high intensity wildfires, including large area, stand-replacing fires. Understory vegetation in riparian areas would also not be impacted by the No Action Alternative. There would be no direct impacts on rare communities or rare plant species as there would be no treatment activities. However, by not reducing risk of high intensity fires, riparian areas, rare communities, and rare plants are still at risk of being damaged from wildfires.

4.3.2 Environmental Effects of the Proposed Action (Alternative 2)

As described above, a number of objectives would be targeted for forests (primarily related to stand structure) and woodlands (primarily related to diversity and woody encroachment). The combined effects of achieving these objectives would be improvements to canopy and understory diversity, an increase in microhabitats available for specialized species (including rare species), and improvement in overall age structure and physical structure of these forest and woodland stands. These positive benefits would be true for both upland and riparian communities, although there are a number of additional elements that limit negative effects on riparian communities, which are particularly sensitive to disturbance.

As described in Section 2, Proposed Actions, treatments within riparian areas would be designed to maintain and restore the aquatic system, including water quality and sediment regime, to support healthy riparian, aquatic and wetland ecosystems. Treatments in these areas are also aimed at restoring the species composition and structural diversity of plant communities in riparian areas and wetlands. Additionally, the proposed treatments are designed to maintain restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

To achieve these objectives, several PDFs are incorporated into the Proposed Action and would be implemented before, during, and after project activities within riparian areas, as relevant to specific treatments. First, in accordance with PDF G-2, riparian areas (among other sensitive areas) within the treatment area would be identified prior to any treatment. Per PDF ME-16, implementation of the Proposed Action would not include removal or treatment of any live riparian hardwood species. Additionally, project activities would be located away from wetlands, riparian areas, floodplains, and streams, to the maximum extent feasible, to prevent erosion, stream turbidity, and sedimentation (see RL-2, ME-13). Stream crossings would only be allowed during the dry season and only through ephemeral and intermittent streams when the crossing helps limit the area of ground disturbance in the treatment area (see RL-2). Mechanical equipment and understory burning would be excluded from least 50 feet from ephemeral and intermittent streams and 150 feet from perennial streams (see ME-12). Temporary roads and landings, as well as skid trails, would also be located away from riparian areas (see RL-2). Temporary roads will not be allowed in federally listed species habitat. Non-riparian trees less than 7 inches in diameter would be removed via hand thinning in riparian areas and non-riparian trees greater than 7 inches in diameter would be felled onto the contour and left to prevent erosion and sedimentation, when feasible (see ME-15, ME-17, FIRE-13). Erosion control measures, such as seeding, mulching, water barring, and tillage, would be applied to skid trails and other disturbed areas with the potential for erosion (see ME-14). Streambank and hillslope disturbance on steep slopes would generally be prevented by requiring full suspension near stream channels (see CY-2). Finally, firelines within Riparian Reserve would be located to avoid burning near streams or other waterbodies (see FIRE-9).

The diversity of forest and woodland types present throughout the project area gives rise also to a diversity of responses to disturbances (Table 4-2). In the case of the Proposed Action, disturbances will result from dead and dying tree removal with relatively localized disturbances and from vegetation management and understory burning with broader scale disturbances. Access for treatments might also generate some small disturbance on the edges of forests and woodlands, although impacts would be minimized with implementation of the PDFs previously discussed.

4.3.2.1 Dead and Dying Tree Removals and Vegetation Management

The ability for vegetation to be resilient to stresses, such as drought and forest pests, depends on the health of the vegetative community to begin with. Factors influencing the health of the vegetative community include growth, density, water and nutrient availability, fire, and soil type, among other factors. The Proposed Action would generally address these stresses by implementing vegetation management techniques (dead and dying tree and other vegetation removal) that would improve vegetation vigor and resiliency. Benefits of the proposed treatments to forests and woodlands in the project area include reduced fuel loads and ignition risk, which would reduce the potential for catastrophic wildfires both in and adjacent to the project area. In addition, the benefits in stand structure and reductions in dead and dying trees would also reduce disease and pest outbreaks.

Table 4-2. Disturbance Sensitivity by Forest Type in the Project Area

Forest Type	Acres in Project Area	Disturbance Sensitivity
Moist Forest		
Douglas-fir Forests	143,234	Generally responds well to fire and other disturbances. Douglas-fir is a shade-intolerant species that prefers canopy openings.
Pacific Ponderosa Pine	51,788	Generally responds well to fire but more sensitive to other forms of disturbance. Ponderosa pine will generally germinate well after fire.
Redwood	8,574	Generally responds well to fire, especially for maintaining and open understory. More sensitive to other forms of disturbance.
Moderate/Dry Forest		
Sierra Nevada Mixed Conifer	20,860	Generally responds well to fire and other disturbances. With the diversity of canopy tree species, there is a mix of trees that invade new openings after disturbances and then transition to closed canopy over time.
Aspen	834	Responds well to fire and other disturbances. Aspen generally will recover from disturbances quickly.
Cypress Forests	12,528	Responds well to fire, particularly in terms of germination after a fire. More sensitive to other types of disturbance.
Interior Ponderosa Pine	37,444	Generally disturbance negatively impacts this forest type.
Jeffrey Pine	760	Generally responds well to fire, particularly in terms of germination after a fire. More sensitive to other types of disturbance.
Knobcone Pine	32,381	Knobcone pine reproduction is controlled exclusively by fire. More sensitive to other types of disturbance.
Western White Pine	817	Moderate fire resistance. Young trees typically killed by fire, mature trees withstand cool fires while moderate to severe fire generally results in death. Sensitive to other types of disturbance.
White Fir	11,501	Generally disturbance negatively impacts this forest type.
Oak Woodland		
Blue Oak-Foothill Pine	88,351	Generally disturbance negatively impacts this forest type, although low intensity fires help maintain the understory and reduce overly dense canopy trees.
California Black Oak	28,578	Responds well to fire but more sensitive to other kinds of disturbance.
California Coast Live Oak	13,670	Responds well to fire but more sensitive to other kinds of disturbance.

Table 4-2. Disturbance Sensitivity by Forest Type in the Project Area (Continued)

Forest Type	Acres in Project Area	Disturbance Sensitivity
Canyon Live Oak	77,485	Grows in a wide variety of plant communities, all of which are subject to periodic or frequent fire. Sensitive to other kinds of disturbance.
Montane Hardwood	3,705	Includes several fire-resistant species and some species with that require heat to open. Sensitive to other kinds of disturbance.
Oregon White Oak	17,097	Fire-resistant species; mortality from fire is rare. Persistence of communities is dependent on periodic fire. Sensitive to other kinds of disturbance.

Sources: (Fitzhugh 1988; Jensen 1988; Martin 1988; Griffith 1992; Howard 1992; Fryer 2007; Gucker 2007; Tollefson 2008; Zouhar et al. 2008; Wilken & Burgher 2009)

Due to the numerous PDFs specifically designed to protect riparian communities within the project area, dead and dying tree and other vegetation removal would have little effect on these vegetation communities. As described under ME-15, felling and/or topping of non-riparian dead and dying trees is the only action allowed within riparian areas for trees greater than 7 inches. To the maximum extent feasible, these trees would be felled onto the natural contour and retained to provide stability to the soil and prevent sedimentation. Additionally, non-riparian tree species less than 7 inches would only be thinned and then only by hand, and piles would be made away from streams for burning (see ME-17, FIRE-13). As such, riparian communities would undergo little ground disturbance. No riparian trees would be removed; however, the removal of other dead and dying trees and understory vegetation would allow more water and nutrient resources for riparian vegetation. As a result, riparian communities in the project area would remain healthy and intact.

4.3.2.2 Prescribed Burning

Upland communities, including woodland, grassland, and shrubland habitats, have the most potential to be affected by prescribed burning, due to the project limitations to avoid burning within riparian areas and rare communities. While there are limitations on prescribed burning in riparian areas, pile burning of dead and dying non-riparian trees and ground vegetation away from streams would be allowed under the Proposed Action.

Pile Burning

Upland communities have the potential to be directly affected by pile burning, although firelines would avoid spreading of pile burns and piles would be relatively small (i.e., maximum size about 64 square feet on the ground or 200 cubic feet in volume). In riparian areas, firelines would be created by hand so as to avoid unnecessary ground disturbance, among other impacts to species within the riparian communities (see FIRE-9). Burned piles would create a source of ash and nutrients which would benefit the areas surrounding them, as long as management of invasive

plants occurs and any soil sterilization is avoided (see Section 4.4, Invasive Plants and Weeds, and Section 4.5, Soils).

Understory Burning

Understory burning would be conducted only in upland vegetation communities. As previously stated, treatments are intended to remove fuels to reduce the risk of ignition and catastrophic fires in forest and woodland upland areas in proximity to critical infrastructure. Prescribed fires would be managed and would be controlled with the use of firelines. Occasionally, the creation of firelines may damage native vegetation, but as required by PDFs mitigation will be undertaken if necessary. These low-intensity understory burns would maintain desired fuel conditions in the project area.

Access for treatments

Numerous PDFs included in the project are specifically designed to protect riparian communities within the project area. For example, in accordance with PDF RL-2, roads and landings would be located away from wetlands, riparian areas, floodplains, and streams. Additionally, topping is the only action allowed within riparian areas for trees greater than 7 inches in diameter (see ME-15). Thus, access for treatments would have little effect on these vegetation communities. While linear features such as temporary access roads and trails would potentially create more edges and openings for invasive species and unauthorized access, disturbed access areas would be decompacted and reseeded with native vegetation, where feasible, following treatments (see ME-18, RL-13, VEG-3, VRM-8). These areas would be managed to promote the growth of native species rather than invasive species and noxious weeds. Additionally, dead and dying trees would be directionally felled if necessary to avoid plants. Therefore, there would be no measurable impacts to rare plant communities and known BLM sensitive plant populations under the Proposed Action. Indirectly, reducing fuel loads in areas adjacent to these plants would reduce ignition risk and wildfires in occupied habitat. There will be potential for accidental damage, primarily due to the possibility of accidental trampling on plants that were missed during pre-treatment surveys, and the potential for the spread of weeds. However, the WEED PDF's significantly reduce this risk (but see analysis in Section 4.4).

PDFs related to Vegetation and Native Plants

General: G-1 through G-4

Roads and Landings: RL-2, RL-10, RL-11, RL-13

Tree Diseases: TD-1 through TD-11

Mechanized Equipment: ME-1, ME-2, ME-13 ME-16, ME-17, ME-19, ME-22

Fuels and Prescribed Fire: FIRE-4, FIRE-5, FIRE-8, FIRE-10 through FIRE-13

Vegetation: VEG-2 through VEG-4

Weeds: WEED-1 through WEED-8

Lands and Realty: LR-5, LR-6

BLM Sensitive Plants: G-1 through G-4, RL-10, RL-11, TD-1 through TD-11, ME-1, ME-2, ME-21, ME-22, FIRE-5, FIRE-7, FIRE-10, VEG-2 through VEG-4, WEED-1 through WEED-8, LR-5, LR-6

4.3.3 Environmental Effects of the Reduced Action (Alternative 3)

Implementation of the Reduced Action would result in fewer beneficial impacts to upland communities associated with understory clearing and burning. These communities would not receive the green-tree thinning and prescribed understory burns necessary to reduce tree and shrub density and the risk of ignition and catastrophic wildfires and to create healthy vegetation communities. In addition, the Reduced Action would result in fewer benefits to riparian communities associated with understory clearing. Without green-tree thinning in riparian areas, riparian vegetation would continue to compete for water and nutrients with dead and dying non-riparian trees as well as understory vegetation. The continuance of these stresses would not support the Proposed Action's goals of maintaining and restoring well-distributed, healthy communities.

4.3.4 Cumulative Impacts

Other agencies and utility companies would continue their ongoing programs for managing forests and woodlands to improve forest health, structural diversity, species diversity, and reduce woody (particularly conifer) encroachment in areas near the project area. These efforts are described briefly below in Cumulative Effects of the No Action Alternative. On the other hand, continued fire suppression and the accumulated changes in forest density over the past century regionally will continue to result in too much woody encroachment and low species diversity in the understory and canopies that are too dense, especially in woodlands. Riparian zones are protected in patchwork areas throughout the region of the project area. Rare plant communities and rare plant populations are likewise protected in patchwork areas. These protected patchworks provide localized benefits, but regional trends of development and invasive plants likely offset many of these localized benefits. Overall, the trends are likely negative for forest health and diversity across broad areas due to the regional trends in forest condition with localized benefits from agencies undertaking forest management and protecting riparian zones and rare plants.

4.3.4.1 Cumulative Impacts of the No Action Alternative

Under the No Action Alternative, the current treatments across BLM (approximately 20,000 acres), USFS (approximately 250,000 acres per year), and private land harvested/managed (approximately 20,000 acres) and private land receiving emergency treatments (10,000-50,000 acres) would continue in order to manage for hazardous trees and forest stand health and resiliency. These activities have not been sufficient to reduce fuel loading and dead/dying trees near critical infrastructure so far. These treatments do not include green tree thinning or understory, so they do not address forest structure and only partially reduce fuel loading. The current low diversity of understory species and high density of small trees would continue, along with any protections for sensitive areas. The risk for high intensity wildfires starting in the areas near critical infrastructure (where most wildfires start) would continue and cause damage to native plants and communities,

in some cases this could take a century or more to fully recover. Considering past, present and reasonably foreseeable future actions, overall cumulative effects to forest and woodland diversity on BLM lands would be negative. Overall cumulative effects on riparian zones, rare communities, and rare plants would be beneficial on BLM lands because these areas are protected on BLM lands. Regionally, the overall cumulative effects are likely mixed depending on the region of California. The efforts of other agencies may reduce negative impacts in small areas, but barely reduce risks in other areas.

4.3.4.2 *Cumulative Impacts of the Proposed Action Alternative*

Under the Proposed Action, forests and woodlands would be managed to reduce ignition risk near critical infrastructure, improve stand structure and diversity, reduce woody encroachment, and protect riparian zones and rare plants. These efforts would dovetail with the planned increases in management through many different activities by other agencies in order to manage for improved forest health (Forest Climate Action Team 2018). Beneficial effects of reducing moisture stress and improved diversity would accrue across the state of California. Considering past, present and reasonably foreseeable future actions, overall cumulative effects to vegetation would be beneficial on BLM lands and efforts being carried out under the California Forest Carbon Plan (Forest Climate Action Team 2018) would combine to make headway in reversing regional trends, at least in some areas.

4.3.4.3 *Cumulative Impacts of the Reduced Action Alternative*

Under the Reduced Action Alternative, only dead and dying trees would be removed and the benefits, likely of shorter duration than the Proposed Action alternative, to forest and woodland health and diversity would be on BLM lands but may not be beneficial other than reducing fuel loading generally. Considering past, present and reasonably foreseeable future actions, overall cumulative effects to vegetation would be neutral to negative on BLM land with no additional benefits to counteract or enhance regional trends.

4.4 Invasive Plants and Weeds

4.4.1 *Environmental Effects of the No Action Alternative (Alternative 1)*

Under the No Action alternative, dead and dying tree removal and vegetation management would continue in limited areas on a case-by-case. In areas where trees fall on their own, soil would be disturbed and newly-opened canopies would create an area for colonization by invasive plants and weeds. Under the No Action alternative, there would be normal risk of spread of invasive plants and weeds, but with the trees falling on their own and creating new soil disturbance that is unmanaged it may increase the spread of invasive plants. Critical infrastructure areas, which already contain high densities and diversity of invasive plant and weed seeds due to the presence of humans and extent of disturbance in these areas, would not be managed to prevent invasion by these plants. Untreated populations of invasive species may act as seed banks and continue to colonize and infest relatively weed-free areas.

4.4.2 Environmental Effects of the Proposed Action (Alternative 2)

As part of the Proposed Action, several PDFs would be incorporated into management activities to prevent the spread and establishment of weeds and other invasive plants. Prior to implementation of individual treatments, weed infestations within the project area would be inventoried so that they would be avoided or treated during and following treatment activities (see G-2). Sites where equipment can be cleaned would also be identified before commencement of project activities (see G-2, WEED-7). Additionally, high-risk sites would be pre-treated for to reduce invasive plants and weeds prior to any treatments under the Proposed Action (see WEED-1).

In general, weed-free gravel and fill dirt would be used for road work, native vegetation would be retained to the maximum extent feasible, and soil disturbance would be avoided in and around treatment areas (see WEED-2). To avoid the spread of invasive weeds or plant species, all tools, equipment, and materials would be cleaned or pressure washed before entering public lands, prior to engaging in treatment activities, before transport to new work areas, and before leaving the project site if operating in areas infested with weeds to remove mud, dirt, and plant parts (see WEED-7). Following soil disturbance, soils may be seeded with native seed in areas where native vegetation does not easily reestablish (see WEED-4). See PDFs WEED-1 through WEED-14 for more detailed information on invasive plant management PDFs.

Table 4-3 provides some examples of how priority invasive plant species might respond to different components of the Proposed Action. While there are a great number of potential invasive species given that individual parcels in the project area occur across many ecoregions throughout much of California, these same types of responses would be expected from species with similar characteristics and seed dispersal methods. Part of the project planning for individual treatments includes evaluating each site for current and potential invasive plants and managing these plants appropriately as part of the treatment.

Table 4-3. Examples of Expected Responses of Invasive Species to Proposed Action

Common Name	Response to Management Activities
Russian knapweed	<p><u>Vegetation Management</u>: Hand pulling or hoeing can be effective for smaller infestations</p> <p><u>Burning</u>: not recommended for single control method; new plants emerge from roots quickly after fire, which leads to increased dominance</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Tree-of-heaven	<p><u>Dead/dying Tree Removal</u>: may not effect, the species is sun and shade tolerant</p> <p><u>Vegetation Management</u>: pulling, digging, and cutting before or during flowering can be effective to remove or stunt growth</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Red brome	<p><u>Vegetation Management</u>: disking or mechanical control activities may promote establishment and dominance; hand removal, raking, and mulching may need to be done repeatedly</p> <p><u>Burning</u>: can produce variable results; may lead to increased populations</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Downy brome, cheatgrass	<p><u>Dead/dying Tree Removal</u>: may slow seed germination which is improved by dark or diffuse light and a little cover</p> <p><u>Burning</u>: will enhance dominance in pure cheatgrass stands; best prescribed for mixed shrub-cheatgrass stands in late spring</p>
Italian thistle	<p><u>Dead/dying Tree Removal</u>: disturbance of vegetative cover promotes establishment</p> <p><u>Vegetation Management</u>: plants can regrow and still produce seed after mowing; disturbance of vegetative cover promotes establishment</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Diffuse knapweed	<p><u>Dead/dying Tree Removal</u>: will improve growth; knapweeds thrive in direct sunlight</p> <p><u>Vegetation Management</u>: mowing and hand pulling may decrease flower and seed production</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Yellow starthistle	<p><u>Dead/dying Tree Removal</u>: may lead to flowering due to increased rains</p> <p><u>Vegetation Management</u>: successful for removal in the late spiny or early flowering stage.</p> <p><u>Burning</u>: effective at the end of the rainy season when flowers first appear.</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Canada thistle	<p><u>Dead/dying Tree Removal</u>: may promote growth; intolerant of shade</p> <p><u>Burning</u>: may reduce old, established stands if done repeatedly; not greatly affected</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Bull thistle	<p><u>Vegetation Management</u>: mowing may control growth if done shortly before plants flower</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>

Table 4-3. Examples of Expected Responses of Invasive Species to Proposed Action (Continued)

Common Name	Response to Management Activities
Scotch broom	<p><u>Burning</u>: may reduce seed bank</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Medusahead	<p><u>Vegetation Management</u>: mowing is effective in low-elevation grasslands in the late spring</p> <p><u>Burning</u>: may be reduced in low-elevation, warm winter areas with high intensity fires</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Leafy spurge	<p><u>Vegetation Management</u>: mowing will prevent seed production and reduce top growth</p> <p><u>Burning</u>: when done alone, can stimulate sprouting and increase plant density; may reduce growth when other control methods used as well</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Halogeton	<p><u>Vegetation Management</u>: soil disturbance may promote invasion</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Dyer's woad	<p><u>Vegetation Management</u>: may not effect, deep roots need to be uprooted to remove</p> <p><u>Burning</u>: may help prevent spread</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Purple loosestrife	<p><u>Vegetation Management</u>: may not affect or may cause resprouting and reestablishment</p> <p><u>Burning</u>: does not kill buried rootstocks, which will sprout again</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Scotch thistle	<p><u>Vegetation Management</u>: mowing will not kill the plant but will lessen seed production when done repeatedly</p> <p><u>Burning</u>: tolerates fire, triggers dormant achenes to germinate and invade</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Russian thistle	<p><u>Dead/dying Tree Removal</u>: may promote establishment, suppressed in shade</p> <p><u>Vegetation Management</u>: discing or loosening the soil can promote germination, mowing or destroying young plants can prevent seed production</p> <p><u>Burning</u>: may eliminate accumulated organic debris and seed, however, much of the seed will have already been disseminated</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>
Mediterranean sage	<p><u>Vegetation Management</u>: plants regrow after mowing, but may reduce seed production if done repeatedly; hand-pulling or digging may reduce populations</p> <p><u>Burning</u>: will not stop growth and establishment</p> <p><u>Access areas</u>: any disturbance can result in dispersal or importation of seeds</p>

Table 4-3. Examples of Expected Responses of Invasive Species to Proposed Action (Continued)

Common Name	Response to Management Activities
Mediterranean grass	<u>Dead/dying Tree Removal</u> : reduced shading promotes establishment <u>Vegetation Management</u> : soil disturbance promotes establishment <u>Burning</u> : promotes growth (Central California only)
Salt cedar, tamarisk	<u>Vegetation Management</u> : may resprout following cutting and plowing <u>Burning</u> : will not kill roots; plants return quickly if untreated by other methods

Sources: (Jim Young 2006; DiTomaso et al. 2007; USNISC 2008; Orloff et al. 2008; USFS 2014; Wenning 2014; CABI 2015b, 2015a, 2016, 2017, 2018b, 2018a; University of California 2016; Stapleton & Orloff 2017; Cal-IPC 2018).

4.4.2.1 Dead and Dying Tree Removals

The cutting and removal of dead and dying trees would create some soil disturbance, but PDFs (particularly WEED-1 through WEED-8) would minimize the establishment of invasive plants and noxious weeds, with implementation of the PDFs. Removing the biomass from a treatment area in the form of pile burning (see below) or mastication also would be unlikely to result in increases of invasive plants and noxious weeds, when combined with the PDFs to evaluate and pre-treat for invasive plants prior to any treatments under the Proposed Action. Hauling logs through the project areas, discussed under Access for Treatments below, would have the most potential to result in the spread and establishment of invasive plants and noxious weeds because of the possibility of catching and spreading seeds along the haul path and repeated disturbance along the haul path. There are some priority species that generally do not occur in closed canopy areas and might increase once dead and dying trees are removed and there is more sunlight reaching the forest floor. These species would be likely to increase anyway as the dead and dying trees would already be creating some canopy openings as their branches decay and the trunks fall over. Overall, while the PDFs will reduce the spread of invasive plants and weeds, there would still be some likelihood of increased spread of invasive plants and weeds, especially given that the treatments would be occurring within 200 feet of critical infrastructure, where invasive plants and weeds are already common.

4.4.2.2 Vegetation Management

As described in Table 4-3 above, understory clearing associated with vegetation management would have little effect on invasive plants and noxious weeds as long as PDFs are followed, as the purpose of these treatments is to reduce fuels, not open canopies. In some cases, reducing understory competition might release an invasive plant, but the majority of priority invasive plants prefer open areas and little to no canopy cover from trees. Understory clearing has the potential to result in incremental negative impacts associated with the spread of invasive plants and noxious weeds. However, implementation of the PDFs designed for weed management, such as reseeding with native vegetation (see VEG-3), would minimize the spread of invasive species in and around the project area, and would reduce these impacts to less than significant.

4.4.2.3 Prescribed Burning

Pile Burning

While understory burning has the potential to result in impacts to certain invasive plants and noxious weeds, pile burning would have little impact on these species, as each pile burn is very small in size (approximately 200 cubic feet). Additionally, as described above, with implementation of the PDFs areas sterilized by pile burning would be seeded with locally occurring native species or covered with native duff/litter to prevent the establishment of invasive species, if an area would not recover with native species on its own.

Understory Burning

As described in Table 4-3 above, for some invasive species, burning does not prevent the establishment of seeds and can even promote dominance of invasive species in sterilized areas. However, as described in the PDFs, each individual treatment area would be managed following treatment to minimize the risks that noxious and invasive weeds become established.

Access for treatments

As previously described, access for treatments associated with the Proposed Action has the most potential to result in negative impacts related to invasive species and noxious weeds. Since a majority of the priority invasive plants and noxious weeds occur in disturbed fields and along roadsides, vehicles, equipment, and personnel entering and exiting the individual treatment areas have the potential to transport infested mud, dirt, and plant parts, which would result in the spread and establishment of these invasive species. Several PDFs are designed to minimize the spread of invasive species within and surrounding the project area. For example, vehicles and equipment would be pressure washed before, after, and between moving to individual treatment areas (see WEED-7, WEED-8). Additionally, access for treatments would avoid weed-infested areas to the maximum extent feasible (see WEED-6). With implementation of the PDFs, project activities would result in less than significant impacts to invasive plants and noxious weeds.

PDFs related to Invasive Plants and Weeds:

General: G-1 through G-4

Roads and Landings: RL-10

Mechanized Equipment: ME-12

Weeds: WEED-1 through WEED-8

4.4.3 Environmental Effects of the Reduced Action (Alternative 3)

Implementation of the Reduced Action would result in slightly reduced negative impacts associated with weeds and invasive plants as compared to the Proposed Action. As described above, removal and hauling of dead and dying trees has the potential to result in increased invasive species occurrence in the project area, due to seed dispersal and soil disturbance. This would still

occur under the Reduce Action; however, there would be no impacts associated with understory clearing or broadcast burning.

4.4.4 Cumulative Impacts

Other agencies and utility companies would continue their ongoing programs for managing invasive plants and noxious weeds in the project area. On the other hand, continued development and lack of coordinated efforts would encourage increases in invasive plants regionally. Vectors that could spread noxious and invasive weeds, such as grazing animals, wildfire, vegetation treatments, construction activities from minerals and realty developments would continue. Overall, the trends are likely negative due to increasing trends for nearly all invasive plants regionally, with some localized benefits from agencies undertaking active management to reduce invasive plants and noxious weeds.

4.4.4.1 Cumulative Impacts of the No Action Alternative

Under the No Action Alternative, there would be no treatments specifically for the management of invasive plants and weeds and no additional management of invasive plants beyond existing efforts by BLM. The spread of invasive plants and noxious weeds both on BLM lands and between BLM lands and non-BLM managed lands would be unchanged under the No Action Alternative. In addition to hazard tree management, many agencies control for invasive plants and weeds in California, and the location and intensity of invasive plant management is constantly in flux due to management and/or natural influences. California Invasive Plant Council (Cal-IPC) maintains the state's Weed Management Areas and coordinates regional partnerships (<https://www.cal-ipc.org/solutions/wmas/>). The soil disturbance from dead trees falling over would contribute in a very small way to the overall regional trend of increasing invasive plants.

4.4.4.2 Cumulative Impacts of the Proposed Action Alternative

Under the Proposed Action, any planned treatments would address invasive plants and noxious, including treating populations in proposed treatment areas before, during and after treatments. The use of a wide range of techniques to control infestations of weeds associated with treatment areas would result in at least short-term reductions in the areas around treatments. Overall, treatment areas are a small part of the BLM lands and even smaller part of all federal lands. Reducing populations in these areas may have only a small effect on the trends on BLM lands in the long-term. Considering past, present and reasonably foreseeable future actions, overall cumulative effects on BLM lands would be neutral to adverse while the continuing cumulative effects at the regional level would continue to be adverse.

4.4.4.3 Cumulative Impacts of the Reduced Action Alternative

The Reduced Action Alternative would only allow removals of dead and dying trees. This restriction would mean fewer opportunities to reduce invasive plants but also fewer opportunities to spread invasive plants compared to the No Action. Overall, these smaller treatment areas would

have an even smaller beneficial effect than under the Proposed Action. Considering past, present and reasonably foreseeable future actions, overall cumulative effects on BLM lands would be neutral to adverse while the continuing cumulative effects at the regional level would continue to be adverse.

4.5 Soils (Compaction, Erosion and Sedimentation)

4.5.1 Environmental Effects of the No Action Alternative (Alternative 1)

Under the No Action Alternative, dead and dying tree removal would continue to be done in limited areas on a case-by-case basis and would not include green thinning or understory burning. Impacts from these treatments would be handled on a case-by-case basis to minimize soil disturbance and to stabilize soils disturbed when accessing areas for tree removal. Dead trees falling on their own would also result in disturbed soils. This would occur both in and out of areas of critical infrastructure and result in exposed soils in small areas. There would be no compaction, but the occasional fallen tree and exposed root ball might result in loose soil in the area immediately around the tree if not managed. Rains generally wash that loose soil into the ground directly under the fallen tree. This would likely occur sporadically throughout forested areas. Thus, there would be small and temporary adverse impacts on soils under the No Action alternative.

One other way the No Action could cause negative impacts to soils is if a dead tree fell (for example, on a powerline) and started a large, high-intensity wildfire. This could result in many acres of exposed soils and, if rainfall was timed perfectly wrong, could result in substantial soil loss. This is a possibility under the No Action and would result in adverse impacts on soils, potential with permanent effects.

4.5.2 Environmental Effects of the Proposed Action (Alternative 2)

The Proposed Action includes numerous PDFs designed to prevent and lessen potential impacts to soils within the project area related to compaction and erosion. PDFs related to soil compaction include avoiding ground-disturbing activities on globally rare soils, sensitive soil types, soils at risk for compaction, and slopes greater than 35% to the maximum extent practicable (see ME-18). Work would also be avoided or limited to hand treatments when soils are saturated and have greater potential for soil compaction; thus, road and landing work, hauling, and yarding would occur during the dry season (see ME-2). When there is snow cover, operations would be allowed only when there is a minimum of 20 inches of snow to protect the soil from compaction or when the soil is frozen to a depth of 6 inches or more (see ME-11). Designated skid roads and trails would be used to limit compaction (see ME-7). Additionally, the project areas would be assessed following project activities to identify where soil ripping/decompaction would be most beneficial (see ME-18).

Erosion prevention features include suspending work during rain events or when soils are saturated to the extent that there is visible runoff or potential sedimentation (see RL-3, ME-21). Exposed soils would be covered or temporarily stabilized during work suspension (see ME-21). Ground

vegetation would generally be retained on cut and fill slopes to reduce erosion and maintain slope stability. When cutting vegetation is required for safety and maintenance, the root mass and ground surface would be left intact (see ME-19). In addition, trees would be felled onto the contour and left in place to provide soil stability in riparian areas (see ME-15). On fragile soils, full or partial suspension would be used to transport trees (see CY-4). Low-intensity underburns on fragile surface erosion and fragile slope gradient soils would only occur in the spring, and firelines for underburns would be constructed manually, rather than with heavy equipment (see FIRE-3). In addition, a number of PDFs protect riparian areas and reduce sedimentation from erosion, as discussed above in Section 4.2.2.

4.5.2.1 Dead and Dying Tree Removals

Implementation of the Proposed Action would result in soil compaction due to the use of heavy mechanical equipment for cutting dead and dying trees, as well as hauling felled trees to nearby access points. The design of the individual treatment and the PDFs to be implemented under the Proposed Action would mitigate any potential detrimental impacts to compaction and rutting and erosion. For example, ground-disturbing activities would occur to the maximum extent feasible only during the dry season, as soils are more susceptible to compaction when saturated (see TD-5, ME-2, and CY-5). In addition, pile burning may result in incremental impacts related to soil sterilization and erosion (see below). Water erosion could result during high intensity rainfall, snowmelt, or runoff events. The PDFs included as part of the Proposed Action, such as felling logs onto the contour and retaining them in riparian areas, specifically address these concerns for soil erosion and minimize potential negative impacts to soils. Individual PDFs would not eliminate all negative impacts to soils, but would minimize them and ensure impacts are short-term with a rapid recovery.

4.5.2.2 Vegetation Management

Understory clearing would result in temporary increased potential for soil erosion, due to the increase in exposed soils. However, as described above a number of PDFs would be followed to reduce compaction from heavy equipment and erosion from ground disturbance. For example, ground vegetation would be retained on cut and fill slopes to avoid erosion and sedimentation of neighboring streams, as described in PDF ME-20. As with dead and dying tree removal, not all soil impacts would be eliminated but they would be minimized and would recover rapidly.

4.5.2.3 Prescribed Burning

Pile Burning

Pile burning may result in temporary soil sterilization associated with burning a relatively large amount of fuel in a small area. Because piles would be relatively small (i.e., maximum size about 64 square feet or 200 cubic feet), recovery of soil productivity would be anticipated in a few months to a few years (Busse & Overby 2013). Standard operational procedures that limit work during periods when soils are wet and subject to compaction or erosion would prevent damage to

soils, although pile burning itself may be performed when soils are wet to reduce soil sterilization and risk of fire starts. In addition, with implementation of FIRE-6, no hand pile burning would occur on fragile slope gradient and fragile surface erosion soils unless there is adequate vegetation between piles to intercept displaced sediment.

Understory Burning

Understory burning up to 1,500 acres per year would temporarily remove soil litter and surface organic matter. These bare soils are likely to increase runoff and thus, erosion and sedimentation. However, these understory burns would be conducted in low to moderate intensity fire situations so soils would not be subject to heat levels that sterilize soils. Understory burns generally do not sterilize the soil, so native seed banks would recover areas following burns and existing deep-rooted perennial herbaceous plants and sprouting shrubs would start growth as soon as favorable conditions occur, likely within the next growing season.

4.5.2.4 Access for Treatments

Direct impacts to soils would include access to treatment areas (e.g., temporary roads) and removal of biomass (e.g., skid trails), which may result in exposure of the soil, mixing of the soil horizons, soil compaction and rutting, and increased susceptibility to wind and water erosion. However, as described in PDF ME-1, existing skid roads and trails would be prioritized over creating new trails and landings to reduce the total compacted area. Any new trails or landings would be recovered and closed after treatments (see RL-10, RL-11, RL-13). Soils would also be ripped and decompacted following treatments, where feasible and necessary for recovering site productivity (see ME-18).

Soils are most susceptible to wind erosion when soil aggregates are broken up, dry conditions exist, and soils are bare. However, a number of PDFs are identified to minimize the amount of displaced sediment during treatment activities (see RL-3, ME-14, ME-18, ME-19, ME-21, LR-9). Project areas would be managed carefully to minimize both short- and long-term soil impacts. After successful stabilization of soils following completion of individual treatments, including reestablishing vegetation and installing erosion control features, it is anticipated that there would be no permanent effects on soils from the Proposed Action.

PDFs related to Soils (Compaction, Erosion and Sedimentation)

General: G-1 through G-4

Roads and Landings: RL- 1 through RL-13

Hauling: H-1 through H-4

Mechanized Equipment: ME-1 through ME-23

Cable Yarding: CY-1 through CY-5

Fuels and Prescribed Fire: FIRE-1 through FIRE-9, FIRE-11

Wildlife: WILD-3

4.5.3 Environmental Effects of the Reduced Action (Alternative 3)

Implementation of the Reduced Action would result in reduced negative impacts to soils as compared to the Proposed Action. Since prescribed burning would only include pile burning, soil sterilization would be similar to the Proposed Action but in smaller areas. Additionally, while soil compaction would occur, there would be less exposed soils and less overall soil compaction, as understory clearing would not occur under this alternative. Since the Reduced Action would have a smaller negative effect on soils, these soils would also recover faster.

4.5.4 Cumulative Impacts

Other agencies would continue their ongoing programs for managing soils to minimize compaction, erosion, and sedimentation. BLM manages approximately 20,000 acres of forest stands annually, USFS manages approximately 250,000 acres annually, and up to 70,000 acres are managed on private lands annually. These programs include efforts under the Clean Water Act and the California Water Quality Control Boards to reduce sediment, total dissolved solids, turbidity, and organic carbon in water resources. Overall, regional trends are mixed with some areas reducing sediment loading and improving soil conservation while others show consistent declines, at least partially related to trends in development and forestry practices. In general, federal lands do not contribute greatly to sediment loading in water resources, although there may be localized problem areas. However, given the current risks of high intensity wildfires that can result in soil sterilization and soil exposure over large areas, there have been and would continue to be adverse impacts to soils over large areas when these wildfires occur.

4.5.4.1 Cumulative Impacts of the No Action Alternative

Under the No Action Alternative, the current treatments by BLM and other entities throughout the state would continue, which do not include green tree thinning or understory burning. Dead tree removals would continue and there would be some localized impacts to soils in very small areas. Even when combined with other forestry-related management, there is still a risk of high intensity wildfires which can cause soil sterilization and loss of protective vegetation leading to sedimentation and erosion. The BLM activities under the No Action would not change the regional trends related to any of the causes of soil sterilization or erosion.

4.5.4.2 Cumulative Impacts of the Proposed Action Alternative

Under the Proposed Action, dead and dying trees would be felled and/or topped and vegetation management and prescribed fires would occur. Short-term adverse effects on soils would occur from ground disturbance during treatments, but these would be minimized by PDFs. There would be no long-term effects on soils, other than the indirect effect of reducing the likelihood of exposed soils over large areas by reducing the risk of high-intensity wildfires. The Proposed Action would have a neutral to beneficial long-term effect, largely because the treatments are focused exactly in those areas where ignition risk is highest. Considering past, present and reasonably foreseeable future actions, overall cumulative effects to soils on and surrounding BLM lands would be neutral

or beneficial over the long-term. Most of the benefits would accrue in small areas and reduce fire risk in areas in and near treatments, but this would also reduce high intensity wildfires spreading into larger areas outside the project area. It would contribute in a small way to the overall acres benefitting from treatment throughout the project area from all parties in large portions of northern and central California, but cumulatively would be unlikely to eliminate the risk of high intensity wildfires across the region.

4.5.4.3 Cumulative Impacts of the Reduced Action Alternative

Under the Reduced Action Alternative, there would be only dead and dying tree removal and PDFs would still be implemented. Some temporary adverse effects would occur, but smaller than under the Proposed Action. However, the long-term benefits from wildfire risk reduction would also be smaller. Considering past, present and reasonably foreseeable future actions, overall cumulative effects to soils on and surrounding BLM lands would be similar to those regionally.

4.6 Fish and Wildlife (including Migratory Birds)

4.6.1 Environmental Effects of the No Action Alternative (Alternative 1)

Under the No Action Alternative, dead and dying tree removal would continue to be done in limited areas on a case-by-case basis and would not include green thinning or understory burning. Under the No Action alternative, direct effects to wildlife species or habitat on BLM-administered lands from vegetation removal or presence of workers would not occur. However, direct and indirect effects from dead tree removal would have the potential to adversely impact fish and wildlife if, for example, associated activities created noise, disturb habitat (including nesting sites), or prevent access to habitat during certain parts of the year. These impacts would be avoided to the maximum extent possible through the use of best management practices on a case-by-case basis.

Impacts from dead trees falling on their own (not removed through management) would also occur, though these impacts would likely be minor and short-term. For example, nesting habitat may be eliminated, or fish habitat might be affected near water resources. Unmanaged dead trees could also increase the risk of wildfires, especially in combination with the current conditions of excessive fuel loading and high ignition risk. Dead trees falling in areas of critical infrastructure, especially if they damage power lines, pose a risk of catastrophic wildfires over large areas. If any stand-replacing or catastrophic wildfires occurred, the impacts on wildlife habitat would be substantial. These combined factors would likely result in more intense fires than is historically normal, and for some species, this has the potential to eliminate occupied or potential habitat for years or even decades. For aquatic species, water quality could also be negatively impacted by more intense or stand-replacing fires, as hydrophobicity of soils leads to erosion of soils, which can cause sedimentation. The potential impacts of the No Action alternative are direct, indirect and adverse in the long-term, even those these types of high intensity wildfires are unlikely and uncommon.

4.6.2 Environmental Effects of the Proposed Action (Alternative 2)

As with other resource areas, there are PDFs incorporated into the Proposed Action designed to protect wildlife and their habitat within the project area. For example, a habitat assessment will be conducted by a wildlife biologist prior to ground work for special habitat features that could be used by any special status wildlife species (e.g. trees with complex structure, cavities, roosting or nesting platforms, nests) (see G-2). For thinning treatments, these habitat features would be marked for retention or excluded from the thinning unit. For prescribed fire treatments, these habitat features would be excluded from the burn unit or fuels would be removed from around the habitat structure prior to burning (see WILD-1). Additionally, several species-specific PDFs are included as part of the Proposed Action. Project activities would avoid cutting/felling/hauling activities within 0.5 mile of active northern goshawk nests between March 1 and August 31 of any given year and forest thinning would not occur in preferred northern goshawk habitat (see WILD-21). To protect nesting and fledging BLM Special Status birds, project activities would only occur in BLM Special Status bird habitat September 15 to February 1 (see WILD-22). Activities during the breeding/nesting season (February 2 to September 14) for migratory birds would also be minimized, to the extent possible (see WILD-23). In addition, within bat roosting habitat, treatments would be limited to protection or improvement of roosting habitat, and project activities would only occur in occupied bat habitat from September 15 to February 1 to avoid nesting bats (see WILD-24).

Table 4-4 summarizes the elements of the Proposed Action that have the potential to impact BLM sensitive wildlife species, as well as associated PDFs to avoid and minimize potential adverse impacts. The PDFs number listed next to each wildlife category indicate those PDFs that help minimize adverse effects to fish and wildlife species under the Proposed Action.

Table 4-4. Elements of the Proposed Action that Have the Potential to Impact BLM Sensitive Wildlife Species

BLM Sensitive Wildlife	Potential Effects of Proposed Action
Amphibians	PDFs that Minimize: G-1, G-2, G-3, G-4, RL-1 through RL-6, RL-8, RL-10, RL-11, RL-13, RL-13, H-2, H-4, WD-1 through WD-14, ME-1, ME-2, ME-3, ME-11, ME-12 through ME-17, ME-21, ME-22, CY-1 through CY-4, FIRE-1, FIRE-2, FIRE-5, FIRE-6, FIRE-9, FIRE-10, FIRE-12, FIRE-15, FIRE-15, FIRE-17, WEED-1 through WEED-8, WILD-1, WILD-2, WILD-3, WILD-5, LR-5, LR-6, HM-2, HM-3
California giant salamander, Foothill yellow-legged frog, red-bellied newt, southern torrent salamander, western spadefoot toad	Riparian, potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
Kern Canyon slender salamander, yellow-blotched salamander, Shasta salamander	Potential impacts from dead and dying tree removal, vegetation management and prescribed burns – but PDFs avoid and minimize
Limestone salamander	No potential for impact, chaparral not included in project area.
Pacific tailed frog, Relictual slender salamander	Riparian, potential impacts from dead and dying tree removal, vegetation management and prescribed burns – but PDFs avoid and minimize
Tehachapi slender salamander	Potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
Reptiles	PDFs that Minimize: G-1, G-2, G-3, G-4, RL-11, RL-13, ME-11, FIRE-5, FIRE-16, FIRE-17, WEED-1 through WEED-8, WILD-1, WILD-2, WILD-5, WILD-16, LR-5, LR-6
Coast horned lizard, Southern Sierra legless lizard	Potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
California mountain kingsnake, Northern California legless lizard	Potential impacts from dead and dying tree removal, vegetation management and prescribed burns – but PDFs avoid and minimize
Two-striped gartersnake	Riparian, potential impacts from dead and dying tree removal, vegetation management and prescribed burns – but PDFs avoid and minimize
Southwestern pond turtle, Western pond turtle	Riparian, potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize (PDF WILD-16)

Table 4-4. Elements of the Proposed Action that Have the Potential to Impact BLM Sensitive Wildlife Species (Continued)

BLM Sensitive Wildlife	Potential Effects of Proposed Action
Fish	PDFs that Minimize: G-1, G-2, G-3, G-4, RL-1 through RL-6, RL-8, RL-10, RL-11, RL-13, H-2, H-4, WD-1 through WD-14, ME-1, ME-2, ME-3, ME-12 through ME-17, ME-20, ME-21, CY-1 through CY-4, FIRE-1, FIRE-2, FIRE-6, FIRE-9, FIRE-10, FIRE-15, WILD-1, WILD-2, WILD-5, WILD-25, LR-5, LR-6, HM-2, HM-3
Clear Lake hitch, Pacific lamprey, Red Hills roach, rough sculpin, San Joaquin roach, Wall Canyon sucker	Aquatic, no potential impacts due to PDFs
Bats	PDFs that Minimize: G-1, G-2, G-3, G-4, RL-11, RL-13, WILD-1, WILD-2, WILD-5, WILD-24, LR-5, LR-6
Long-eared myotis, pallid bat, small-footed myotis, Western mastiff bat, Western red bat	Potential impacts from dead and dying tree removal, vegetation management and prescribed burns – but PDFs avoid and minimize
Fringed myotis, spotted bat, Townsend's big-eared bat, Yuma myotis	Potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
Predators	PDFs that Minimize: G-1, G-2, G-3, G-4, RL-11, RL-13, WILD-1, WILD-2, WILD-5, WILD-26, LR-5, LR-6
American badger	Limited potential for impacts, tends to occur in grasslands, shrublands, and chaparral
Fisher (West Coast DPS)	Potential impacts from dead and dying tree removal, vegetation management and prescribed burns – but PDFs avoid and minimize
Humboldt marten	Potential impacts from dead and dying tree removal, vegetation management and prescribed burns – but PDFs avoid and minimize
Mountain lion	Potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
Sierra Nevada red fox	Potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
Small Mammals	PDFs that Minimize: G-1, G-2, G-3, G-4, RL-11, RL-13, ME-11, FIRE-16, FIRE-17, WEED-1 through WEED-8, WILD-1, WILD-2, WILD-5, LR-5, LR-6
Big-eared kangaroo rat, Nelson's antelope squirrel, pygmy rabbit, western white-tailed jackrabbit	Limited potential for impacts, tends to occur in grasslands, shrublands, and chaparral
Oregon snowshoe hare	Potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
San Joaquin pocket mouse	Limited potential for impacts, tends to occur in grasslands, desert shrublands, and savannas
Sierra Nevada mountain beaver	Riparian, potential impacts from vegetation management and

Table 4-4. Elements of the Proposed Action that Have the Potential to Impact BLM Sensitive Wildlife Species (Continued)

BLM Sensitive Wildlife	Potential Effects of Proposed Action
	prescribed burns – but PDFs avoid and minimize
Sonoma tree vole	Potential impacts from dead and dying tree removal, vegetation management and prescribed burns – but PDFs avoid and minimize
Tulare grasshopper mouse	Limited potential for impacts, tends to occur in semi-arid grasslands, shrublands, and chaparral
Raptors	PDFs that Minimize: G-1, G-2, G-3, G-4, RL-11, RL-13, WILD-1, WILD-2, WILD-5, WILD-17 through WILD-23, LR-5, LR-6
Bald Eagle	Potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize (PDF WILD-17)
Burrowing Owl	Limited potential for impacts, tends to occur in grasslands, shrublands, and chaparral
California spotted owl	Potential impacts from dead and dying tree removal, vegetation management and prescribed burns – but PDFs avoid and minimize
Golden eagle	Potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
Great gray owl	Potential impacts from dead and dying tree removal, vegetation management and prescribed burns – but PDFs avoid and minimize (PDF WILD-20)
Northern goshawk	Potential impacts from dead and dying tree removal, vegetation management and prescribed burns – but PDFs avoid and minimize (PDF WILD-21)
Swainson's hawk	Limited potential for impacts, tends to occur in grasslands, shrublands, and chaparral
Migratory Birds	PDFs that Minimize: G-1, G-2, G-3, G-4, RL-11, RL-13, ME-11, ME-12, ME-15, ME-16, ME-17, FIRE-12, FIRE-16, FIRE-17, WEED-1 through WEED-8, WILD-1, WILD-2, WILD-5, WILD-22, WILD-23, LR-5, LR-6
Bank swallow, black swift, purple martin, yellow warbler, yellow-breasted chat	Riparian, potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
California black rail, greater sandhill crane, tricolored blackbird, yellow rail	Limited potential for impacts, tends to occur in wetland which will not be impacted
Terrestrial Mollusks	PDFs that Minimize: G-1, G-2, G-3, G-4, RL-1 through RL-4, RL-11, H-2, H-4, ME-11, ME-12 through ME-17, ME-20, ME-21, CY-1 through CY-4, FIRE-5, FIRE-6, FIRE-9, FIRE-10, FIRE-12, FIRE-15, FIRE-15, FIRE-17, WEED-1 through WEED-9, WILD-1, WILD-2, WILD-5, LR-5, LR-6, HM-2, HM-3
Big Bur Hesperian snail	Potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
Hirsute Sierra sideband snail	Potential impacts from vegetation management and prescribed

Table 4-4. Elements of the Proposed Action that Have the Potential to Impact BLM Sensitive Wildlife Species (Continued)

BLM Sensitive Wildlife	Potential Effects of Proposed Action
	burns – but PDFs avoid and minimize
Hooded lancetooth	Riparian, potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
Keeled sideband snail	Potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
Siskiyou shoulderband snail	Riparian, potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize
Tehama chaparral snail	Limited potential for impacts, tends to occur in chaparral
Tuolumne sideband snail	Potential impacts from vegetation management and prescribed burns – but PDFs avoid and minimize

4.6.2.1 Dead and Dying Tree Removals and Vegetation Management

Removal of dead and dying trees and other vegetation would directly impact wildlife species and habitat present in the project area. Many species require dead wood on the ground or snags as food sources and shelter. Species that are dependent upon dead and dying trees that may be affected would include fisher, Humboldt marten, Sonoma tree vole, western red bat, pallid bat, western mastiff bat, great gray owl, northern goshawk, relictual slender salamander, Kern Canyon slender salamander, Pacific tailed frog, shasta salamander, northern California legless lizard, southern Sierra legless lizard, and two-striped gartersnake.

General vegetation removal for thinning purposes has the potential to affect all wildlife species listed in Table 4-4, with the exception of aquatic species. Temporary direct habitat removal may temporarily or permanently displace wildlife. Removal of the dead and dying trees and other vegetation also has the potential to cause direct temporary impacts to species due to related noise and visual disturbances. Construction equipment, the presence of workers, and physically removing trees and other vegetation could displace individuals from habitat or cause direct harm from equipment. Any wildlife disturbed by treatment activities could temporarily or permanently relocate to similar, potentially more suitable habitat nearby. Wildlife relocating to new areas could affect territory boundaries and breeding and foraging activities. The individual treatment areas would occur adjacent (i.e., maximum 200 feet) to existing infrastructure and developed areas, which currently provide limited wildlife habitat and are also likely impacted by edge effects. In addition to displacement, there is potential for the understory to be damaged while trees are being felled. If this were to occur, the BLM would implement PDFs to improve habitat for wildlife and plants, such as designing treatments to accelerate the capacity of critical habitat to provide essential physical or biological features or to develop those features over time (see WILD-6). Further, downed wood caused by tree felling would be retained in some cases to meet key wildlife habitat values and removed in other cases if fuel loading is an issue and wildlife habitat values are considered satisfied.

In addition to these negative impacts, implementation of the project would result in some indirect long-term benefits to wildlife. Logs and dead and dying trees increase fuel loading, which cause higher intensity wildfires. These high-intensity fires often transform forested landscapes for decades to centuries afterwards, leading to positive and negative impacts to various wildlife species. Negative impacts from wildfires may include soil sterilization and establishment of non-native invasive plant species, which drastically changes the suitable habitat for native wildlife. Although the results are usually not entirely negative, the effects of high intensity fires greatly affect wildlife species composition and often are not part of natural fire regimes (Smith 2000). Removal of the fuel loads (i.e., dead and dying trees and understory vegetation) in the project area would reduce the chances of a high intensity fire and subsequent habitat degradation (Zouhar et al. 2008).

In the long-term, logs, dead trees, cavities, and other habitat features would naturally be reintroduced into the ecosystem following forest treatment. Prescribed burns and proper vegetation management (discussed further below) would eventually introduce complex habitat features, creating an overall improved forest structure, which would provide a higher quality habitat for individuals temporarily affected by dead and dying tree removal. While dead and dying trees can be hugely beneficial to wildlife, there are currently substantially more dead and dying trees than is beneficial across the California landscape (USFS 2016; TMTF 2017). Removal of the dead and dying trees within 200 feet of critical infrastructure would not change availability at the landscape level. Removing existing dead wood in these limited areas would improve overall habitat conditions in these edge habitats and reduce ignition risk, thereby protecting wildlife habitat.

4.6.2.2 Prescribed Burning

Prescribed burning may cause direct temporary impacts to species during the prescribed burn by introducing noise, visual, and physical disturbances. The presence of workers during a prescribed burn could displace many species from habitat areas. Introducing fire could also cause direct harm to individual organisms. Animals with limited mobility or slower escape capabilities, living above ground are most vulnerable to wildfire-induced injury or mortality, but occasionally, even large mammals are killed by fire (Smith 2000). Prescribed fires may require wildlife species to relocate to new areas which could affect territories, as well as breeding and foraging activities. However, the Proposed Action is taking place in a limited area, 200 feet near critical infrastructure, so individuals would be able to easily escape most prescribed burns and find alternative habitat nearby. This mosaic pattern often has benefits for wildlife species by providing microhabitats and habitat diversity to more species.

In order to reduce or eliminate potential direct effects of prescribed burns, PDFs specific to wildlife species and migratory birds would be implemented as described above. Prescribed burns are not expected to affect aquatic species due to the riparian area buffers (as described in Section 4.2.2.) and as a result of erosion and sedimentation-control PDFs discussed in Section 4.2.2. and 4.4.2.

Pile Burning

Pile burning would be localized and relatively small (i.e., maximum size about 64 square feet or 200 cubic feet). Therefore, this treatment is not anticipated to adversely affect any wildlife or migratory bird species as long as the handpiles avoid any sensitive animal areas, which would be identified prior to ground work as established in PDF G-2. Any incidental impacts from smoke would be temporary and primarily limited to the 200-foot corridor of infrastructure in the Proposed Action area and therefore, would not adversely affect wildlife or migratory bird species.

Understory Burning

Although there is some potential for temporary direct effects on individual wildlife, there would also be benefits to wildlife in the long-term. Prescribed understory fires have been shown to mimic low-severity wildfires and create similar structural and habitat conditions that benefit many wildlife species. Fires often cause a short-term increase in productivity, availability, or nutrient content of forage and browse, which benefits many wildlife species (Stephens et al. 2012). Additionally, species specific PDFs would be implemented to minimize negative impacts to wildlife. For example, in accordance with PDF FIRE-5, understory burns would be conducted in conditions promoting a light to moderate burn (i.e., when soil and duff are moist), in order to increase the productivity of the habitat without resulting in adverse impacts to wildlife.

4.6.2.3 Access for treatments

Accessing the individual project areas to gain entry and remove biomass or perform prescribed burns would directly impact wildlife species and habitat present in each project area. Temporary direct habitat removal would occur as a result of creating access roads and hauling biomass, which may displace wildlife. Relocating to new areas would affect territory boundaries, breeding, and foraging activities. Removal of dead and dying trees and other vegetation may also cause direct temporary wildlife impacts related to noise and visual disturbances. Construction equipment, the presence of workers, and physically removing biomass could also cause direct harm from equipment. However, implementation of the PDFs would prevent and avoid impacts to sensitive wildlife species, and affected habitat would be managed following treatment activities.

PDFs related to Fish and Wildlife

General: G-1 through G-4

Roads and Landings: RL-1 through RL-13

Hauling: H-2, H-4

Water Drafting: WD-1 through WD-9

Mechanized Equipment: ME-1, ME-2, ME-3, ME-11, ME-13 through ME-18, ME-21, ME-22

Cable Yarding: CY-1 through CY-5

Fuels and Prescribed Fire: FIRE-1, FIRE-2, FIRE-5, FIRE-6, FIRE-8, FIRE-9, FIRE-11, FIRE-14, FIRE-15, FIRE-16

Weeds: WEED-1 through WEED-8

Wildlife: WILD-1, WILD-2, WILD-3, WILD-6, WILD-16 through WILD-26

Lands and Realty: LR-5, LR-6

Hazardous Materials: HM-2, HM-3

4.6.3 Environmental Effects of the Reduced Action (Alternative 3)

Impacts of this option would be similar to those listed under the Proposed Action for dead and dying tree removal and pile burning above, with some disturbance and displacement of individuals from a variety of wildlife species. There would be less reduction in ignition risk without the vegetation management and understory burning, but there would be some reduction due to dead and dying tree removal.

4.6.4 Cumulative Impacts

Other agencies, as well as some non-profit entities, would continue their ongoing programs for managing fish and wildlife and their habitat. Overall, regional trends for fish and wildlife are mixed with some areas and species showing marked improvements while others show consistent declines.

4.6.4.1 Cumulative Impacts of the No Action Alternative

Under the No Action Alternative, forest management of BLM lands (approximately 20,000 acres annually) would continue. Other forest management would also continue with USFS treating approximately 250,000 acres per year and private landowners approximately 70,000 acres per year as well), but these have not been sufficient to reduce current conditions of excessive fuel loading and high ignition risk. These risks would persist under the No Action alternative, along with the potential risk of catastrophic wildfires over large areas, and associated impacts on fish and wildlife habitat. The effects on fish and wildlife of the No Action would be neutral to adverse, if any stand-replacing wildfires occur. Considering past, present, and reasonably foreseeable future actions, overall cumulative effects to wildlife would be highly variable depending on species and location.

4.6.4.2 Cumulative Impacts of the Proposed Action Alternative

Under the Proposed Action, the proposed treatments would potentially temporarily disturb wildlife, but PDFs would be implemented to protect wildlife and their habitat within the project area. The long-term effects of improved forest and woodland health, improved stand diversity and structure, and reduced ignition risk and high intensity wildfires is likely to benefit fish and wildlife and their habitat. However, most of the benefits would accrue in small areas in and near critical infrastructure (e.g. transportation corridors and areas frequented by humans), and may not necessarily benefit fish and wildlife significantly given that they are not typically prime habitat for fish and wildlife. The Proposed Action alternative would contribute in a small way to the overall acres benefitting from treatment throughout the project area from all parties in large portions of northern and central California, which would enhance fish and wildlife habitat on a regional scale.

Considering past, present, and reasonably foreseeable future actions, overall cumulative effects to wildlife would be highly variable depending on location and species, but the effects of the Proposed Action would increase any beneficial effects occurring regionally.

4.6.4.3 Cumulative Impacts of the Reduced Action Alternative

Under the Reduced Action Alternative, there would be less short-term disturbance to fish and wildlife but long-term benefits would also be smaller and more dispersed. Considering past, present, and reasonably foreseeable actions, overall cumulative effects to wildlife would be highly variable depending on location and species, but the effects of the Reduced Action would be neutral relative to effects occurring regionally.

4.7 Federally Listed Species

4.7.1 Environmental Effects of the No Action Alternative (Alternative 1)

Under the No Action Alternative, dead and dying tree removal may be done in limited areas on a case-by-case basis and would not include green thinning or understory burning. These BLM-managed acres would not impact federally listed species under the No Action alternative, as areas containing federally listed species would be avoided by the BLM. In the rare circumstance where federally listed species overlap with areas managed for dead and dying trees under the No Action alternative, BLM would implement measures to avoid and minimize take. Impacts from fallen trees would also occur if they were not managed (i.e. if the trees fell over on their own), particularly if a fallen tree causes a wildfire. Impacts to federally listed species would be unpredictable under this scenario, but it is possible that adverse impacts to individuals or populations would occur if a large, high-intensity wildfire were to start.

Federally listed species would continue to be at risk of impacts from wildfire. Increased fuel loading and increased ignition risk from the dead and dying trees and ladder fuels means there is a higher risk of stand-replacing wildfires that impact wildlife habitat and potentially result in direct take of individuals from listed species. In addition, critical habitat could be destroyed if stand-replacing wildfires occurred. Since this is not predictable, it is unknown which species would be most likely to be impacted under the No Action alternative.

4.7.2 Environmental Effects of the Proposed Action (Alternative 2)

The BLM has developed a programmatic Biological Assessment that analyzes the potential effects of the Proposed Action on this species in detail. A summary is provided here to support the NEPA analysis, but additional information is available in the programmatic Biological Assessment.

4.7.2.1 Plants

There are 11 federally listed plant species that have the potential or are known to occur in the project area and that may be affected by the Proposed Action. These species cover a range of

habitats across the project area, although many are associated with open areas near or interspersed with forest and woodlands. Most occur in very localized, small areas. In accordance with PDFs G-2 and G-3, all known federally listed plant populations and potential habitat would be identified during planning for individual treatments and those areas then avoided during any treatment activities. Dead and dying trees would be directionally felled if necessary to avoid areas with federally listed plants (see G-3).

Therefore, there would be no measurable impacts to federally listed plants under the Proposed Action. Indirectly, reducing fuel loads in areas adjacent to federally listed plants would reduce ignition risk and wildfires in occupied habitat. The effects determination as required by the Section 7 consultation under the Endangered Species Act was “may affect, not likely to adversely affect” due to the potential for accidental damage, primarily due to the possibility of accidental trampling on listed plants that were missed during pre-treatment survey, and the potential for the spread of weeds. However, PDFs WEED-1 through WEED-8 significantly reduce this risk.

4.7.2.2 Aquatic Wildlife

There are five federally listed aquatic species that occur in streams for part of their life cycle, with one crayfish and one frog also using adjacent riparian habitat. There are also three salmonid species (with multiple ESUs and DPSs). There are nine species with critical habitat within the project area, with six of them being aquatic wildlife (the other three are birds). The California red-legged frog is primarily aquatic (discussed here) but also has a terrestrial phase (discussed under Section 4.7.2.3, Terrestrial Wildlife).

As with federally listed plants above, the approach for aquatic and riparian habitats is avoidance. This includes areas that would be avoided wholesale (e.g. vernal pools and in-stream work) and activities that would be carefully managed (e.g. water drafting, work in riparian zones) in order to protect water quality and sensitive aquatic habitats and species (see WILD-3, RL-2, WD-2 through WD-14).

While there would be some activities in riparian zones and some work associated with streams (e.g., water drafting, established stream crossings), these activities are minimized and managed carefully to avoid increasing sediment entering water resources, damaging riparian vegetation and soils, and changing shading and woody debris in streams. As a result, there may be some highly localized and minimal impacts to federally listed aquatic species, primarily due to temporary increases in sediment or minor changes in canopy cover due to removal of dead or dying trees. However, implementation of PDFs WILD-25 and ME-12 through ME-17 would minimize these impacts by retaining some canopy cover in riparian areas.

No long term significant impacts to critical habitat for California red-legged frog are expected.

Table 4-5. Federally-Listed Aquatic Species and Potential Impacts from Proposed Action

Common Name	Federal Status	Critical Habitat	Species-Specific PDFs	Potential Impacts
California red-legged frog	FT	Yes	WILD-6, WILD-13	Aquatic phase – temporary, minor sediment; minor canopy/shading changes
Shasta crayfish	FE	No	WILD-11	temporary, minor sediment; minor canopy/shading changes
Chinook salmon - Central Valley spring-run ESU	FT	Yes	WILD-25, Water-related PDFs plus WD-1 thru WD-14	temporary, minor sediment; minor canopy/shading changes
Chinook salmon - Sacramento River winter-run ESU	FE	Yes	Water-related PDFs plus WD-1 thru WD-4	temporary, minor sediment; minor canopy/shading changes
Chinook salmon – central California coast ESU	FT	Yes	WILD-25, Water-related PDFs plus WD-1 thru WD-14	temporary, minor sediment; minor canopy/shading changes
Coho salmon - southern OR / northern CA ESU	FT	Yes	WILD-25, Water-related PDFs plus WD-1 thru WD-14	temporary, minor sediment; minor canopy/shading changes
Coho salmon – central California coast ESU	FE	Yes	WILD-25, Water-related PDFs plus WD-1 thru WD-14	temporary, minor sediment; minor canopy/shading changes
Steelhead - Central Valley DPS	FT	Yes	WILD-25, Water-related PDFs plus WD-1 thru WD-14	temporary, minor sediment; minor canopy/shading changes
Steelhead - northern California DPS	FT	Yes	WILD-25, Water-related PDFs plus WD-1 thru WD-14	temporary, minor sediment; minor canopy/shading changes
Steelhead - south-central California coast DPS	FT	Yes	WILD-25, Water-related PDFs plus WD-1 thru WD-14	temporary, minor sediment; minor canopy/shading changes
Steelhead – central California coast DPS	FT	Yes	WILD-25, Water-related PDFs plus WD-1 thru WD-14	temporary, minor sediment; minor canopy/shading changes

Sources: (USFWS 2018w, 2018y, 2018v, 2018t, 2002, 2017, 2018u, 2018z; CDFW 2018; Kratville & Olswang 2018; NOAA 2018c, 2018a, 2018b. FE: Federally endangered, FT: Federally threatened *CH indicates critical habitat is designated in that county within the project area.

4.7.2.3 Terrestrial Wildlife

There are nine federally listed terrestrial wildlife species that include six birds, one invertebrate, and one mammal, plus the terrestrial phase of the California red-legged frog. These species occur in a range of habitats. Some like the gray wolf have a wide range of habitat use while others are

habitat specialists, such as the marbled murrelet. Many of these terrestrial wildlife species use riparian habitats.

The primary means by which federally listed terrestrial wildlife might be impacted by the Proposed Action include:

- Disturbance from equipment, presence of humans, and/or noise: this is a common feature and the PDFs generally specify buffers and measures to avoid and minimize these effects, but they may still occur especially in areas outside ‘core’ areas, such as foraging habitat or corridors used for movement.
- Changes to habitat structure/composition: the removal of dead and dying trees as well as vegetation and management and understory burning all change the structure of a stand. In general, these changes should result in long-term benefits to the habitat by reducing wildfire risk, reducing future tree mortality, reducing moisture stress, opening up the understory, and improving overall species diversity and spatial heterogeneity. There may be temporary impacts while a stand recovers from the initial changes from treatment.
- Direct take (damage, harassment, mortality) of individuals: due the PDFs, this would largely be accidental occurring when a survey missed a population or an individual moves into an area where it was not expected to occur.

Five of the birds also have critical habitat occurring in the project area. As specified in PDF WILD-6, treatments would not adversely alter critical habitat. When possible, treatments would support benefit critical habitat but including activities that would facilitate providing essential physical or biological features within critical habitat. The specifics of this would vary depending on which critical habitat and which treatment activity is proposed.

Table 4-6. Federally-Listed Terrestrial Wildlife and Potential Impacts from Proposed Action

Common Name	Federal Status	Critical Habitat	Species-Specific PDFs	Potential Impacts
California red-legged frog	FT	Yes	WILD-6, WILD-13	Terrestrial phase – unlikely effects only if a frog travels overland beyond the 300-foot buffers established in the PDFs
California condor	FE	Yes	WILD-6, WILD-10	Avoidance and buffers prevent any impacts to critical habitat or key areas. Temporary effects could occur if a foraging area is avoided by individual birds during treatments. Treatments would not permanently alter the quality of the foraging habitat.
Least Bell’s vireo	FE	No	WILD-9	Limited impacts due to buffers for noise and activities around known sites during breeding season and suitable nesting trees in general, as well as PDFs to retain 300-foot buffer around all suitable nesting trees and occupied stands

Table 4-6. Federally-Listed Terrestrial Wildlife and Potential Impacts from Proposed Action (Continued)

Common Name	Federal Status	Critical Habitat	Species-Specific PDFs	Potential Impacts
Marbled murrelet	FT	Yes	WILD-6, WILD-8	Limited impacts due to buffers for noise and activities around known sites during breeding season and suitable nesting trees in general, as well as PDFs to retain suitable nesting trees and maintain 40% canopy cover.
Northern spotted owl	FT	Yes	WILD-6, WILD-7	Limited impacts due to buffers for noise and activities around known sites during breeding season, as well as PDFs for specific tree retention and canopy cover depending on the type of habitat.
Southwestern willow flycatcher	FE	Yes	WILD-6, WILD-9	No direct effects as occupied habitat during breeding season is full avoidance. Limited effects on habitat from treatments outside the breeding season. In some cases, treatments may improve the habitat for the species. In others, there may be a temporary adverse effect until habitat recovers from removals.
Western yellow-billed cuckoo	FT	Yes	WILD-6, WILD-9	No direct effects as occupied habitat during breeding season is full avoidance. Limited effects on habitat from treatments outside the breeding season. In some cases, treatments may improve the habitat for the species. In others, there may be a temporary adverse effect until habitat recovers from removals.
Valley elderberry longhorn beetle	FT	No	WILD-12	No adverse impacts as elderberries in occupied habitat would be avoided. Any accidental damage would be recovered.
Gray wolf	FE	No	WILD-14	Important habitat (den sites, rendezvous sites, etc.) would have a 1-mile buffer during seasonal restriction. Additional buffers may be identified during treatment planning. Possible benefits from increased prey or better hunting with improvements to understory structure.

Sources: USFWS 2018l, 2018x, 2018m, 2018o, 2018p, 2018q, 2018r, 2018s, 2018n, CDFW; CDFW 2018).
FE: Federally endangered, FT: Federally threatened

PDFs related to Federally Listed Species

General: G-1 through G-4

Roads and Landings: RL-1 through RL-5, RL-7, RL-11, RL-12, RL-14, RL-15

Hauling: H-2, H-4

Water Drafting: WD-1 through WD-14

Mechanized Equipment: ME-2, ME-3, ME-6, ME-12 through ME-18, ME-21

Cable Yarding: CY-1 through CY-5

Fuels and Prescribed Fire: FIRE-1 through FIRE-4, FIRE-8 through FIRE-14

Vegetation: VEG-2 through VEG-4

Weeds: WEED-1 through WEED-8

Wildlife: WILD-1, WILD-2, WILD-3, WILD-6 through WILD-15, WILD-22, WILD-25

Lands and Realty: LR-5

Hazardous Materials: HM-2, HM-3

4.7.3 Environmental Effects of the Reduced Action (Alternative 3)

There would be fewer negative impacts from the Reduced Action compared to the Proposed Action and those impacts would be limited to dead and dying tree removal and pile burning, and access to accomplish those treatments. The reduction in ignition risk would also be lower and the risk of spread of a stand-replacing fire would not be reduced as much. This means there would be less likelihood of adverse impacts but also diminished beneficial effects on habitat for federally listed species.

4.7.4 Cumulative Impacts

Other agencies, as well as some non-profit entities, would continue their ongoing programs for managing federally listed species. BLM manages approximately 20,000 acres of forest land for dead trees, fuels, and forestry annually, approximately 250,000 acres are managed annually by USFS, and approximately 20,000 acres for forestland per year of private land are harvested/managed plus an additional 10,000-50,000 acres per year on private land receive emergency treatments. Overall, regional trends for federally listed species would be dependent upon the species, with some showing improvement and increased populations while other species show consistent declines.

4.7.4.1 Cumulative Impacts of the No Action Alternative

Under the No Action Alternative, the current hazardous tree treatments by BLM and other entities throughout the state would continue, which has not been sufficient to reduce fuel loading, dead/dying trees, or changes in forest structure near critical infrastructure. Although the current case-by-case basis treatments by BLM avoid areas containing federally listed species, these species and their habitats would continue to be affected by the increased fuel loading and ignition risk. A higher risk of stand-replacing wildfires that impact potential and known habitat could also result in direct take of individuals during wildfires. Considering past, present, and reasonably foreseeable actions, overall cumulative effects to federally listed species would continue to be adverse at the regional level and generally for all species (otherwise the species would be proposed for delisting).

4.7.4.2 Cumulative Impacts of the Proposed Action Alternative

Under the Proposed Action, dead and dying trees would be felled and/or topped and vegetation management (thinning) and pile and understory burns would occur on 2,500 to 20,000 acres each year. This may double the amount of treatment acres conducted on BLM lands from the average

of 20,000 acres currently being treated to 40,000 acres treated annually. The effects of the Proposed Action would be potentially long-term and beneficial through the removal of dead and dying trees and the improvements to understory and canopy structure from vegetation management and understory burning. Under the Proposed Action, treatment activities have some potential to disrupt or impact federally listed species but the implementation of PDFs would avoid and minimize those effects. Most of the benefits to federally listed species would accrue in small areas and reduce fire risk in areas in and near treatments. It would contribute in a small way to the overall acres benefitting from treatment throughout the project area from all parties. in large portions of northern and central California. This would reduce the risk of habitat alterations for federally listed species in the context of wildfire management on a regional scale – a beneficial long-term impact of the Proposed Action. while providing for Considering past, present, and reasonably foreseeable future actions, overall cumulative effects to federally listed species would result in minor, short term adverse impacts, and overall, long-term beneficial effects on BLM lands, but unlikely to reverse regional trends and result in the delisting of any federally listed species.

4.7.4.3 Cumulative Impacts of the Reduced Action Alternative

Under the Reduced Action Alternative, there would be fewer negative impacts compared to the Proposed Action. However, the ignition risk reduction would be lower, and the spread of fire would not be as reduced. Considering past, present, and reasonably foreseeable future actions, overall cumulative effects to federally listed species would result in minor, short term adverse impacts, and overall, long-term beneficial effects on BLM lands, but unlikely to reverse regional trends and result in the delisting of any federally listed species.

4.8 Cultural Resources

4.8.1 Environmental Effects of the No Action Alternative (Alternative 1)

Potential direct and indirect effects to significant or potentially significant cultural resources occur when project-related activities cause physical damage to or destruction of these resources. The possibility of project-related effects on cultural resources would not occur under the No Action Alternative, given that hazard removal and vegetation management treatments proposed under this programmatic environmental assessment (Alternative 2 and Alternative 3) would not occur.

Under the No Action Alternative, a reduction in ignition wildfire risk within 200 feet of critical infrastructure, and generally within the project area, would not occur. The potential for wildfire would remain or even increase in some areas, given the untreated fuel load caused by dead tree decay. Wildfires typically result in emergency responses, potentially causing ground disturbance (including potential damage to cultural resources) through fire suppression activities involving control line construction by hand crews, bulldozers and other heavy mechanical equipment.

Dead and dying trees would not be removed under the No Action Alternative and would continue to represent potential hazards that could fall, destroying or causing damage to cultural resources such as historic-period built environment resources.

Therefore, the No Action Alternative is considered to have the potential for negative effects on significant or potentially significant cultural resources.

4.8.2 Environmental Effects of the Proposed Action (Alternative 2)

The Proposed Action provides for a wide range of strategies for dead and dying tree removal and vegetation management, including manual felling, pile burning, understory burning, mechanical treatments, and mastication, etc., as well as some associated temporary infrastructure (i.e., landing areas, temporary roads). The extent to which these approaches have the potential for resulting in direct impacts to cultural resources is described below. Potential impacts caused by the implementation of these strategies would be avoided or greatly minimized by the PDFs in Appendix B. Each project proposed under this programmatic environmental assessment in the future will require Section 106 NHPA review, including (as necessary) BLM Class III pedestrian survey of the project's area of potential effect (APE), evaluation of resources to determine their NRHP eligibility status, assessment of effects, and the application of appropriate PDFs in Appendix B to protect NRHP-listed or -eligible resources (or potentially eligible resources, or resources assumed eligible for purposes of undertaking) during project implementation.

Ground-based vegetation extraction including skidding machinery use and development of skid trails/skidding and hauling on skid trails could damage or destroy archaeological resources, historic-era built environment resources, and Native American traditional cultural properties or other areas of special interest. Similar impacts could result from ground-based and cable-based extraction for biomass removal, cable-based extraction (yarding onto to landings or road/route sides), and temporary access road construction. Appendix B includes numerous PDFs designed to avoid or greatly minimize these impacts. Generally the following PDFs will be applied: according to CR-13 ground disturbance resulting in soil movement or compaction caused by tree removal and other mechanical vegetation treatments (i.e., use of heavy equipment, masticators, chippers, etc.) would not be allowed to occur on cultural resources listed on or determined to be eligible (or potentially eligible) for the NRHP. Under CR-14, prior to project implementation, cultural resources listed on or determined eligible (or potentially eligible) for the NRHP would be marked on the ground for avoidance. The marking would be determined in consultation with the BLM project manager or lead and project personnel, prior to the implementation of the project. The APE and appropriate buffer distance would be at the discretion of the FO Archaeologist, taking into consideration project activities and potential effects.

Mechanical mastication (grinding, chipping, and shredding vegetation on site) would require transportation of equipment that has the potential for ground disturbance that could damage or destroy surface archaeological resources, historic-era built environment resources, and Native American traditional cultural properties. In addition to PDFs CR-13 and CR-14, use of rubber tracked, rather than rubber-tire or metal tracked vehicles, with articulating booms that could extend in the air over sensitive cultural resources would avoid or minimize potential impacts to significant and sensitive resources identified during Section 106 review.

Prescribed fire including hand piling/burning and understory burning have the potential to damage or destroy historic-period artifacts, such as glass and wood. Depending on the intensity of the burn and other factors, prescribed burning also has the potential to alter or destroy hydration bands in prehistoric obsidian artifacts, rendering these artifacts unsuitable for hydration studies used to help date archaeological deposits. Significant and sensitive cultural resources would be identified through Section 106 review, and potential impacts avoided by, for example, creating a protection zone or buffer around the sensitive resources (CR-20) and application of other PDFs in Appendix B (CR-18, -19, and -21). Historic arborglyphs are rare within the project area but are generally considered significant and would be protected by removing vegetation within a 15-foot (5-meter) radius (CR-25) as well as through other PDFs in Appendix B.

An additional potential direct impact resulting from vegetation removal would be the potential for falling trees to damage a significant or potentially significant built environment resources such as a historic cabin or gold mill. Significant and sensitive resources would be identified during Section 106 review and PDFs would be implemented to avoid or minimize effects to these resources. For example, under CR-12 any dead or dying or green tree vegetation management that would pose a threat to NRHP-listed or eligible (or potentially eligible) cultural resources would be directionally felled to avoid damaging those cultural resource. A BLM-approved archaeological monitor would be present on-site during such activities (CR-12). The strategy would avoid this potential direct impact.

Potential indirect impacts of project implementation could include improved public access to or increased visibility of sensitive archaeological resources, leading to incidences of unauthorized removal, disturbance or alternation. Examples would include creating new vehicle equipment access roads or reopening of closed roads for project-related vehicles that could later in time create or improve public access to cultural resources vulnerable to looting and vandalism. As use of these roads would be temporary and the roads would be closed and restored after the project, the potential indirect effect would be avoided or minimized. When warranted, the areas encompassing these cultural resources could be hand-treated to avoid direct and indirect impacts from the vegetation treatments (CR-22).

Another potential indirect impact to cultural resources would include a change of the character of the resource's setting that contributes to its significance. This may be particularly true for cultural resources that may be listed on or eligible for the NRHP under Criteria A, B and/or C and where setting is an important aspect of the resource's integrity and/or plays a role in the resource's significance. These resources will be identified through Section 106 review at the project level; project design features in Appendix B will be implemented to retain the resource's setting if this contributes to the significance. It is anticipated that projects proposed under pEA could in some cases have beneficial effects (i.e., reduced fuel loading and corresponding risk of high severity wildfire, etc.) to setting where setting contributes to a resource's significance.

The potential for indirect impacts caused by erosion and sedimentation of significant or potentially significant cultural resources located down-gradient of a project's hazard removal and vegetation

treatment areas is addressed by numerous Project Design Features such as (RL-1) avoiding ground disturbances associated with temporary road and landing construction and maintenance and use of unimproved roads during the wet season; (RL-3, H-1, ME-2); and using best management temporary road construction and erosion control practices to retain and direct storm flow runoff (RL-5, RL-6, RL-9).

The Project Design Features in Appendix B provide specific guidance as to how future implementation of the pEA projects would be reviewed under Section 106 NHPA using the BLM California Statewide Protocol Agreement. Certain PDFs will be required for planning and implementing all projects proposed under the pEA in the future. The PDFs address the following steps in future project planning and implementation.

Determining Area of Potential Effect: Individual projects would be subject to review pursuant to Section 106 NHPA using the BLM California's Statewide Protocol Agreement. As part of this process, an Area of Potential Effect (APE) would be determined by the BLM Field Office archaeologist and a reasonable-and-good faith effort would be made to identify and assess all potential direct and indirect effects of the project on significant or potentially significant cultural resources. These PDFs include: CR-1; CR-3; CR-4; and CR-7.

Ensuring Sufficient Field Inventory of Cultural Resources within the APE: Each individual project APE would be inventoried in accordance with BLM California's Statewide Protocol Agreement and other BLM California-specific policy and procedures to ensure the identification of, and planning for, all significant or potentially significant cultural resources within the APE. In most cases, BLM Class III inventory coverage will be required for each individual project. These PDFs include: CR-5; CR-15; CR-18; CR-19; and CR-21.

Identification of Appropriate PDFs. Informed by the results of the Section 106 review, the Field Office archaeologist would apply appropriate PDFs in Appendix B which are designed to provide flexibility to achieve project objectives while avoiding or minimizing potential negative effects on significant or potentially significant cultural resources. The PDFs would be incorporated into the Decision Record for the project and would be implemented. This guidance is explained in these PDFs: CR-2; CR-6; and CR-11.

Guidance Prior, During and Subsequent to Project Implementation: These PDFs provide guidance applied prior, during and subsequent to future implementation. They include: CR-8; CR-9; CR-10; CR-23; CR-24; CR-26; CR-27; CR-28.

Avoiding Cultural Resource Impacts: These PDFs provide specific direction to ensure the avoidance of significant or potentially significant cultural resources during project implementation. They include: CR-12; CR-13; CR-14; CR-16; CR-17; CR-18; CR-20; CR-22; CR-25.

Incorporation of these PDFs during future project implementation would ensure that regulatory compliance (Section 106 NHPA) and avoidance or minimization of direct and indirect effects to significant and potentially significant cultural resources would be accomplished.

4.8.3 Environmental Effects of the Reduced Action (Alternative 3)

Reduced Alternative 3 would not include any green tree thinning or understory burning. Under this alternative, dead and dying trees would be felled and their removal would be permitted by the other means/measures proposed under Alternative 2 (e.g., mastication, pile burning, etc.). However, in this scenario, no understory burning would be allowed. Further, this alternative would not include vegetation management (e.g., green tree thinning).

Elimination of green tree thinning and broadcast burning would reduce the potential for ground disturbances and would thus reduce the potential for direct impacts on cultural resources. Conversely, all potential project management strategies that would have the potential for ground surface disturbances would be available under Alternative 3. Therefore, potential impacts to cultural resources under the Alternative 3 would be similar to Alternative 2, the Proposed Action, and would be addressed through project-specific Section 106 review and application of PDFs (in Appendix B).

4.8.4 Cumulative Impacts

The proposed project would incorporate PDFs that would help ensure avoidance or minimization of direct negative effects to significant cultural resources caused by ground disturbance or prescribed fire as well as indirect negative effects caused by a change in integrity of setting or later in time as a result of improved public access, potentially leading to looting and vandalism in certain situations. Therefore, project contributions to cumulative impacts would not be significant.

4.8.4.1 Cumulative Impacts of the No Action Alternative

No short-term impacts to cultural resources would be anticipated under the No-Action Alternative. Long-term impacts to cultural resources could be adverse if areas were affected by wildfire or the falling of dead trees on adjacent historic-period built environment resources. Considering past, present, and reasonably foreseeable future actions, overall effects to cultural resources would be neutral.

4.8.4.2 Cumulative Impacts of the Proposed Action Alternative

Under the Proposed Action, dead and dying trees would be felled and/or topped, understory vegetation would be cleared, and prescribed pile and understory burns would occur. In the short-term, the use of mechanical and prescribed fire treatments has the greatest potential to affect cultural resources. This would be avoided or greatly minimized through project-specific Section 106 review under the BLM California's Statewide Protocol Agreement and the implementation of the cultural resource PDFs (in Appendix B). The Proposed Action would have a beneficial effect

over the long-term, due to the reduction in hazards and potential for burning and associated impacts to cultural resources. Considering past, present, and reasonably foreseeable future actions, overall cumulative effects to cultural resources from hazard removal would be neutral or beneficial.

4.8.4.3 Cumulative Impacts of the Reduced Action Alternative

Under the Reduced Action Alternative, dead and dying tree removal and pile burning would occur, but methods would be limited to remove hazard vegetation and improve overall forest health. Overall, cumulative impacts would be similar to those described for the Proposed Action. Considering past, present, and reasonably foreseeable future actions, overall cumulative effects to cultural resources would be neutral or beneficial.

4.9 Paleontological Resources

4.9.1 Environmental Effects of the No Action Alternative (Alternative 1)

Potential direct effects to significant or potentially significant paleontological resources occur when project-related activities cause physical damage to or destruction of these resources. The possibility of project-related effects would not occur under the No Action Alternative, given that the hazard removal and vegetation management treatments proposed under this programmatic environmental assessment (Alternative 2 and Alternative 3) would not occur.

Under the No Action Alternative, a reduction in wildfire ignition risk within 200 feet of critical infrastructure, and generally within the project area, would not occur. The potential for wildfires would remain or even increase in some areas given untreated fuel load caused by dead tree decay. Response to wildfires typically result in emergency responses, potentially causing ground disturbance (including potential damage to paleontological resources) through fire suppression activities involving control line construction by hand crews, bulldozers and other heavy mechanical equipment.

Therefore, the No Action Alternative is considered to have the potential for negative effects on significant or potentially significant paleontological resources.

4.9.2 Environmental Effects of the Proposed Action (Alternative 2)

The Proposed Action provides for a wide range of strategies for dead and dying tree removal, vegetation management, and prescribed fire, including manual felling, pile burning, understory burning, mechanical treatments, and mastication, etc., as well as some associated temporary infrastructure (i.e., landing areas, temporary roads). These approaches have the potential for direct impacts to significant or potentially significant paleontological resources from ground disturbances.

Ground-based vegetation extraction including skidding machinery use and development of skid trails/skidding and hauling on skid trails could damage or destroy paleontological resources.

Similar impacts could result from ground-based and cable-based extraction for biomass removal, cable-based extraction (yarding onto landings or road/route sides), and temporary access road construction.

Mechanical mastication (grinding, chipping, and shredding vegetation on site) would require transportation of equipment that has the potential for ground disturbance that could damage or destroy significant or potentially significant paleontological resources. Use of rubber tracked, rather than rubber-tire or metal tracked vehicles, with articulating booms that could extend in the air over potentially sensitive paleontological resources rather than requiring the equipment to be transported over the ground surface would help to avoid or minimize potential impacts. Significant or potentially significant paleontological resources would be identified at the project level, during project review, and potential impacts would be avoided or minimized by creating a buffer around these resources so that they are protected from ground disturbing activities (PALEO-1, PALEO-2).

Prescribed fire including hand piling/burning and understory burning would not have the potential to damage paleontological resources.

Potential indirect impacts of project implementation are unlikely but might include improved access to paleontological resources with a corresponding increase in unauthorized collection of protected paleontological resources. Examples would include new vehicle equipment access roads or reopening of closed roads that could create or improve access to resources vulnerable to looting and vandalism. As use of these roads would be temporary, the potential indirect effect would be avoided or minimized.

Numerous PDFs (in Appendix B) would minimize the potential for indirect erosion and sedimentation of significant or potentially significant paleontological resources located down-gradient of project related hazard removal and vegetation management. These PDFs include: avoid ground disturbances on steep slopes (RL-1); avoiding ground disturbances associated with temporary road and landing construction and maintenance and use of unimproved roads during the wet season (RL-3, H-1, ME-2); and using best management temporary road construction and erosion control practices to retain and direct storm flow runoff (RL-5, RL-6, RL-9).

Similar to the cultural resources PDFs (see Appendix B) implementation of the pEA projects would address potential impacts and avoidance relative to significant or potentially significant paleontological resources. All individual project areas would be inventoried in accordance with BLM policy and procedures to ensure the identification of significant or potentially significant paleontological resources within the project area (PALEO-1). Typically, only portions of the project area that contain Class 4 (high potential) or Class 5 (very high potential) formations as defined under the BLM's Potential Fossil Yield Classification (PFYC) system (pursuant to WO IM No. 2016-124) will be subject to paleontological resource assessment. Unknown (Class U) formations may also require assessment, as determined by the FO Archaeologist or FO paleontology lead (PALEO-1).

Future project ground disturbances would not be allowed to occur within the boundaries of significant or potentially significant paleontological resource localities (PALEO-2). Appropriate buffers would be established from the paleontological resource boundaries to ensure protection during project implementation (PALEO-3). If impacts to significant or potentially significant paleontological resources are unavoidable during implementation of a project, mitigation (such as data recovery) would be identified and implemented in accordance with BLM policy and procedures (PALEO-4 and PALEO-5).

PDFs related to Paleontological Resources

General: G-1 through G-4

Paleontological Resources: PALEO-1 through PALEO-5

Roads and Landings: RL-1, RL-3, RL-5, RL-6, RL-9

4.9.3 Environmental Effects of the Reduced Action (Alternative 3)

Alternative 3 would not include any green tree thinning or understory burning. Under this alternative, dead and dying trees would be felled and their removal would be permitted by the other means/measures proposed under Alternative 2 (e.g., mastication, pile burning, etc.). However, in this scenario, no understory burning would be allowed. Further, this alternative would not include vegetation management (e.g., green tree thinning).

Elimination of green tree thinning, in particular, would reduce potential ground disturbances and thus would reduce the potential for direct impacts on significant or potentially significant paleontological resources. Conversely, all other hazard removal and vegetation management strategies (such as use of a tracked masticator) that do have the potential for ground surface disturbances would be available under the Alternative 3. Therefore, potential impacts to paleontological resources under Alternative 3 would be similar to Alternative 2 (Proposed Action).

4.9.4 Cumulative Impacts

The proposed project would incorporate PDFs that would help ensure avoidance or minimization of direct negative effects to significant or potentially significant paleontological resources caused by ground disturbance as well as indirect negative effects caused later in time as a result of improved public access leading to unauthorized collection of protected paleontological resources. Therefore, project contributions to cumulative impacts would not be significant.

4.9.4.1 Cumulative Impacts of the No Action Alternative

No short-term impacts to paleontological resources would be anticipated under the No Action Alternative. Long-term impacts to paleontological resources could be adverse if areas were affected by wildfire leading to unplanned ground disturbance associated with emergency use of hand crews, bulldozers and other heavy equipment during suppression operations. Considering past, present, and reasonably foreseeable future actions, overall effects to paleontological resources would be neutral.

4.9.4.2 Cumulative Impacts of the Proposed Action Alternative

Under Alternative 2, the Proposed Action, dead and dying trees would be felled and/or topped, understory vegetation would be cleared, and prescribed pile and understory burns would occur. In the short-term, the use of mechanical treatments has the greatest potential to affect paleontological resources. This would be minimized or avoided through project-specific compliance and the implementation of the paleontological resource PDFs (in Appendix B). The Proposed Action would have a beneficial effect over the long-term, due to the reduction in hazards and potential for high severity wildfires and associated impacts to paleontological resources that could result from suppression operations involving hand crews, bulldozers, and other heavy equipment. Considering past, present, and reasonably foreseeable future actions, overall cumulative effects to paleontological resources from hazard removal would be neutral or beneficial.

4.9.4.3 Cumulative Impacts of the Reduced Action Alternative

Under Alternative 3, the Reduced Action Alternative, dead and dying tree removal and pile burning would occur, but green tree thinning and understory burning would not occur. Overall, cumulative impacts would be similar to those described for the Proposed Action. Considering past, present, and reasonably foreseeable future actions, overall cumulative effects to paleontological resources would be neutral or beneficial.

4.10 Recreation

4.10.1 Environmental Effects of the No Action Alternative (Alternative 1)

Under the No Action Alternative, dead and dying tree removal would continue to be done in limited areas (e.g. not to the level analyzed in this pEA) on a case-by-case basis and would not include green thinning or understory burning. Users would continue to be subject to existing hazard trees and could potentially be injured by falling dead trees or wildfires. Further, in the event of large tree falls or wildfire(s) within or near a recreational area, these areas could experience longer-term closures than the temporary closures that would be needed to perform hazard removal treatments included in the Proposed Action.

4.10.2 Environmental Effects of the Proposed Action (Alternative 2)

Under the Proposed Action, hazards to people and critical infrastructure associated with dead and dying trees and excess fuel loading near critical infrastructure would be reduced. Portions of recreation areas (e.g., campgrounds) may be temporarily closed during treatments for public health and safety reasons. Access roads to developed recreation areas and existing motorized trails may experience temporary increases in use by heavy equipment (e.g., skidders, cable yarders, etc.) and treatment teams. Access roads and motorized trails may also be degraded due to increase in use. Proliferation of illegal trails could result from the creation of temporary access roads or re-opening of previously closed roads and trails to support hazard tree removal. However, implementation of

PDFs REC-1 through REC-6 and LR-6 would minimize these impacts below a level of significance.

PDFs related to Recreation

General: GEN-1 through GEN-4

Recreation: REC-1 through REC-6

Visual Resource Management: VRM-1, VRM-2, VRM-3

Safety: SAFE-1, SAFE-2, SAFE-3, SAFE-4

4.10.3 Environmental Effects of the Reduced Proposed Action (Alternative 3)

Impacts under this alternative would be generally similar to those described for Alternative 2, with regard to mechanical treatment methods. However, under Alternative 3 no green tree thinning or understory burning would occur, resulting in less severe short-term impacts. While short-term hazard trees would be removed under this alternative, longer-term hazards would continue to present themselves over time. Therefore, the presence of heavy equipment and vehicles would be less intense but would likely occur more frequently than described for Alternative 2 as more individual treatments would be required to address emerging hazards over the long-term as trees die due to poor stand health.

4.10.3.1 Cumulative Impacts of the No Action Alternative

Under the No Action Alternative, treatments would occur on a case-by-case basis, and tree mortality and wildfire risk would continue. These activities have not been sufficient to reduce fuel loading and dead/dying trees near critical infrastructure. Fewer acres would be treated on smaller parcels of land. Considering past, present, and reasonably foreseeable future actions, overall effects to recreation would be adverse.

4.10.3.2 Cumulative Impacts of the Proposed Action Alternative

Under the Proposed Action, dead and dying trees would be felled and/or topped, ground vegetation would be cleared, and prescribed pile and understory burns would occur on an additional 2,500 to 20,000 acres each year. This may double the amount of treatment acres conducted on BLM-managed lands from the average of 20,000 acres currently being treated annually to 40,000 acres annually. In the short-term, the use of mechanical and prescribed fire treatments has the greatest potential to result in short-term closures of recreational areas. The Proposed Action would have a beneficial effect over the long-term, due to the reduction in hazards and potential for shorter closures of recreational areas. Considering past, present, and reasonably foreseeable future actions, overall cumulative effects to recreation would be beneficial.

4.10.3.3 Cumulative Impacts of the Reduced Action Alternative

Under the Reduced Action Alternative, dead and dying tree removal and pile burning would occur, but methods would be limited to remove hazard vegetation and improve overall forest health. Overall, cumulative impacts would be similar to those described for the No Action Alternative.

4.11 Lands with Wilderness Characteristics

4.11.1 Environmental Effects of the No Action Alternative (Alternative 1)

Under the No Action Alternative, dead and dying tree removal would continue to be done in limited areas (e.g. not to the level analyzed in this pEA) on a case-by-case basis and would not include green thinning or understory burning. Users would continue to be subject to existing hazard trees and could potentially be injured by falling dead trees or wildfires. Further, in the event of large tree falls or wildfire(s) within or in the vicinity of LWC, these areas could experience long-term closures.

4.11.2 Environmental Effects of the Proposed Action (Alternative 2)

Under the Proposed Action, hazards to people and critical infrastructure associated with dead and dying trees and excess fuel loading near critical infrastructure would be reduced. The use of mechanical treatment methods for dead and dying tree removals and vegetation management (green tree thinning) could adversely affect LWC due to the use of vehicles and heavy equipment, which generally degrade wilderness characteristics. Additionally, the use of mechanized equipment could have a short term, adverse effect on visitor's experience within LWCs, as these areas are normally characterized as places for solitude, where sights, sounds, and evidence of other people are rare or infrequent; where the use of an area is non-motorized, non-mechanical means. In addition, access to treatment areas (e.g. temporary roads) would cause impacts to wilderness characteristics, since LWCs must be roadless areas. However, most LWC are considered to have "apparent naturalness" even when minor modifications (e.g., firebreaks) are present.

The effects of prescribed fire on LWCs would be the same as for forest structure and fuel loading (Section 4.2). LWCs would benefit from the increased treatments as a result of improved native vegetation conditions.

4.11.3 Environmental Effects of the Reduced Proposed Action (Alternative 3)

Impacts under this alternative would be generally similar to those described for the Alternative 2, with regard to mechanical treatment methods. However, under Alternative 3 no green tree thinning or understory burning would occur, resulting in less severe short-term impacts. While short-term hazard trees would be removed under this alternative, longer-term hazards related to overall stand health would not be addressed, and additional hazards would continue to present themselves over time. Therefore, the presence of heavy equipment and vehicles would be less intense but would likely occur more frequently than described for Alternative 2 as more individual treatments would be required to address emerging hazards over the long-term as trees die due to poor stand health. Additionally, without the green thinning and prescribed understory burns necessary to reduce the risk of ignition and catastrophic wildfires and to create healthy vegetation communities, naturalness in LWC would likely decrease under this alternative.

4.11.4 Cumulative Impacts

Short-term cumulative effects to LWC would increase as a result of hazard removal and vegetation management treatments. Prescribed fire treatments could have the greatest short-term visual impacts to LWCs, as compared to the other methods. In the long-term, the removal of hazards and implementation of vegetation management treatments would be expected to cumulatively benefit LWCs by maintaining or restoring native plant communities. Considering past, present and reasonably foreseeable future actions, overall cumulative effects to LWCs would be neutral or beneficial.

4.12 Residual Impacts

“Residual effects” are those adverse effects that remain after implementation of mitigation measures. Measures have been incorporated into the elements of the Proposed Action to avoid and minimize adverse effects (Appendix B). The environmental analysis in Chapter 4 takes those measures into account, and the effects described for each resource assume implementation of the PDFs.

5. CONSULTATION AND COORDINATION

5.1 Scoping

The BLM interdisciplinary team conducted internal scoping meetings in the fall of 2018, and identified the geographic project purpose and need, issues for analysis, and alternatives.

5.2 Consultation

5.2.1 Tribal Consultation

Letters describing the preliminary Proposed Action initiating consultation with all affected federally recognized Native American Tribes were sent on May 1, 2018. This consultation also addresses required consultation under the NHPA Section 106 guidelines. Further consultation in the form of phone calls and meetings is anticipated during the development of this pEA.

5.2.2 USFWS Consultation

BLM initiated informal consultation with the USFWS in early 2018. A draft Programmatic Biological Assessment, along with the public pEA was provided and consultation was initiated with USFWS and NMFS in June 2018. A revised Programmatic Biological Assessment was provided in October 2018 and November 2018. The USFWS concurred with BLM's determination that the 29 federally listed species were not likely to be adversely affected (NLAA) by the Proposed Action on February 1, 2019.

5.3 Public Review

The pEA was made available to the public, organizations and other agencies for a 30-day review and comment period. The public review and comment period closed on August 8, 2018. This pEA was revised to address public comments where necessary.

6. LIST OF PREPARERS

BLM Interdisciplinary Preparers	Title	Resource Values	Wood Infrastructure Contact
Coreen Francis	Project Lead / State Forester	Forestry	Doug McFarlin
James Weigand	Ecologist	Air Quality	Nick Meisinger
James Savage	Fire Management Specialist	Fire and Fuels	Jarrold Armstrong
Miriam Morrill	Fire Mitigation & Education Specialist	Fire and Fuels	Jarrold Armstrong
James Weigand	Ecologist	Soils	Dawn Johnson
Alex Benavides	Hydrologist	Hydrology	Kari Morehouse
Gabe Venegas	Hydrologist, Region 5 FS	Hydrology	Kari Morehouse
Christina Lund	State Botanist	Botany / Special Status Plants	Sydney Margolis
Jack Hamby	Range/Weeds State Program Lead	Range / Weeds	Jarrold Armstrong
Amy Dumas	Wild Horse and Burro Specialist	Wild Horses and Burros	Dawn Johnson
Vicki Campbell	State Mitigation and Fisheries Lead	Wildlife / T&E / Fisheries	Dawn Johnson
Jane Arteaga	Travel and Transportation Program Lead	Travel and Transportation	Nick Meisinger
Alden Neel	Archaeologist	Cultural and Paleontological Resources	David Stone, I
James Barnes	Associate State Archaeologist	Cultural and Paleontological Resources	David Stone, I
Brian Bellew	Recreation Program Lead	Recreation/VRM	Nancy Christensen
Julie McGrew	Visual Resource Specialist	VRM	Nancy Christensen
Erik Pignata	Realty Specialist	Lands/Realty	Nancy Christensen
Mike Sintetos	National Conservation Lands program lead	Special Designations and Lands with Wilderness Characteristics	Nancy Christensen
Elizabeth Meyer-Shields	Planning and Environmental Coordinator	NEPA/Planning	Nancy Christensen
Steven Walterscheid	GIS Specialist	GIS/Data	Aaron Johnson

APPENDIX A - ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Dead/Dying Tree Felling Only

The BLM considered an alternative that would have allowed the felling and/or topping of dead or dying trees only. No vegetation reduction action of any kind (e.g., mastication, burning) was considered under this alternative. Further, this alternative would not have included any vegetation management (e.g., green tree thinning, underburning). While this would have reduced short-term, temporary impacts, it was ultimately determined that these omissions from the action would have left too much dead wood, thus increasing fire risk, and would not have met the purpose and need for removing hazardous fuels. For this reason, the “Dead/Dying Tree Felling Only” alternative was eliminated from further consideration and will not be analyzed in detail.

Snag Retention Near Critical Infrastructure

The BLM considered the retention of snags (dead trees) within the treatment areas (e.g., within 200 feet of critical infrastructure) since these features are highly valued for wildlife but dismissed this as a stand-alone alternative because of the overhead and falling hazards associated with these, which would not meet the purpose and need for protecting public health and safety. The BLM has incorporated PDFs that encourage retaining dead and dying trees where they may be far enough away from the critical infrastructure or do not pose a risk to the public (e.g., perhaps leaning away from the areas of concern).

Wilderness Areas and Wilderness Study Areas

The BLM considered including Wilderness Areas and Wilderness Study Areas in the project area. The BLM manages Wilderness Areas based on the policy included in BLM Manual 6340 (Management of Designated Wilderness Areas), and Wilderness Study Areas based on the policy included in BLM Manual 6330 (Management of BLM Wilderness Study Areas). The BLM manages Wilderness Areas to preserve wilderness character and Wilderness Study Areas to maintain the area’s suitability for preservation as wilderness. These areas typically have less critical infrastructure than other BLM-administered public lands and, therefore, pose fewer risks. Motorized vehicle use is generally prohibited in these areas. Because hazard removal and vegetation treatments in Wilderness Areas and Wilderness Study Areas would be subject to specific analysis to ensure compliance with Wilderness and Wilderness Study Area policy, these treatments do not lend themselves to programmatic analysis. Therefore, Wilderness Areas and Wilderness Study Areas were excluded from the project area.

Juniper and Pinyon-Juniper Woodlands

The BLM considered including juniper and pinyon-juniper woodlands in the project area. Spatial analysis of tree mortality within these woodlands showed only 15 percent of the total acres with known tree mortality was in this community type. Of the affected acres within juniper woodlands,

the levels of individual tree mortality (e.g., dead trees per acre) within these mapped areas was 90 percent (%) less than those mapped in the other forest and woodland types in the project area. In summary, high levels of tree mortality is less of a concern in this community type, since there are fewer dead trees per acre and fewer acres affected. Additionally, these trees are much shorter than the other forest and woodland tree species and thus pose less threat to public safety. For these reasons, the juniper and pinyon-juniper woodland types were removed from the project area. The Bishop Field Office has only pinyon-juniper woodlands, so this Field Office was dropped from the project area.

APPENDIX B - PROJECT DESIGN FEATURES

General

G-1: All proposed treatments will comply with all required laws, regulatory approvals will be obtained, and BLM standards and guidelines will be followed. A pre-project compliance checklist will be completed by BLM Project Managers when planning site-specific treatments allowed under this programmatic EA to ensure compliance with all laws and regulations. All pertinent resource specialists will be consulted during project planning (e.g. archeologist, botanist, wildlife biologist, hydrologist, soil scientist, geologist, fuels specialist, weeds, forester, realty). This also applies for treatments to be implemented by a Right-of-Way (ROW) holder, such as a power company or road department, which will have to comply with any existing ROW agreements.

G-2: During project pre-planning, walk-through surveys and/or desktop reviews will be done by resource specialists in proposed treatment areas to identify the following:

- Stand Characteristics
 - Slope, aspect, and topographic position
 - Average tree diameter (based off the dominant size class of trees)
 - Current canopy closure (percentage)
 - Species composition, plant association
 - Canopy layers present
 - Amount of dead trees and down wood present
 - Individual trees with complex structure, cavities, roosting or nesting platforms, and/or nests
 - Tons per acre of surface fuels
- Sensitive Resources
 - Potential and critical habitat for federally listed and BLM sensitive plants and wildlife.
 - Known federally listed and BLM sensitive plants and wildlife.
 - Sensitive soils, rare soils and hydric soils
 - Wetlands and riparian zones
 - Weed infestations and weed free staging areas
 - Unstable areas and headwater swales
 - Any necessary equipment cleaning areas
- Cultural Resources
 - Within a project area/Area of Potential Effect (APE) previously subject to BLM Class III (intensive) cultural resource inventory:
 - Recorded cultural resources
 - Cultural resources determined eligible for or listed on the National Register of Historic Places (NHRP), potentially NRHP eligible, or previously assumed/treated by the BLM as NRHP eligible
 - Cultural resources to which tribes may attach religious and cultural significance
 - If not previously subject to BLM Class III inventory or previous field inventory is now considered insufficient or outdated, the BLM Field Office Archaeologist will

- determine strategy for conducting Class III inventory within the project's APE.
- Visual Resources
 - Visual Resources Management (VRM) Class II and III areas, or other visually sensitive areas such as:
 - VRM Class I and Class II areas with slopes over 25 percent
 - Lands within 5 miles of sensitive viewshed corridors (travel routes, communities, recreation areas, etc.) of moderate to high visual exposure, where details of vegetation and landform are readily discernible
 - Skylines and ridges
 - With the exception of hazard tree removal under treatment priorities 1 and 2, a VRM contrast rating (BLM Handbook H-8431 Visual Resource Contrast Rating) will be required for all vegetation treatments regardless of the VRM class to ensure compliance with the VRM class objective.
 - Contrast ratings will be conducted by field office (FO) staff familiar with VRM and will follow the established process as described in the BLM Handbook.
 - The results of the contrast ratings, indicating the degree of contrast between the proposed project and the characteristic landscape, will be used to determine if additional mitigation measures are required.
- Water Resources
 - Consider whether the proposed project needs to consult with the appropriate Regional Water Quality Board to determine the regulatory permit requirements, as applicable.

G-3: Any sensitive resources that require protection and/or subject to further investigation by a resource specialist will be clearly identified by flagging or other means of identification. Sensitive resources will be avoided to the maximum extent possible. Adverse impacts to federally-protected species will be avoided. Dead and dying trees will be directionally felled away from sensitive resources if they pose a hazard to public safety. Sensitive resources include:

- Significant cultural resources and paleontological resources
- Sensitive soil types, including rare soils and hydric soils
- Rare plant communities (with an S1 rank)
- Rare animal habitats and known locations
- Special status species, including known locations (plants and animals)
- Riparian and aquatic setbacks
- Known raptor nesting trees (while in use)
- Existing telephone, transmission lines, fences, ditches, roads, trails, and other infrastructure
- High risk, difficult to manage weed infestations

G-4: The boundaries of treatment areas will be recorded with a Global Positioning System (GPS) unit and tracked with all the applicable BLM geodatabases (e.g. NFPOR's, FORVIS, VTRT, etc.). Photo plots and/or stand exam plots will be installed in representative treatment areas to meet monitoring objectives.

G-5: A dying tree is defined as a standing tree that has been severely damaged by forces such as fire, wind, ice, insects, disease, or drought and that in the judgment of an experienced forester is likely to die within one to three years (Smith and Cluck 2011).

G-6: Ensuring Avoidance of Listed Species

Each project will implement at least one of these three options.

Option 1 – Complete protocol level surveys of the site specific project area, documenting that no listed species are present or could move into the project area. Surveys to be completed by a BLM biologist (with knowledge of the species) or a service approved contract biologist.

Option 2 – Implement a Worker Environmental Awareness Training regarding federally listed species to any person (BLM staff and contract workers) conducting the proposed work activities. The training will ensure that workers are made aware of sensitive areas that need to be avoided and ensure that the pertinent conservation measures outlined in this consultation are followed.

Option 3 – A biological monitor (either BLM biologist or contract biologist that has been approved by the Service) will be present on site during all habitat treatments and activities, conducting surveys just prior to ground or vegetation disturbance to ensure no listed species are present.

Roads and Landings - General

RL-1: Locate temporary roads and landings on stable locations, e.g., ridge tops, stable benches, or flats, and gentle-to-moderate side slopes. No temporary road construction on steep slopes (> 35 percent), unstable slopes and headwater swales. New temporary roads or landings are further restricted by species-specific PDFs for federally listed species.

RL-2: Locate temporary roads and landings at least 100 feet away from wetlands, riparian areas, floodplains, vernal pools, and streams. The only crossings allowed are during the dry season and only through ephemeral and intermittent streams when the crossing helps limit the area of ground disturbance in the treatment area. Species specific buffers will be implemented and the most restrictive distance applies.

RL-3: Temporary road and landing construction and decommissioning, and road maintenance will not occur during the wet season (generally October 15 through May 15) when the potential for soil erosion, compaction, and water quality degradation exists. This restriction could be waived under dry conditions and a specific erosion control plan (e.g., rocking, waterbarring, seeding, mulching, barricading). All ground-disturbing activities will be suspended if projected forecasted rain will saturate soils to the extent that there is potential for movement of sediment from the road to wetlands, floodplains or streams. Exposed soils in temporary roads and landings will be covered with clean (weed free) straw mulch or slash or temporarily stabilized during work suspension. Some variations in these dates will be permitted dependent on weather and soil moisture conditions on roads.

RL-4: Waste material from road/landing construction and maintenance activities, or new material, will be temporarily stored in stable areas in a location where sediment laden runoff can be confined. This material will be stored a minimum of 300 feet from perennial streams, 150 feet from intermittent streams, or 100 feet from any ephemeral stream. Materials will be stored in previously disturbed areas whenever possible. Material storage areas will be approved by BLM resource specialists before they will be used. Where necessary, erosion control will be done to minimize sediment delivery to streams.

Roads and Landings – Surface Drainage and Erosion Control

RL-5: Effectively drain the road surface by using crowning, insloping or outsloping, grade reversals (rolling dips), and waterbars or a combination of these or other methods. Avoid concentrated discharge onto fill slopes unless the fill slopes are stable and erosion-resistant.

RL-6: Use only broad-based drainage dips or lead-off ditches in lieu of cross drains for low volume roads. Locate these surface water drainage measures where they will not drain into wetlands, floodplains, and streams.

RL-7: Avoid use of outside road berms unless designed to protect road fills from runoff. If road berms are used, breach to accommodate drainage where fill slopes are stable.

RL-8: Divert road and landing runoff water away from headwalls, slide areas, high landslide hazard locations, or steep erodible fill slopes.

RL-9: As needed, landings will be blocked sufficiently to preclude vehicle access.

RL-10: Inspect roads and landings to ensure that vegetation stabilization measures are operating as planned, drainage structures are operational, and non-native invasive plants (weeds), are not providing erosion control. Conduct vegetation treatments and drainage structure maintenance as needed.

Roads and Landings – Decommissioning

RL-11: Decommission landings, temporary roads, and re-constructed roads upon completion of use.

RL-12: If needed for multiple operating seasons, roads will be waterbarred and blocked at the entrance, prior to the wet season, to control erosion and use until final decommissioning.

RL-13: After use, roads and landings will be decommissioned by ripping, water barring, seeding, mulching and/or blocking. Decommissioning will include recontouring the entire length, placing logs, slash, boulders, berms, and other material so the entrance is camouflaged, the former road bed is stabilized, and vehicle use is precluded along its entire length.

Hauling

H-1: No hauling or landing operations will be allowed on native surface or rocked roads during the wet season (generally October 15 through May 15) to protect the road from damage and decrease the potential for off-site sediment movement. Some variations in these dates will be permitted dependent upon weather and soil moisture conditions of the roads, as approved by BLM. There are further hauling restrictions specific to salmonids (WILD-25).

H-2: Allow road or landing use on adequately rocked roads during the wet season (see H-1) only during periods of dry weather (i.e., restrict use when soil moisture conditions or rain events could result in road damage or the transport of sediment to nearby stream channels). There are further hauling restrictions specific to salmonids (WILD-25).

H-3: Winter hauling will be allowed on paved roads or any road when at least 4 inches of packed frozen snow is present on hauling roads (at high elevations during snow season). Snow plowing will maintain at least 4 inches of packed snow on hauling roads. Provide drainage through the snow bank at periodic intervals to allow for snow melt to drain off the road surface.

H-4: During hauling operations, apply water or approved road surface stabilizers/dust control additives to reduce loss of surfacing material and buildup of fine sediment that can enter into waterways. Prevent entry of road surface stabilizers/dust control additives into waterways during application. No additives are allowed specific to salmonids (WILD-25).

Water Drafting

WD-1: Use a wildlife- and/or fisheries biologist-approved water source and screen if applicable in drafting water for use in prescribed fire and harvest operations in order to avoid federally listed aquatic species. When developing water drafting locations, BLM will first attempt to identify alternative water sources for projects such as lakes, ponds, area outside or above anadromous waters, or from sources such as wells or hydrants.

WD-2: Water drafting from streams, pools and ponds known or likely to be inhabited by federally listed aquatic species will follow the operating guidelines and screen criteria described in the NOAA Fisheries (2001) Water Drafting Specifications, as outlined in WD-3 through WD-7 below.

WD-3: Water drafting operations are restricted to one hour after sunrise to one hour before sunset in streams, pools and ponds.

WD-4: The pumping rate shall not exceed 350 gallons per minute in streams, pools and ponds.

WD-5: The pumping rate shall not exceed 10% of the stream flow.

WD-6: Seek streams, pools and ponds where water is deep and flowing (if applicable).

WD-7: All drafting hoses will have a suction strained/fish screen with holes 2 millimeters or less in size. All screen mesh must be in good repair and present a sealed, positive barrier. The surface area of the screen shall be at least 2.5 square feet to accommodate the upper pumping limit of 350 gallons per minute (see WD-4).

WD-8: Drafting will occur in the deepest portion of the stream channel, pool or pond possible with the equipment in use.

WD-9: Where streams are the sole water source, drafting will be allowed until stream flow reach 2 cubic feet per second (cfs). Below 2 cfs, drafting will only be allowed in previously developed off-site water impoundments as approved by the BLM. For streams with listed anadromous fish, the stream flow must remain above 7 cfs. For situations where the listed anadromous stream flows are between 2 and 7 cfs, BLM may consult with NOAA to determine site specific project features would allow for drafting in a manner consistent with the NLAA determination.

WD-10: The end of the drafting hose will be placed in a clean container to avoid disturbing the sediment in the stream channel, pool or pond.

WD-11: Drafting equipment shall be secured to prevent equipment from drifting down stream or floating about a pool or pond.

WD-12: Do not overfill tanks when collecting water as this can lead to increased sedimentation to the stream channel. Pumping shall be terminated when the tank is full.

WD-13: Do not back water trucks beyond the road or turnout surface to prevent damaging the approach to the water source.

WD-14: For monitoring purposes, water truck operators shall keep a log on the truck containing the following information: *Operators Name, Date, Time, Water Source, Pump Rate, Filling Time, Screen Cleaned (Y or N), Screen Condition, Comments.*

WD-15: Protecting listed salmonid aquatic habitat – the maximum time allowed for each water drafting event is 60 minutes. The maximum number of drafting events per day is 5 times.

WD-16: No water drafting within the southern California steelhead DPS.

Tree Diseases-Annosus

TD-1: To prevent the spread of Annosus root disease (also known as Heterobasidion root disease) in areas where the disease has been documented, all freshly cut living or recently killed conifer stumps greater than 14-inches (stump diameter) will be treated with an EPA-registered borate compound (e.g. Sporax® or Cellu-Treat®) within 24 hours after the tree is cut. Whenever possible, stumps will be treated immediately after cutting.

Tree Diseases – Sudden Oak Death

TD-2: Project leads/contractors will inform personnel when working in an area with Sudden Oak Death disease, unauthorized movement of plant material is prohibited, and the intent of mitigation measures is to prevent disease spread (14 CCR 1035.2). If some sites in the general operating area are found to be disease-free or have a low incidence of disease, these sites should be considered for operations on these sites before moving to more heavily infested sites.

TD-3: To the extent practical and feasible, route equipment will be kept away from host plants and trees, especially in areas with disease symptoms. Landings, log decks, logging roads, tractor roads, and other sites of equipment activity should be located away from host plants, especially areas with disease symptoms.

TD-4: Each time equipment or vehicles leave the site, the equipment or vehicles should be inspected by operations personnel for host plant debris (leaves, twigs, and branches). Host plant debris should be removed from equipment and vehicles prior to their departure. This applies to all equipment and vehicles associated with the operation, including logging equipment, log-hauling trucks, pick-up trucks, employee's personal vehicles, etc. An exception will be granted for equipment or vehicles that leave the site temporarily and will not be traveling to uninfested areas prior to their return.

TD-5: When feasible, operations will be conducted during the dry season. Paved and rocked roads and landings will be utilized to the extent possible.

TD-6: After working in an infested area, workers will remove or wash off accumulations of soil, mud, and organic debris from shoes, boots, vehicles and heavy equipment, etc. before traveling to an area that is not infested with Sudden Oak Death. Lysol® or a bleach solution could be used to disinfect shoes and boots after cleaning.

TD-7: Loads of logs and equipment leaving the site should be inspected to ensure that no host material is being transported without a permit. This may require cleaning mud from vehicle to remove host plant material imbedded in mud depending on conditions when the timber harvest is conducted. An equipment power wash station should be considered. The cleaning station will be located at least 300 feet from threatened and endangered fish-bearing streams and/or 50 feet from intermittent streams that lead to such streams. The station should be: located within the generally infested area; paved or rocked; well-drained so that vehicles exiting the station do not become contaminated by the wash water; located where wash water would not enter a watercourse (e.g. on ridges or flat areas disconnected from streams); pay particular attention to sites where soil and organic debris may accumulate.

TD-8: If water is drafted and used for dust control, draft water from areas upstream of known infestations or from uninfested drainages.

TD-9: If drafting from known infested watercourses, roads should not be watered with that source in areas that are not known to be infested.

TD-10: Water used in operations may require treatment with Ultra Clorox, similar to the recommended water treatment for *P. lateralis*, which causes Port-Orford Cedar Root Disease. The registration rate is 1 gallon of Ultra Clorox Bleach per 1,000 gallons of drafted water.

TD-11: Off-road approaches to drafting sites should be sufficiently rocked to minimize accumulating infested soil on drafting vehicles.

Mechanized Equipment – General

ME-1: Incorporate existing skid trails and landings as a priority over creating new trails and landings where feasible, into a designated trail network for ground-based harvesting equipment, consider proper spacing, skid trail direction and location relative to terrain and stream channel features. Old skid trails will not be opened or driven on without the approval of the authorized officer or contracting officer’s representative.

ME-2: Ground-based equipment operations will occur during the dry season, generally May 15 through October 15, or on approval by the authorized officer or contracting officer’s representative. Variations in these dates will be dependent upon review of weather and soil moisture conditions by BLM. No variations are allowed specific to federally-listed salmonids (WILD-25).

ME-3: The BLM will immediately shut down all harvest and yarding operations if there is potential for sediment movement to waterways due to weather or soil moisture conditions.

ME-4: Waterbar skid trails, tractor, and hand fire-lines based on gradient and erosion class according to following guidelines:

Gradient	Water Bar Spacing (feet)* Erosion Class **		
	High	Moderate	Low
2-5%	200	300	400
6-10%	150	200	300
11-15%	100	150	200
16-20%	75	100	150
21-35%	50	75	100
> 36%	50	50	50

*Spacing is determined by slope distance and is the maximum allowed for the grade

**The following guide lists soil types according to erosion class:

High: granite, sandstone, andesite porphyry, glacial or alluvial deposits, soft matrix conglomerate, volcanic ash, pyroclastics;

Moderate: basalt, andesite, quartzite, hard matrix conglomerate, rhyolite;

Low: metasediments, metavolcanics, hard shale

ME-5: Use the following techniques to construct waterbars:

- Open the downslope end of the waterbar to allow free passage of water.
- Construct the waterbar so that it will not deposit water where it will cause erosion.
- Compact the waterbar to prevent water from breaching the berm.
- Skew waterbars no more than 30 degrees from perpendicular to the centerline of the trail or road.

ME-6: Block main skid trails where they intersect roads and landings with an approved barricade and/or scattered slash to preclude OHV use.

ME-7: Use designated skid roads to limit soil compaction to less than 12% of the project area.

ME-8: Locate skid trails to minimize disturbance to coarse woody debris. Where skid trails encounter large coarse woody debris, either the log would be moved out of the way, or a section will be bucked out for equipment access. All sections will remain on site and as undisturbed as possible. ME-9: Require low psi, wide-track vehicles or one-pass operations (one round trip, in and out) for all mechanical harvester (includes felling and bunching) operations. For multiple passes, equipment must walk on 12 inches of slash for equipment greater than 6 pounds per square inch or 8 inches of slash for equipment less than 6 pounds per square inch. Require mechanized equipment to be capable of reaching 20 feet.

ME-10: Deleted because it was redundant with another PDF.

ME-11: Mechanized equipment may be allowed to operate off of designated skid trails if the conditions meet the following parameters and it will not result in detrimental compaction of over 12% of the unit area. This allowance may be achieved by several ways based on site-specific assessment and includes, but is not restricted to, operation in dry (less than 15% soil moisture) conditions; walking mechanized equipment on slash; avoiding soil series at inherent risk to detrimental compaction; or the use of “ghost trails,” skid trails that have had only one or two passes. Operations will be suspended when these conditions no longer exist:

- The 15% soil moisture standard could be modified based on moisture content at which specific soil is the most resistive to compaction.
- Ground-based equipment will be allowed on snow only when the snowpack is sufficient to protect the soil. Operations will be allowed to start when there is a minimum of twenty (20) inches of snow, however no logging will be allowed once the snow depth deteriorates below eighteen inches of snow to protect soil from compaction. Designated skid trail requirements will be waived if ground-based equipment is allowed on snow.
- In the winter when average snow depths limits ground surface exposure, operations may occur if:
 - Snow depth is at least 20 inches; or
 - Soils remain frozen to a depth of 6 or more inches.

Mechanized Equipment - Riparian

ME-12: Mechanized equipment must stay at least 50 feet from ephemeral and intermittent streams, 150 feet from perennial streams. These distances may be increased if required by the RMP or if there are site specific concerns warranting more protection (e.g., species specific buffers will be implemented and the most restrictive distance applies (WILD-13, WILD-25)).

ME-13: Designate skid trails in locations that channel water from the trail surface away from waterbodies, floodplains, and wetlands, or unstable areas adjacent to them.

ME-14 Apply erosion control measures to skid trails and other disturbed areas with potential for erosion and subsequent sediment and silt delivery to waterbodies, floodplains, or wetlands. These practices may include seeding, mulching, water barring, tillage, and woody debris placement. Use guidelines from the road decommissioning section.

ME-15: Dead and dying tree felling and/or topping is the only action allowed within riparian areas for trees greater than 7 inches in diameter. As much as feasible, fell these trees onto the contour and leave to provide stability to the soil.

ME-16: No removal or treatment of live riparian hardwood species such as willow, ash, maple, alder, yew, dogwood, and valley oak. For more information on tree species, refer to http://wetland-plants.usace.army.mil/nwpl_static/v33/home/home.html.

ME-17: Hand thinning of non-riparian tree species less than 7 inches in diameter is allowed within riparian areas. These trees will be piled more than 50 feet from ephemeral and intermittent streams and 100 feet from perennial streams for future burning, or distances as directed by RMPs.

Mechanized Equipment – Soils

ME-18: Soils series at inherent risk to detrimental compaction or erosion will be avoided. No ground-based equipment on these soils. Recommendations to reduce compaction:

- Snow pack of a minimum of 20 inches (for winter operations)
- Restrict ground-based equipment to slopes less than 35%
- Mechanical harvesting equipment (e.g. excavators, loaders, forwarders, and harvesters) may be used on short pitch slopes of greater than 35% but less than 45% when necessary to access benches of lower gradient (length determined on a site-specific basis, generally less than 50 feet).
- Additionally, if the amount of available slash is not enough or if there is a need to reduce the percent of detrimentally compacted area in the unit, the authorized officer may stipulate mechanical decompaction of site-specific areas identified by the resource specialist. Post-harvest assessments will be conducted to determine where soil ripping is most beneficial to ameliorate compaction and improve soil productivity while minimizing root damage to residual trees.

ME-19: Ground vegetation will be retained on cut and fill slopes in order to reduce surface erosion and maintain slope stability unless it poses a safety hazard or restricts individual project activities. Cut vegetation as required for safety and maintenance, leaving the root mass and ground surface intact.

ME-20: Disturbed soils will be covered with weed free straw and/or native materials and may be seeded with native or other approved plant seed or protected by other best management practices such as straw wattles, straw matting, jute netting, riprap armoring, etc. Where soils are deeper and more likely to erode, a packed gravel base will be considered on roads and trails to help reduce soil movement.

ME-21: Damage to high shrink-swell soils will be prevented by limiting compacting activities to periods when soils are sufficiently dry to resist damage from the activity. Work will be suspended during precipitation events or when observations indicate that saturated soils exist to the extent that there is visible runoff or a potential for causing soil erosion into streams. Cover (e.g., straw mulch or slash) will be used to temporarily stabilize exposed soils during work suspension, as necessary.

ME-22: In areas with a high content of serpentinite and peridotite mineralogy, sparsely vegetated with occasional shrubs and few or no conifers, or scattered large conifers, as well as distinct clumps of small to large shrubs:

- Exclude heavy equipment from these sites. No machinery off of well-established tracks, routes, or roads; No vehicle or equipment staging, log decking, skid trail, landing, or access road construction through these sites. Previously constructed landing sites that are heavily disturbed may be used after approval by BLM.
- No pile burning.
- Felled dead and dying trees will be left in place unless they can be removed from the site by full suspension or endlined by equipment that remains on well-established existing roads.
- No landing construction or use, unless approved by BLM.

ME-24: No treatments, other than dead tree felling, will occur on rare soils and hydric soils.

Cable Yarding

CY-1: Design cable yarding corridors crossing streams to limit the number of such corridors, using narrow widths, and using the most perpendicular orientation to the stream feasible. Minimize cable yarding corridor widths and space corridors as far apart as is practicable given physical and operational limitations, through practices such as setting limitations on corridor width, corridor spacing, or the amount of corridors in an area. For example, such practices could include, as effective and practicable:

- Setting cable yarding corridors at 12-foot maximum widths, and

- Setting corridor spacing where they cross the streams to no less than 100 feet apart when physical, topography, or operational constraints demand, with an overall desire to keep an average spacing of 150 feet apart.

CY-2: Prevent streambank and hillslope disturbance on steep slopes (generally >35 percent) by requiring full-suspension within 50 feet of definable ephemeral and intermittent stream channels, and 150 feet of perennial stream channels. Yard the remaining areas across the riparian area using at least one-end suspension. ME-15 and ME-17 limit the size classes of trees that can be cut in riparian areas, and WILD-25 includes limitations on cable yarding operations near streams that are known or have the potential to be inhabited by federally listed salmonids.

CY-3: On non-sensitive soils:

- Restrict non-suspension yarding distances to less than 300 feet.
- On non-suspension yarding corridors, place slash over any areas where 50% of the top soil is removed at a width of 5 feet or more.

CY-4: On sensitive soils:

- Use full or partial suspension
- Construct hand waterbars in cable yarding corridors on fragile surface erosion soils where gouging occurs immediately after use according to guidelines used for the restoration of skid trails, tractor, and handlines (see ME-4 above).
- Restrict yarding to dry season (generally May 15 through October 15).

Fuels and Prescribed Fire – General

FIRE-1: No burning or storing materials (e.g., chips, slash, logs) in road ditchlines or on cut slopes above ditchlines, unless the material can provide bank stability and will not be transported into the ditch at the side of the road.

FIRE-2: Where individual projects use prescribed fires, localized erosion will be minimized by covering up handline sections with woody material where fire lines are constructed on steep slopes, following implementation of burns.

FIRE-3: Low-intensity underburns will be implemented only in the spring on sensitive surface and slope soils.

FIRE-4: Firelines for all prescribed fires authorized by this pEA will be constructed manually and rehabilitated after the prescribed burn is declared out.

FIRE-5: Piles will be dispersed across treatment areas. Understory and broadcast burns will be conducted only when a light to moderate burn can be achieved (conditions when soil and duff are

moist). The objective is to retain no more than 50% of the mound depth / duff layer around trees, minimize water stress on trees, and avoid adverse effects on tree roots and foliage.

FIRE-6: No hand pile burning on fragile slope gradient and fragile surface erosion soils unless there is adequate vegetation between piles to intercept sediment displaced from piles. On these soils, ignite piles from upper slope so fire backs into pile wherever possible. Limit handpiles to slopes less than 65%. Piles will be burned when soil and duff moisture are high.

FIRE-7: Sufficiently block fire containment lines at all access points to preclude OHV use. This will include such measures as placing boulders, logs and slash; falling trees less than 8 inches diameter breast height (dbh); or other actions as necessary.

FIRE-8: The average depth of masticated material will be less than 4 inches, in order to control erosion and suppress vegetative resprouting.

Fuels and Prescribed Fire – Riparian

FIRE-9: Limit fire lines inside riparian areas to hand lines. Construct fire lines by hand on all slopes greater than 35 percent and inside the Riparian Reserve or Stream Management Zone. Use erosion control techniques such as tilling, waterbarring, or debris placement on fire lines when there is potential for soil erosion and delivery to waterbodies, floodplains, and wetlands. Avoid placement of fire lines where water will be directed into waterbodies, floodplains, wetlands, headwalls, or areas of instability.

FIRE-10: Use erosion control techniques such as waterbarring, or debris placement on fire lines when there is potential for soil erosion and delivery to waterbodies, floodplains, and wetlands. Avoid placement of fire lines where water would be directed into waterbodies, floodplains, wetlands, headwalls, or areas of instability.

FIRE-11: No tractor firelines and no mechanical piling.

FIRE-12: Removed because redundant with FIRE-13

FIRE-13: Avoid burning of large woody material within the Riparian Reserve or Stream Management Zone. Down logs greater than 24-inch maximum diameter and 8 feet in length will be protected by constructing a handline around these logs. Furthermore, understory burning will not occur when 1000-hour fuels (3 to 8 inches in size) are less than 9% moisture content.

FIRE-14: Locate fire lines so that open meadows associated with streams do not burn.

FIRE-15: Class A retardant foams may be used to control and suppress fire during prescribed fire implementation. It may be used as part of wet line construction, mop up, and suppression. The foam is made by introducing air into a mixture of water and foam concentrate, usually as part of the pump apparatus on a firefighting engine, and then applied to the wildland fuels via the nozzle. Chemical retardant foam will not contact waterbodies, or wetlands. Leave at least a 200-foot buffer

zone from the high-water line of any water body. For more information on fire retardant foams see NWCG Publication PMS 446-1 Foam vs Fire. Store and dispose of ignition devices/materials (e.g., flares and drip torches) a minimum of 200 feet from waterbodies, floodplains, and wetlands. Maintain and refuel equipment (e.g., drip torches and chainsaws) a minimum of 200 feet from waterbodies, floodplains, and wetlands. Portable pumps can be refueled on-site within a spill containment system.

Fuels and Prescribe Fire – Wildlife

FIRE-16: Approximately 10 to 20% of each fuels treatment unit greater than 10 acres will remain untreated. Each “no treatment” areas should be between 0.25 and 1 acre, or larger if they are linked to other “no treatment” areas designated for other resource concerns.

FIRE-17: Approximately 10% of handpiles during handpile burn treatments units will be left unburned.

Vegetation – General

VEG-1: Deleted because VEG-2 covers protections for special status species.

VEG-2: If special status plant species are discovered during individual project preplanning (G-2, G-3), the species will be identified, flagged, and will be avoided to the maximum extent possible. Buffer zone sizes around special status plant sites will be at least 50 feet and/or identified at the discretion of a qualified botanist.

VEG-5: **Suitable habitat** is habitat that has the potential to support federally-listed species. Habitat suitability will be initially assessed by the BLM based on species range and habitat characteristics (e.g., vegetation community, soil type, elevation). **Occupied Habitat** is habitat that is either known to be occupied by a species or is suitable habitat that has not been surveyed sufficiently to demonstrate that it is unoccupied. Therefore:

1. Prior to conducting project activities with the potential to impact listed plant species (e.g., ground disturbing activity, vegetation removal, and off-road vehicle use) and within the species range for any listed plant species, conduct a desktop habitat assessment (same as G-2) within and adjacent to the project area to determine habitat suitability for each species potentially present. If a desktop habitat assessment is inconclusive then a botanist familiar with the species will conduct a site visit to determine habitat suitability. If suitable habitat is present, follow measure #2.

2. Conduct field surveys to determine species presence; the survey period will occur when nearby reference populations are in bloom, using known blooming periods and local blooming data as a guide. The activity will be conducted in the same year following the survey, or prior to the next blooming season. If a nearby reference population is not available, a qualified botanist will conduct early-, mid-, and late-blooming period site surveys when the species is most likely to be found. If the species can be found year-round (e.g., perennial evergreen species), one survey may be

appropriate. If nearby reference populations are present, perform one site survey when the reference population is in bloom. A second year of surveys may be needed for ongoing multi-year activities, or if surveys occur during years with variable climatic conditions (e.g. below average precipitation).

Vegetation – Mechanized Equipment

VEG-3: In special status plant (SSP) populations, which includes federally listed plants, BLM sensitive plants, and rare plant communities (S1 ranked), the following applies:

- No heavy equipment will be allowed within 100 feet (including masticators) unless on an existing road.
- Dead and dying tree felling/removal will require consultation with a BLM specialist on a case-by-case basis to determine which direction they should be felled in order to avoid adverse impacts.
- Felled trees will be left on site unless they can be accessed by a self-loader from the roadway.
- No yarding of trees will be allowed through buffered sites, unless designed to maintain or improve the habitat.
- No anchor trees will be allowed within known populations.
- New landings will not be constructed within 300 feet of known populations.
- Existing landing use, construction of temporary roads, or burning of piles will not occur within 100 feet of known rare plant populations.
- Green tree thinning will not be allowed within 50 feet of boundary of population.
- Disturbed areas will be seeded with genetically appropriate native seed, when deemed appropriate by the FO botanist.
- Heavy equipment will be cleaned prior to entering BLM lands to remove all dirt and vegetation from the vehicle body, undercarriage, tires, and attachments.

Vegetation – Fuels and Prescribed Fire

VEG-4: In special status plant (SSP) populations, which includes federally listed plants, BLM sensitive plants, and rare plant communities (S1 ranked), the following applies:

- Use only chainsaws or other hand tools to cut vegetation within SSP buffers as described above.
- No mechanized equipment will be used to build fire line.
- Pile burning will only be allowed if designed to maintain or improve the habitat.
- Piles will be no larger than 8 feet by 8 feet in size and cover no more than 5% of the treatment area.
- Firelines constructed in suitable habitat will be pulled back and seeded with genetically appropriate native seed, when deemed necessary by the FO botanist.

Weeds

WEED-1: Before ground-disturbing activities begin, weed infestations would be inventoried and areas would be identified for avoidance, particularly in operating areas and in areas along access routes. When possible, high-risk sites will be pre-treated for weed establishment and spread before the implementation of individual projects or avoidance measures will be taken.

WEED-2: Where available use weed-free gravel and fill dirt for road work. Survey BLM rock quarries and storage areas that will supply gravel or fill dirt for noxious weeds. Introduction and spread of weeds caused by moving weed-infested sand, gravel, borrow, and fill material will be avoided.

WEED-3: To prevent weed germination and establishment, native vegetation will be retained to the maximum extent practicable in and around individual project activity areas and soil disturbance will be kept to a minimum while still meeting project objectives

WEED-4: If deemed appropriate by the FO botanist, burned piles or other disturbed sites will be seeded with native species or covered with native duff/litter, particularly if known or expected invasive plants species are present.

WEED-5: Each individual area will be monitored following treatment to ensure that noxious and invasive weeds do not become established.

WEED-6: Weed propagation and establishment will be minimized by avoiding driving through weed-infested areas to the maximum extent feasible.

WEED-7: Sites where equipment can be cleaned will be identified during the individual project planning phase. Equipment will be cleaned or pressure washed before entering public lands, prior to engaging in individual project activities, before transport to new work areas, and before leaving the project site if operating in areas infested with weeds to remove mud, dirt, and plant parts. Weeds that establish at designated equipment cleaning sites will be inspected and treated, as necessary.

WEED-8: To avoid the importation or spread of invasive weeds or non-native invasive plant species, all tools, equipment and materials required for project implementation will be washed prior to transport to the project site.

Wildlife – General

WILD-1: All Special Status Wildlife: a habitat assessment will be done by a wildlife biologist prior to implementation for special habitat features that could be used by any special status wildlife species (e.g. trees with complex structure, cavities, roosting or nesting platforms, nests). Seasonal restrictions within the PDFs for federally listed species restrict the use of manual and mechanical methods within various distances of the species and/or habitat, therefore adverse impacts will be avoided. For thinning treatments, these habitat features will be marked for retention or excluded

from the thinning unit. For prescribed fire treatments, these habitat features will be excluded from the burn unit or fuels will be removed from around the habitat structure prior to burning. In federally listed suitable habitat, apply the applicable PDF's with the assumption the species occurs, unless surveys conducted in compliance with protocols determine the species does not occupy the potential habitat.

WILD-2: Survey and manage protocols will be followed in a consistent manner with current and future guidelines for areas requiring the management of these species.

WILD-3: No treatment is proposed within 200 feet of vernal pools.

WILD-4: To retain suitable microclimatic and substrate conditions in talus habitat, restrict ground disturbing activities (e.g. heavy equipment or yarding of trees) that displace or compact the substrate to 12% or less of the talus area.

WILD-5: Dead and dying trees which pose a hazard to public safety and are likely to fall on their own, will be felled at a minimum, and potentially left onsite if warranted by the following species-specific PDFs.

Wildlife – Federal Listed Species

WILD-6: In designated critical habitat, the following will occur:

- Treatments have been designed to ensure they will not directly or indirectly adversely alter the quantity or quality of the essential physical or biological features of designated critical habitat for the relevant species.
- When possible, treatments will be designed to accelerate the capacity of the designated critical habitat to provide essential physical or biological features or to develop those features over time.

WILD-7: Northern Spotted Owl (NSO)

- No noise greater than 90 decibels will occur within 0.25 miles of unsurveyed nesting/roosting or foraging habitat or known activity center from February 1 and July 9, unless surveys determine the suitable habitat or site to be unoccupied or the owls to be non-nesting. The BLM may propose reduced buffers for work in areas with moderate to high ambient (existing pre-project) noise levels based on Estimating the Effects of Auditory and Visual Disturbance to Northern Spotted Owls and Marbled Murrelets in Northwestern California (U.S. Fish and Wildlife Service, 2006). The FWS will review the proposed changes to determine if they are acceptable. There is no restriction on noise less than 90 decibels, and no noise restriction from July 10 through January 31.
- No prescribed fire (includes both pile and underburning) will occur within a 0.25 mile buffer of any unsurveyed nesting/roosting or foraging habitat or known activity center from

February 1 through July 31, unless surveys determine the suitable habitat or site to be unoccupied or the owls to be non-nesting. This PDF is designed to minimize the potential effects of smoke to developing juvenile owls that are not yet sufficiently mobile to move from the area.

- No project activity (tree cutting and removal) will be implemented in unsurveyed nesting/roosting or foraging habitat from February 1 through September 15 to reduce adverse impacts associated with habitat modification. The seasonal restriction may be lifted upon completion of protocol surveys see Protocol for Surveying Proposed Management Activities that may Impact Northern Spotted Owls) indicating the northern spotted owls are not nesting.
- An experienced wildlife biologist will be consulted prior to cutting and removal of dead and dying trees that meet the description of a potential northern spotted owl nest trees within unsurveyed nesting/roosting or foraging habitat. The purpose of the assessment is to determine whether the tree may be used by nesting northern spotted owls. Large diameter trees (>20 inches dbh) with a likelihood of providing for a northern spotted owl nest (cavity, platform, broken top) will be retained and assessed for use during the nesting season before being felled, unless the tree meets the criteria of an imminent hazard (as described in Angwin et al. 2012).
- In nesting, roosting, and foraging NSO habitat, silvicultural prescriptions will maintain the following habitat features and stand characteristics:
 - Moderate to high canopy cover (60 to over 80 percent)
 - Multilayered, multispecies canopies with large (20–30 in or greater dbh) overstory trees; retain all dominant and codominant trees to achieve desired canopy closure
 - High basal area; high quality nesting >210 ft², nesting/roosting 150 to 180 ft², foraging 120 – 180 ft²
 - High diversity of different diameters of trees
 - Trees less than 8 inches (dbh) will be left at a 20 X 20 spacing to retain at least 100 trees of this size class per acre.
 - Any hardwood that is greater than 12 inches (dbh) will be not be cut
 - High incidence of large live trees with various deformities (e.g., large cavities, broken tops, mistletoe infections, and other evidence of decadence)
 - Create sufficient open space below the canopy for spotted owls to fly if feasible given the aforementioned canopy closure and basal area retention levels.
 - Dead and dying trees that are greater than 20 inches (dbh) that are felled to protect public safety will be left onsite, with the bole completely intact, to provide for down woody structure. Dead and dying trees that are less than this size may be removed if they create excessive fuel loading (>20 tons per acre).
 - No existing down wood logs or material will be removed.
- In dispersal NSO habitat, silvicultural prescriptions will maintain the following habitat features and stand characteristics:

- Stands with adequate tree size and canopy cover to provide protection from avian predators and minimal foraging opportunities; in general this may include, but is not limited to, trees at least 11 inches in diameter and a minimum 40 percent canopy cover;
- Retain residual trees (trees from previous older stands) and large diameter trees that exhibit fire resilient characteristics such as thickened, furrowed bark and well-developed crowns, unless the tree poses a hazard to public safety.
- Within riparian areas dead and dying tree felling and/or topping is the only action allowed within riparian areas for trees greater than 7 inches in diameter, therefore overstory canopy cover would not be decreased in riparian NSO habitat. These trees will be left onsite.
- No temporary roads, corridors, and skid trails will be permitted in nesting, roosting, foraging habitat. Existing roads and skid trails will be used to the extent possible.

WILD-8: Marbled Murrelet (MAMU)

Noise and smoke impacts:

- Loud noises above ambient levels and greater than 90 decibels would not occur in or within 0.25 mile of any known occupied marbled murrelet site or any unsurveyed suitable habitat between March 24 and September 15 (marbled murrelet breeding season).
- When treatments are in or within 0.25 mile of unsurveyed suitable marbled murrelet habitat, short duration and/or transient work other than harvest of trees and burning, generating less than 90 decibels (e.g. road repair, blading, brushing), may occur starting August 5, provided it is confined to between 2 hours after sunrise to 2 hours before sunset between August 6 and September 15.
- No burning or timber harvest in suitable marbled murrelet habitat during the breeding season.
- The seasonal restrictions listed above may be waived if surveys to protocol have determined the suitable habitat is not occupied. These restrictions avoid adverse effects to breeding marbled murrelets from noise and smoke.

Habitat Impacts:

- In suitable marbled murrelet habitat, a 300-foot no cut buffer would be maintained around all potentially suitable nesting trees, including adjacent trees with interlocking branches. Suitable nest trees are large old and/or mature coniferous trees having nest platform structures (e.g. limb deformations, tree damage, and mistletoe blooms at least 4 inch diameter and 33 feet high in the live crown of a coniferous tree), typically adjacent to canopy openings to access such platforms. See Pacific Seabird Protocol (2003) for definitions.

- No activities will occur in or within 300 feet of any known occupied marbled murrelet stands (e.g., Lacks Creek and Headwaters Forest Reserve).
- In suitable, unsurveyed or unoccupied marbled murrelet habitat, trees < 19 inch DBH may be cut outside of the breeding season (March 24 through September 15) provided dominant and co-dominant trees are not cut, and total canopy closure is not reduced more than 10 percent.
- No new temporary roads, logging corridors, skid trails, or landings will be constructed in suitable marbled murrelet habitat.

Critical Habitat:

- In suitable critical habitat, no harvest of potential nest trees or green trees greater than 1/2 site potential tree height that contribute to total tree canopy closure within 0.5 mile of potential nest trees. A 1/2 site potential tree height can be determined by estimating the height of dominant trees in the stand and dividing by 2.

WILD-9: Southwestern Willow Flycatcher, Western Yellow-billed Cuckoo, Least Bell's Vireo

- Treatment activities will be conducted outside the breeding season, unless species specific protocol surveys have been conducted within the past year with negative results. The breeding season for these birds is as follows:

Southwestern willow flycatcher: May through September

Western yellow-billed cuckoo: June through August

Least Bell's vireo: March through September

WILD-10: California Condor

- To avoid and/or minimize the potential for microtrash to collect in areas used or potentially used by California condors within the treatment area, the following measures will be implemented: trash receptacles will be fitted with animal- and weatherproof lids; work areas will be cleaned daily and all trash will be collected; waste will be properly contained and removed regularly for disposal at appropriate offsite permitted disposal facilities; and signage will be posted.
- To the extent practicable, avoid work within 0.25 mile of active nests during the fledging period, which extends from August 15 through December 31.
- No work generating sound levels >90 decibels will occur within 0.25 mile of a known active nest site during the nesting season (year round), unless there is a landscape feature that attenuates sound.
- A BLM biologist or Service-approved contract biologist familiar with the species will brief employees, contractors, and other workers about the potential presence of the California condor. Briefings include prohibitions on approaching, harming, harassing, or otherwise intentionally disturbing California condors.

- Water tanks should be covered with a welded steel grate, or welded wire mesh secured to a frame to avoid drowning risk to condors.
- Workers will undergo "hazing training pursuant to the attached memo from the California Condor Recovery Program (see attached memo in the Final Biological Assessment). If any California condors are attracted to the work site, the hazing measures will be implemented to avoid the possibility that the birds will become habituated to human activities, which poses a risk to their well-being.
- Limit development and disturbance, to the maximum extent practicable, in areas of designated critical habitat.
- If any helicopters are to be used in condor habitat within 0.25 miles of a known active nests, a biologist will be on the project site and will maintain radio contact with the project foreman, who will be in radio contact with the helicopter pilot. The biologist will have the authority to restrict use of any landing zones when California condors are present in the area or if there are any concerns to California condor safety. The biologist will also be authorized to assist with determining helicopter flight paths to avoid roosting or nesting individuals.
- Helicopter operations will avoid all known active nests by a minimum of 1,000 feet above ground level; helicopter operators will transit to and from work sites at a minimum of 200 feet above ground level when near nests, unless carrying loads and otherwise consistent with FAA regulations; and will minimize hover time.
- From January 15 through August 15, if there is a known active California condor nest(s) within 0.5 mile of a project, BLM will coordinate with the Service 60 days before a project begins to determine if additional project-specific effects need to be evaluated and additional project-specific conservation measures developed, such as having a biological monitor present to ensure that project activities covered under this consultation avoid all adverse effects to the species. Adverse effects include but are not limited to smoke disturbance or helicopter activity potentially leading to adult California condors abandoning an egg, or chicks fledging from the nest prematurely.

WILD-11: Shasta Crayfish

- Within the Fall River, Tule River, Pit River (upstream of Fall River Mills), Hat Creek (downstream from the confluence of Rising River) and Rising River in northeastern Shasta County, no new, temporary, and/or reopened roads, landings, or other ground disturbance will occur within 600 feet of a riparian area that is hydrologically connected to Shasta crayfish habitat.

WILD-12: Valley Elderberry Longhorn Beetle- within the range of the valley elderberry longhorn beetle:

- All elderberry shrubs with a stem diameter greater than 1 inches at ground level will be avoided.
- No treatments within 20 feet of the drip line of the elderberry shrubs. No hand piling, felling, no green tree thinning, no prescribed fire.
- Mechanical treatments will not occur within 100 feet of the dripline of the elderberry shrubs.

WILD-13: California Red-Legged Frog

The following measures apply to **all** parcels within the range of CRLF that contain suitable habitat:

- Pile Burning will not occur within 300 feet of any water body potentially inhabited by California red-legged frogs.
- No road or landing construction/reopening will occur within 300 feet of any water body potentially inhabited by California red-legged frogs.
- All trees will be felled away from water features.
- Water will not be drafted from occupied California red-legged frog habitat.
- Biological monitor –Prior to ground disturbing work, a biological monitor will survey suitable sheltering habitat for CRLF within project work area that occurs within 300 feet of suitable aquatic habitat.
- If a California red-legged frog is encountered in the work area, workers will stop all work in the immediate area and the sighting will be reported to a BLM biologist, who will report the encounter to the USFWS to receive further guidance to ensure compliance with the ESA.
- When working within 1 mile of occupied California red-legged frog aquatic habitat, BLM will, to the maximum extent possible, ensure that dispersal barriers are not created (e.g., leaving large felled logs in a pattern that restricts dispersal).
- For all activities with the potential to adversely affect California red-legged frogs (as determined by a BLM biologist), no work will occur within 24 hours of a 70 percent or greater forecasted rain event of 0.25-inch or greater. Work can resume when site conditions are dry enough to avoid potential direct impacts to frogs (as determined by a BLM biologist).
- During the wet season (after the first frontal rain of greater than ¼ inch after October 15th and ends April 15th), no cutting or equipment will occur within 300 feet of any water body potentially inhabited by California red-legged frogs.
- During the dry season, no cutting or equipment will occur within 75 feet (Sierra Nevada populations)/300 feet (coastal populations) of any water body (seeps, springs, wet meadows) potentially inhabited by California red-legged frogs.

The following measures apply to five coastal properties proposed for impacts within dispersal distance of California red-legged frog occurrences and the Michigan Bluff and Spivey Pond parcels:

- Except for pile burning, Project activities will only occur during the dry season (April 15th until the first rain greater than 1/4 inch after October 15th).
- During the dry season, no cutting or equipment will occur within 75 feet (Sierra Nevada populations)/300 feet (coastal areas) of any water body (seeps, springs, wet meadows) inhabited by California red-legged frogs.
- Pile burning may occur in the winter (outside of 300 feet of aquatic habitat, per 3a, below). Piles that are constructed within 300-500 feet of known occupied CARLF aquatic habitat will have wildlife exclusion fencing placed around them to ensure that CARLF do not enter the burn piles.
- No masticator use will occur at the Michigan Bluff and Spivey Pond parcels. Masticator use is allow at the 5 coastal properties.

WILD-14: Gray wolf

- Review of current wolf activity:
 - Through coordination with CDFW, review current wolf activity in California at least annually, prior to initiation of treatments.
- Signs of wolf activity around den and rendezvous sites may or may not be obvious, and may include tracks, prey carcasses and bones, scat, and visual observation(s) of a wolf or wolves. If a treatment unit or activity is located within one mile of highly suitable, potential den site habitat (based on coordination with CDFW), or within one mile of a previously established/known den site, the following will be implemented to minimize the potential for direct and indirect effects to wolf reproductive behaviors to a discountable level:
 - If habitat conditions are favorable for potential or suitable den or rendezvous sites in or within one mile of project activities, coordination with CDFW is required to determine if wolf activity is known in the project area.
 - The need for and/or level of survey and monitoring (camera trapping stations, tracking surveys, or other methods to monitor for potential wolf use), will depend on the outcome of discussions with CDFW noted in previous bullet. Decisions and rationale as to whether or not to survey/monitor will be documented in BLM's files.
 - A buffer of at least 1 mile will be implemented around den and rendezvous sites from April 1 to July 15. The buffer distance is likely to be larger than 1 mile and irregularly shaped to avoid disclosing sensitive information regarding the location of den or rendezvous sites. The size and shape of the buffer will be determined through coordination with CDFW and/or USFWS.
 - Activities will not be implemented within the buffer of a known den or rendezvous site between April 1 and July 15.

- This seasonal restriction may be lifted after coordination with USFWS if surveys (camera or telemetry data, site reviews for evidence, other supported survey results) show there are no reproducing wolves within one mile of the proposed activities.
- If a den or rendezvous site is detected within one mile of the treatment unit or project activity prior to or during implementation, activities should cease and USFWS be notified. Coordination with USFWS will be completed prior resuming planned activities.
- If buffers and associated seasonal restrictions cannot be implemented, further consultation with USFWS will be required.

WILD-15: Point Arena mountain beaver (PAMB)

- No project activities will occur within 500 feet of active PAMB burrows or suitable habitat at any time. (note: modifies project such that there will be no effects to this species)

WILD-25: Federally Listed Salmonids:

- Project treatment areas will not exceed 1% of the total watershed in a given year. See Appendix C of the Final Biological Assessment for the cumulative 10 year treatment cap for each HUC10 watershed.
- Water drafting from streams, pools and ponds known or likely to be inhabited by federally listed salmonids will follow the operating guidelines and screen criteria described in the NOAA Fisheries (2001) Water Drafting Specifications, as outlined in WD-3 through WD-7 and WD-15.
- Hauling, cable yarding, or mechanical operations will not occur during the wet season (Oct 15 to May 15) in watersheds known or likely to be inhabited by salmonids. Any operations proposed during the wet season would need to additional consultation with NOAA and further NEPA analysis.
- Mechanized equipment and cable yarding operations must stay at least 50 feet from ephemeral and intermittent streams, 150 feet from perennial streams, and 300 feet from streams known or likely to be inhabited by salmonids. These distances may be increased if required by the RMP or if there are site specific concerns warranting more protection. Within these distances the following vegetation management restrictions also apply:
 - Dead and dying tree felling and/or topping is the only action allowed within riparian areas for trees greater than 7 inches in diameter. As much as feasible, the trees will be felled onto the contour and left on site to provide stability to the soil.
 - No removal or treatment of live riparian dependent species such as willow, ash, maple, alder, and valley oak.
 - Hand thinning of non-riparian dependent tree species (e.g. Douglas-fir, tanoak, pine, etc.) less than 7 inches in diameter is allowed within riparian areas. These trees will be hand piled more than 50 feet from ephemeral and intermittent streams and 150 feet

from perennial and fish bearing streams for future burning, or distances as directed by RMPs.

- Locate temporary roads and landings on stable locations (e.g., ridge tops, stable benches, or flats, and gentle-to-moderate side slopes) in areas that are not connected to intermittent, perennial, or streams known or likely to be inhabited by salmonids. These features cannot be located within 300 feet of these streams.
- No temporary road or landing construction on unstable slopes and headwater swales in watersheds known or likely to be inhabited by federally-listed salmonids.
- For temporary roads that will be used for multiple seasons portions of the roads that cross ephemeral drainages will be rocked to prevent potential erosion/sedimentation affects. Additional winterizing methods/treatments are discussed in section 2.5 of the Final Biological Assessment.
- No more than 1.5 miles of temporary roads will be constructed per project.
- During hauling operations, apply only water to road surface to control dust and erosion. No dust control additives are allowed in watersheds known or likely to be inhabited by salmonids.

Wildlife – Other Sensitive Species

WILD-16: Western Pond Turtle

- Ground disturbing heavy equipment will not be permitted around areas of western pond turtle nesting habitat.
- Buffer size will be determined by biologists based on microsite conditions.
- Manual fuel treatment methods could be employed within these buffers, although no slash piling will be permitted.

WILD-17: Bald Eagle

- Treatment activities will avoid cutting/felling/hauling activities within 1.0 mile of active nests between January 1 and August 31 of any given year
- No cutting/felling/hauling activities will be conducted within 0.5 mile of winter roosts between December 1 and April 1 of any given year.

WILD-18: Golden Eagle

- Treatment activities will avoid cutting/felling/hauling activities within 1.0 mile of active nests between February 1 and August 31 of any given year.

WILD-19: California Spotted Owl

- **Treatment activities are prohibited within 0.25** mile of the activity center during the breeding season (March 1 through August 31), unless surveys confirm that California

spotted owls are not nesting. Prior to implementing activities within or adjacent to a California spotted owl Protect Activity Center (PAC) and the location of the nest site or activity center is uncertain, conduct surveys to establish or confirm the location of the nest or activity center. PAC's should be delineated to ensure that 300 acres of habitat with greater than 70 percent canopy cover will be available.

- Mechanical treatment will not be allowed, unless it is needed to improve habitat suitability.
- All treatments within habitat will retain living trees (non-hazard) with DBH greater than 30 inches.
- Large diameter tree species that exhibit fire resilient characteristics such as thickened, furrowed bark and well-developed crowns will be retained, unless the tree poses a hazard to public safety.

WILD-20: Great Gray Owl

- Provide a 300-foot buffer around natural openings greater than 1-acre that have habitat associated with them. Within this buffer, treatments are limited to protection or improvement of nesting habitat.
- Treatment activities are prohibited within 0.25 mile of an active great gray owl nest stand, during the nesting period (typically March 1 to August 15). The restriction may be waived for vegetation treatments of limited scope and duration, if a qualified biologist determines that activities are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location.

WILD-21: Northern goshawk

- Project activities will avoid cutting/felling/hauling activities within 0.5 mile of active nests between March 1 and August 31 of any given year.
- Treatment activities are prohibited within 0.25 mile of active nest sites during the breeding season (February 15 through September 15) unless surveys confirm that northern goshawks are not nesting.

WILD-22: BLM Special Status Birds

- To protect nesting and fledging, project activities may only occur in BLM Special Status bird habitat September 15 to February 1; project activities may not occur February 2 to September 14.
- The timelines above may be condensed based on species specific documented nesting and fledging behavior in different parts of its range, so long as the effects remain the same as analyzed or are lessened.

WILD-23: Migratory Birds

- Migratory birds will be managed in accordance with the Migratory Bird Treaty Act (MBTA) and Migratory Bird Executive Order (EO) 13186, Responsibilities of Federal Agencies to Protect Migratory Birds.
- Activities during the breeding/nesting season (February 2 - September 14) for migratory birds should be minimized, to the extent possible.
- All mature shrubs will be inspected for active bird nests during nesting season and all active nests will be retained with a minimum 10 feet untreated buffer.

WILD-24: Bats

- Within maternity roosting habitat, treatments are limited to protection or improvement of roosting habitat.
- Within maternity roosting habitat, project activities that may impact bats may not occur between February 2 to September 14.

WILD-26: Fisher and Marten

- Treatment activities are prohibited around fisher den sites (700-acre buffers) from March 1 through June 30 and around marten den sites (100-acre buffers) from May 1 through July 31.
- Restrictions may be waived for individual treatments of limited scope and duration, when a qualified biologist documents that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing, and specific location.

Cultural Resources – General

CR-1: Compliance with Section 106 of the National Historic Preservation Act (NHPA) must be completed for all projects proposed under the Programmatic Environmental Assessment (EA). The extent of cultural resource field inventory, tribal consultation, cultural resource evaluation, and project design features undertaken related to this compliance will be determined by the Bureau of Land Management (BLM) FO Archaeologist in accordance with the Programmatic EA and the California Statewide Protocol Agreement (Protocol). A cultural resource/Section 106 compliance study, including all necessary field inventories and evaluations, as well as proposed project design features, will be completed prior to the Decision to implement any projects proposed under the Programmatic EA.

CR-2: Project design features will be designed to avoid or minimize adverse effects to cultural resources listed on or eligible (or potentially eligible or assumed eligible) for the National Register of Historic Places (NRHP) including districts, sites, objects, structures, and buildings, as well as cultural resources that are of traditional and cultural significance to Native American Indian Tribes (i.e., traditional cultural places). The project design features will be based on results of the cultural

resource compliance study and will be approved by the FO Archaeologist and incorporated into Section 106 and National Environmental Policy Act (NEPA) compliance documentation as well as the Decision for each project proposed under the Programmatic EA.

CR-3: The FO Archaeologist will define the undertaking's Area of Potential Effects (APE) in consultation with the BLM project manager or lead (i.e., forestry, fuels, or vegetation management specialist) and in accordance with the Protocol and other BLM and Department of the Interior (DOI) policy. The APE will include, but will not be limited to, areas where the project will cause direct effects, particularly as a result of ground disturbing activities, to cultural resources (i.e., areas to be treated using mechanical methods, staging areas, material storage, temporary roads, control lines, etc.).

CR-4: The APE will also include areas where indirect effects may occur to NRHP-listed or -eligible cultural resources (or assumed eligible). These may be effects to physical features within the setting of cultural resources that contribute to their significance as well as effects caused later in time as result of a change in public access (leading potentially to cultural resource looting and/or vandalism). Inventory methods and project design features for identifying and avoiding or minimizing indirect effects will be developed by the FO Archaeologist on a project-by-project basis.

CR-5: All areas subject to proposed ground-disturbing activities (i.e., mechanical tree removal and vegetation treatments, etc.) must be inventoried at the BLM Class III level or have sufficient Class III level inventory coverage as determined by the FO Archaeologist in accordance with procedures in the Protocol. Areas proposed for staging areas, road improvement, etc. outside of tree removal/vegetation treatment areas will be inventoried at the BLM Class III level or must have sufficient Class III inventory coverage prior to project implementation. Cultural resources listed on or determined to be eligible (or assumed eligible) for the NRHP within the APE will be routinely avoided by project design, as described below under Mechanical Treatments (CR-13 and CR-14), unless other project design features are recommended by the FO Archaeologist.

CR-6: Certain cultural resources within the APE may not be affected by certain project activities or may be beneficially affected. The FO Archaeologist will make this determination for each NRHP-listed or -eligible (or assumed eligible) cultural resource within the APE on a project-by-project basis and will recommend an appropriate project design feature or other management approach for each cultural resource within the APE.

CR-7: The APE will include a 100 ft buffer along each side of any proposed haul route. The level of cultural resource inventory and other identification required for the buffer will be determined by the FO archaeologist, following procedures in the Protocol, and will depend on the intensity of proposed hauling use and other factors. The FO Archaeologist has discretion to increase or decrease the size of the 100 ft buffer depending on the particular circumstances of the proposed hauling and cultural resource sensitivity along the haul route. Certain NRHP-listed or -eligible (or assumed eligible) cultural resources may be adversely affected by excessive dust, emissions,

sounds, vibrations, and other effects along routes related to Project use by trucks for hauling or transport of heavy equipment. The FO archaeologist will assess these potential effects on sensitive cultural resources and will recommend appropriate project design features to avoid or minimize these effects. Project design features may include, but are not limited to, decreasing truck speed or hauling frequency in the vicinity of the resource. In some cases, sensitive cultural resources along haul routes will be monitored by the FO archaeologist or BLM-approved archaeologist to determine if the level of Project-related use on the haul route is causing adverse effects to sensitive cultural resources. If the FO Archaeologist finds that the resource is being negatively impacted, FO Archaeologist-proposed project design features to avoid or minimize the effects will be immediately implemented and/or the project design features related to Post-Review Discovery and Unanticipated Effects (below) will be followed.

CR-8: The BLM project manager or lead will be apprised of all cultural resource locations within the APE before project implementation to help ensure protection.

CR-9: Cultural resources that require protection and will be subject to project design features recommended by the FO Archaeologist will be discussed with the BLM project manager and, as necessary, project proponents/contractors, to insure that project personnel understand the project design features and their required role in the implementation of these project design features.

CR-10: At the request of the FO Archaeologist, cultural resources within the APE will be monitored by a BLM-approved archaeologist during and, as necessary, and after project implementation.

CR-11: Project design features not included herein and/or tailored to specific project conditions will be recommended by the FO Archaeologist and implemented, as needed, on a project-by-project basis, to avoid or minimize adverse effects to NRHP-listed and -eligible (or assumed eligible) cultural resources within the APE. The FO Archaeologist has discretion to implement project design features (included or not included herein) to protect cultural resources with values (scientific, aesthetic, traditional cultural, etc.) not rising to the level of NRHP eligible.

CR-12: All dead or dying trees or green trees that are subject to removal and pose a threat to NRHP-listed or eligible (or assumed eligible) cultural resources will be directionally felled in order to avoid damaging those cultural resources. At the request of the FO Archaeologist, a BLM-approved archaeological monitor will be present on-site during such activities.

Cultural Resources – Mechanical Treatments

CR-13: Generally, ground disturbance resulting in soil movement or compaction caused by tree removal and other mechanical vegetation treatments (i.e., use of heavy equipment, masticators, chippers, etc.) will not be allowed to occur on cultural resources listed on or determined to be eligible (or assumed eligible) for the NRHP. Equipment such as masticators will have rubber tracks rather than metal tracks to reduce ground disturbance, whenever feasible or warranted by resource concerns, to further reduce potential for impacts.

CR-14: Prior to project implementation, cultural resources listed on or determined eligible (or assumed eligible) for the NRHP will be marked on the ground for avoidance by the FO Archaeologist or BLM-approved archaeologist. The marking to be used will be determined in consultation with the BLM project manager or lead and project personnel, prior to the implementation of the project. The APE and appropriate buffer distance will be at the discretion of the FO Archaeologist, taking into consideration project activities and potential effects.

Cultural Resources – Construction of New Roads, Temporary Roads, Skid Trails, or Fire Lines

CR-15: A BLM Class III cultural resource inventory must be completed for construction or restoration of all roads, skid trails, landings, and fire lines, as well as decommissioning of these developments. If existing Class III inventory is to be used in lieu of new inventory, the existing inventory must be determined sufficient by the FO Archaeologist, in accordance with procedures in the Protocol. Construction or restoration of temporary roads may increase public access to cultural resources susceptible to looting and vandalism. Inventory, evaluation, and project design features for cultural resources that may be indirectly affected by the change in access may be necessary as determined by the FO Archaeologist.

CR-16: For cultural resources listed on or determined eligible (or assumed eligible) for the NRHP within the APE, a minimum of a 30-meter buffer around cultural resource is encouraged but may be increased or decreased based on the discretion of the FO Archaeologist, taking into consideration project activities and potential effects.

CR-17: Hauling on roads that bisect known archaeological resources may continue if deemed appropriate by the FO Archaeologist and authorized as part of the Decision for the project. Vehicles and equipment using these roads must stay on the road prism in areas that bisect archaeological resources. Road construction, reconstruction, decommissioning or modification of the existing road prism within resource boundaries may not occur without additional review and/or consultation, including NRHP eligibility evaluation of cultural resources, as determined by the FO archaeologist. The preference will be to avoid direct effects to NRHP listed or eligible (or assumed eligible) resources. The FO Archaeologist may recommend project design features, such as capping archaeological sites in road prisms with gravel or other materials, to minimize erosion and other direct effects potentially caused by Project-related use.

Cultural Resources – Prescribed Burning

CR: 18: Areas where pile burning is proposed will require BLM Class III inventory coverage prior to project implementation. The FO archaeologist has discretion to determine if pile burning will be allowed to occur on NRHP-listed or -eligible (or assumed eligible) cultural resources. Sensitive cultural resources may include arboglyphs/silvaglyphs, pictographs, petroglyphs, and archaeological sites with artifacts that can be damaged or destroyed by pile burning. This includes avoidance of thermal alteration and damage to hydration bands in obsidian artifacts suitable for obsidian hydration studies.

CR-19: For understory or broadcast prescribed burning, BLM Class III inventory will be required for all areas that have been identified by the FO Archaeologist as being within the APE and that have high potential or sensitivity for cultural resources. Lower potential areas within the APE may be inventoried at the BLM Class II (reconnaissance) level after consultation with the State Historic Preservation Office (SHPO) staff, in accordance with procedures in the Protocol. The field inventory must be completed before the Decision to implement the burn has been made.

CR-20: NRHP-listed or -eligible (or assumed eligible) cultural resources within the APE will be protected by a project design feature recommended by the FO Archaeologist, taking into consideration the cultural resource type, environmental setting, anticipated burn conditions, and other factors. Project design features may include, but are not limited to, removal from the burn area/APE, fuel breaks and no treatment buffers around the resource, wrapping, foaming, wetting, black lines, fire lines (machine or hand dug), and raking.

CR-21: All potentially ground-disturbing activities related to the prescribed burn (fire-control lines, staging areas, and helispots) as well as all road improvement, construction or decommissioning will be included in the APE and will require BLM Class III inventory prior to project implementation; any NRHP-listed or eligible (or assumed eligible) cultural resources will be avoided as described above under project design features CUL-13 and CUL-14 for Mechanical Treatments.

Cultural Resources – Hazard Removal and Vegetation Management Treatments within the Boundaries of Cultural Resources

CR-22: Removal of hazard trees and associated vegetation through low impact methods (i.e., use of hand tools) within cultural resources boundaries will be done in a way that prevents the formation of distinct “archaeology islands” remaining within project areas where cultural resources are present. This in turn will deter livestock from congregating within cultural resource areas for shading purposes, and also decrease the potential for members of the public to find (and potentially loot and/or vandalize) cultural resource areas based on the presence of distinct vegetation “archaeology islands.”

CR-23: At the discretion of the FO Archaeologist, hand work (involving hand tools and methods) may occur within the boundaries of cultural resource sites and districts so long as the work does not negatively affect NRHP-listed or -eligible (assumed eligible) cultural resources. Hand work as it is used herein does not involve use of mechanized equipment, though use of chainsaws to fell individual or small groups of trees or cut other vegetation posing a hazard to critical infrastructure is included under this project design feature.

CR-24: At the discretion of the FO Archaeologist, woody material may be chipped within the boundaries of cultural resource sites and districts so long as the staging of chipping equipment on-site and placement of chipped material does not negatively affect NRHP-listed or -eligible (assumed eligible) cultural resources. If such resources are identified within the APE, the BLM

FO Archaeologist will determine where the chipping equipment can be placed and where the chipped material can be piled or spread.

CR-25: Historic arborglyphs, generally found in aspen stands and assumed to be NRHP eligible, will be preserved in place and will not be cut or damaged. Burnable materials will be removed within a 15-foot (5-meter) radius to avoid impacts of prescribed burning. The FO Archaeologist has discretion to increase the radius surrounding the arborglyph(s), depending on slope, aspect, and other factors. Cut vegetation will not be piled within 15 feet of arborglyphs, and no more than five feet high to avoid heat damage to the tree or carving.

Cultural Resources - Adverse Effect, Post-Review Discovery and Unanticipated Effects, and NAGPRA Inadvertent Discovery

CR-26: If an undertaking proposed under this programmatic EA results in a finding of adverse effect pursuant to Section 106, the FO will seek concurrence from the SHPO for this finding pursuant to the Protocol and, if SHPO concurrence is received, continue Section 106 review to resolve adverse effect pursuant to 36 CFR 800.6. An environmental assessment (tiering to the programmatic EA) will be prepared to determine whether the adverse effect will result in a finding of Significant Effect or No Significant Effect under NEPA.

CR-27: In the event of post-review discovery of, or unanticipated effects to, cultural resources during implementation of a project under this Programmatic EA, the following procedures will be undertaken.

- a. The FO Archaeologist, Field Manager, and BLM project manager or lead will be immediately notified by personnel responsible for project implementation.
- b. All project work and activities with the potential to damage the cultural resource will cease immediately within 50 feet of the post-review discovery or where the unanticipated effects have occurred. This distance may be changed at the discretion of the FO Archaeologist in consultation with the Field Manager and BLM project manager, taking into account the circumstances of the specific project and discovery.
- c. The FO Archaeologist will make an assessment of the situation and, in consultation with the Field Manager, prescribe a course of action consistent with the Protocol and/or the Section 106 regulations at 36 CFR 800.13 pertaining to post-review discoveries and unanticipated effects.
- d. The FO Archaeologist will oversee and document implementation of the agreed-upon steps and will report the discovery event and the manner of its resolution.
- e. The Field Manager has sole discretion to authorize (through a Notice to Proceed) continuation of project work and activities within the area of the discovery or anticipated effects after the situation is fully resolved.

CR-28: Inadvertent discovery of human remains and objects subject, or potentially subject, to NAGPRA as defined in 43 CFR 10.2 (d) will be handled by the BLM under the ARPA regulation at 43 CFR 7 and NAGPRA regulations at 43 CFR 10 as well as related BLM policy, including BLM California-specific policy and procedures such as those in the Protocol. The situation will be

resolved to the satisfaction of the Field Manager, working in consultation with the FO Archaeologist, before project work and activities are allowed to continue in the area of the inadvertent discovery. The Field Manager has sole discretion to authorize (through a Notice to Proceed) continuation of project work and activities in the area of the discovery.

Paleontology

PALEO-1: All portions of the project area to be subjected to ground-disturbing activities (i.e., mechanical tree removal, etc.) and have potential to adversely impact significant paleontological resources will be assessed for such resources, as determined by the FO Archaeologist or FO paleontology lead, in accordance with BLM policy, including Washington Office (WO) Instructional Memorandum (IM) No. 2009-011 (Assessment and Mitigation of Potential Impacts to Paleontological Resources). Typically, only portions of the project area that contain Class 4 (high potential) or Class 5 (very high potential) formations as defined under the BLM's Potential Fossil Yield Classification (PFYC) system (pursuant to WO IM No. 2016-124) will be subject to paleontological resource assessment. Unknown (Class U) formations may also require assessment, as determined by the FO Archaeologist or FO paleontology lead.

PALEO-2: Generally, ground disturbance resulting in soil movement or compaction caused by tree removal and other mechanical vegetation treatments (i.e., use of heavy equipment, masticators, chippers, etc.), prescribed burning, and road use (i.e., construction, maintenance, decommissioning, and increased truck hauling) will not be allowed to occur within the boundaries of significant paleontological resource localities (or those resources assumed to be significant) unless the ground disturbance will clearly not affect the resource, as determined by the FO Archaeologist or FO Paleontology Lead.

PALEO-3: Prior to project implementation, significant paleontological resources (or those resources assumed to be significant) will be marked on the ground for avoidance. The marking will be determined in consultation with the BLM project manager or lead and project personnel, prior to the implementation of the project. The appropriate buffer distance will be at the discretion of the FO Archaeologist or FO Paleontology Lead, taking into consideration project activities and potential effects. The FO Archaeologist or FO Paleontology Lead also have discretion to require professional monitoring during and after project implementation, in accordance with WO IM No. 2009-011.

PALEO-4: In the event of a post-review discovery or unanticipated effects to significant paleontological resources during implementation of a project under this programmatic EA, project-related work in the area of the post-review discovery will immediately cease, project personnel will notify the Field Manager, and the FO Archaeologist or FO Paleontology Lead, in consultation with the Field Manager, Project Manager, and, as applicable, the project proponent, will immediately implement PALEO-2 and PALEO-3 to avoid or minimize adverse impacts to the post-review discovery. The Field Manager has sole discretion to authorize (through a Notice to Proceed) continuation of project work and activities in the area of the post-discovery.

PALEO-5: In the event that a significant paleontological resource cannot be avoided and/or unanticipated effects cannot be stopped, the FO Archaeologist or FO Paleontology Lead, in consultation with the Field Manager, Project Manager, and, as applicable, the project proponent, will plan and implement mitigation (such as data recovery) appropriate to the scale of the effect to resolve the situation. Mitigation will only be planned and implemented for significant paleontological resources in accordance with WO IM No. 2009-011. Mitigation should be completed prior to the decision to implement the project. In the event that mitigation is necessary to address unanticipated effects or effects to post-review discoveries, the Field Manager has sole discretion to authorize (through a Notice to Proceed) continuation of project work and activities in the area of the unanticipated effects or post-review discovery.

Recreation

REC-1: To the extent possible, roads that provide access to developed recreation sites will be used minimally for both safety concerns and potential degradation of access roads. If the use of these roads is necessary for treatment activities, these roads will be avoided during weekends.

REC-2: Where needed, vegetation or woody materials will be retained or deposited to inhibit creation of undesired trails by recreationist or to protect/screen sensitive resources.

REC-3: Recreation planner will be consulted for proposed hazard tree removal in recreation sites or along trails and roads to ensure recreation management objectives are met by proposed treatment.

REC-4: Vegetation treatments along dispersed use trails will only entail the falling of dead and dying trees to protect trail users from these hazards. Excessive fuel loading may need to be piled or lopped and scattered. Trails with more concentrated use that also have other critical infrastructure concerns such as nearby roads and private property are likely to need proactive tree thinning to enhance forest health and functionality.

REC-5: To the extent practical, downed wood resulting from treatments in or adjacent to campgrounds will be made available for firewood sales in the campgrounds in which the treatment occurred. Quantities will be determined in coordination with the FO recreation planner.

REC-6: If a designated off-highway-vehicle trail or non-motorized trail is damaged during treatment activities, the trail will be restored to BLM required specifications standards.

Lands and Realty

LR-1: BLM will notify the right-of-way (ROW) holder in writing when designing vegetation management projects near or adjacent to critical infrastructure. BLM will consider any written recommendations as to how the proposed use affects the integrity of, or the ability to operate the critical infrastructure. The notice will contain a time period within which the ROW holder must respond. The notice may also notify the holder of additional opportunities to comment.

LR-2: The ROW holder shall conduct all activities associated with the maintenance, operation, and termination of the ROW within the authorized limits of the ROW.

LR-3: ROW holders must contact the authorized officer and receive BLM authorization prior to conducting vegetation management treatments analyzed within this pEA, unless previously authorized in their existing ROW.

LR-4: Prior to any operations, the ROW holder, if required, shall enter into a timber sale or vegetation contract with the BLM for timber designated for cutting on the right-of-way.

LR-5: Specific sites as identified by the authorized officer (e.g., archeological sites, areas with threatened and endangered species, or fragile watersheds) where equipment and vehicles shall not be allowed, shall be clearly marked onsite by the holder before any surface disturbing activities begin. The holder shall be responsible for ensuring that personnel are well trained to recognize these markers and understand the equipment movement restrictions involved.

LR-6: ROW holder project activity vehicle and equipment traffic shall be restricted to routes approved by the authorized officer. New access roads or cross-county vehicle travel will not be permitted unless prior written approval is given by the authorized officer. Authorized roads used for the project shall be rehabilitated or maintained when activities are complete as approved by the authorized officer.

LR-7: During conditions of extreme fire danger, ROW operations shall be limited or suspended in specific areas, or additional measures may be required by the authorized officer.

LR-8: The ROW authorization holder shall permit free and unrestricted public access to and upon the project area for all lawful purposes except for those specific areas designated as restricted by the authorized officer to protect the public, wildlife, livestock, or facilities.

LR-9: As directed by the authorizing officer, all road segments shall be winterized by providing a well-drained roadway by water barring, maintaining drainage, and any additional measures necessary to minimize erosion and other damage to the roadway or the surrounding public lands.

LR-10: The authorization holder shall provide for the safety of the public entering the project area.

Visual Resource Management

VRM-1: Contrast Rating(s) will be conducted within sensitive viewsheds where treatments will occur within dense vegetation.

VRM-2: In areas where clearing within dense vegetation is required, thinning and feathering of the adjacent vegetation will be incorporated to dissipate the linear edges of the clearing and mimic forms of natural clearings. In general, thinning and feathering will be done in irregular patches of varying densities as well as a gradation of tall vegetation down to low vegetation at the clearing edge for a more natural appearance. Thus, the contrast of a distinct line is faded out into a wide

transitional band and the focal point of an artificial line will be decreased. In some circumstances, safety considerations may dictate specific thinning and feathering practices.

VRM-3: Roads

- Sightlines necessary for road safety should be kept open. A uniform forest edge on either side of the road appears uninteresting and oppressive, and may disorient the traveler.
 - Provide a more sinuous roadside space that flows from one side of the road to the other. Create variation in this space by leaving clumps of trees, giving the traveler a greater sense of movement and providing points of interest. This will provide the traveler with a sequence of enclosures and openings, which add variety to the driving experience.
 - Create additional open spaces to provide opportunities for important views.
 - Minimize clearing on shoulders to reduce erosion.
 - Vegetation treatment debris should be kept to a minimum along the roadside.
 - If road base materials are being used within sensitive viewsheds, use of materials that do not visually contrast are recommended when feasible.

VRM-4: Trails

- The detail requires similar consideration to that of roads. However, the main difference is the speed of the traveler and the general scale of the space being much narrower.
 - Maintain canopies, when possible, where trails can pass beneath.
 - Provide opportunities to create views and access to water edges to make the experience more interesting.
 - Vegetation treatment debris should be kept away from the trail as far as possible.

VRM-5: Electric Transmission and Distribution Lines

- Trees should appear to meet across the open space in some places so that the corridor does not split the forest completely. Trees that will not present a safety or engineering hazard or otherwise interfere with operations should be left in place. If, by regulatory standards, all vegetation must be cleared, feathering the edges may be permitted. In this situation, some clearing and thinning should be considered outside of the corridor to create an irregular vegetation outline.
- Create a corridor of varying character and width, taking care to avoid irregular but parallel edges or irregular but symmetrical space.

VRM-6: Single Locations (e.g., recreation areas, communities, and private residences)

- Preserve vegetation for screening facilities or to buffer views into secure areas.
- Maximize views of natural features.
- Minimize views of parking.
- Preserve vegetation that guides access and vehicular and pedestrian circulation.

- Preserve vegetation to buffer campsites from roads and neighbors.
- Preserve vegetation to provide shade.

VRM-7: Temporary Access and Landing Construction

- Vegetation clearing should be minimized. Brush-beating, mowing, or using protective surface matting should be used. Trees should be trimmed versus cut.
- Routes should be unobtrusive and should be chosen to make as much use of landform as possible.
- Routes should not break the continuity of the canopy or ground vegetation.
- Areas with views and water edges should be crossed at the least visible point.
- Steep slopes should be avoided. The alignment should curve and blend with the landform.
- Landings and turning points should be sited where natural gradients provide space and are not positioned on prominent spurs or ridges.
- Routes and landings should be reclaimed upon the completion of a harvest with a methodology and seed mixture specified by the FO.

VRM-8: Reclamation of Existing Routes

- Routes should be reclaimed upon the completion of a harvest with a methodology and seed mixture specified by the FO.

Rangeland Management

RM-1: BLM will contact all grazing permittees/lessees prior to cutting in a grazing allotment and inform them of the treatments and actions and the time entering and working in the allotment.

RM-2: If projects such as fences, gates, cattle guards, or water sources are cut/damaged, then they will be repaired immediately.

Air Quality

AQ-1: All uses of prescribed fire during will meet the air quality standards, regulations, policies, and guidelines specified by the Federal Clean Air Act, the California Clean Air Act, the California Air Resources Board (ARB), regional Air Quality Management Districts (AQMD)/Air Pollution Control Districts (APCD), and municipal air pollution requirements and BLM Handbooks. This will be detailed in the BLM approved Prescribed Fire plan.

AQ-2: If prescribed fire is used, a BLM approved Prescribed Fire Plan will be in place prior to ignition. Air emissions will be managed by timing and atmospheric dispersal per the approved Prescribed Fire Plan.

AQ-3: The Prescribed Fire Plan will have a design, reviewed by NPS, USFS, BLM, ARB and/or AQMD/APCD that will have no adverse impact on Class I air quality areas.

AQ-4: The BLM and its collaborators will adhere to fuel standards for diesel fuel emissions established by the Air Resources Board, AQMDs, and APCDs for all on-road vehicles and off-road vehicles and equipment involved in projects.

Hazardous Materials

HM-1: During operations described in the Proposed Action, the operator will be required to have a BLM-approved spill plan or other applicable contingency plan. In the event of any release of oil or other hazardous substance into the soil, water, or air, the operator will immediately implement the site's plan. As part of the plan, the operator will be required to have spill containment kits present on the site during operations.

HM-2: Equipment refueling will not occur within 300 feet of perennial streams, 150 feet of intermittent streams, or 100 feet of any ephemeral stream to prevent toxic materials from entering waterways. Hydraulic fluid and fuel lines shall be in proper working condition in order to minimize leakage.

HM-3: All hazardous materials and petroleum products will be stored in durable containers located at least 300 feet from perennial streams, 150 feet from intermittent streams, or 100 feet from any ephemeral stream. Containers will be located so that accidental spills will be contained and will not drain into the stream system. Waste diesel, oil, hydraulic fluid and other hazardous materials will be removed from the site and disposed of at an approved site.

Safety

SAFE-1: Signs and/or road guards will be posted to warn the public about vegetation management, prescribed fire, road, trail, and facilities maintenance when and where necessary for safety.

SAFE-2: Existing telephone, transmission lines, fences, ditches, roads, trails, and other improvements will be protected while implementing the proposed treatments.

SAFE-3: Mechanized hand tools will have federal- or state-approved spark arresters.

SAFE-4: Fire staff will evaluate recommended actions in terms of safety. If the recommended treatment cannot be completed due to safety concerns, the proposal will be returned to the resource staff for other treatment options and further analysis.

SAFE-5: Tree cutting teams will carry fire extinguishers with them. One per chainsaw is required.

APPENDIX C - DESCRIPTIONS OF MANUAL AND MECHANICAL METHODS, PRESCRIBED FIRE AND ACCESS FOR TREATMENTS

Manual and Mechanical Methods

Biomass Utilization. Biomass consists of dead or live materials that the vegetative prescription identified for cutting or removal. The goal of biomass extraction is to reduce hazardous fuels, reduce smoke emissions, and utilize the biomass to benefit the local economy as well as reduce the costs of treatments. Ground-based (Photos 2-1, 2-2, and 2-3) and cable-based (Photo 2-4) extraction methods may be used to remove biomass. Actual acres of extraction would be determined based on environmental factors, and economics, safety, and access limitations.



Photo 2-1. Chipping biomass



Photo 2-2. Removing biomass from unit in whole tree form



Photo 2-3. Gathering small diameter material with a skidsteer



Photo 2-4. Removing biomass from unit in whole tree form with one end suspension using roadside cable system

Ground-based Extraction. On slopes of less than 35 percent, woody biomass and saw log material created from thinning operations would be cut, skidded, or hauled to landings or road sides using low ground pressure machinery. To reduce ground disturbance and soil compaction, equipment would be limited to the smallest size necessary. Skidding machinery would be equipped to obtain one end log suspension during skidding and would be restricted to approved skid trails. This method requires narrow skid trails (about 7 to 9 feet wide). Existing skid trails would be used when possible. Skid trail locations would be approximately 150 feet apart, but vary depending on the site-specific terrain, and would be pre-located and approved by the BLM contract administrator in order to minimize soil disturbance. Skidding and hauling operations would be suspended when soil moisture content at a 4-6 inches depth exceeds 25 percent by weight.

Cable-based Extraction. On slopes greater than 35 percent, woody biomass and saw log material created from thinning operations would be yarded to landings or road/route sides. Cable yarding drags trees with one end suspended and one end on the ground. Corridors would be generally less than 15 feet wide, depending on the size of trees to be removed and the terrain; locations would be pre-approved by the BLM contract administrator. Landings would be a minimum of 150 feet apart. In riparian areas and across areas not scheduled for treatment, cable corridors would have a maximum clearing width of 12 feet and spaced an average of 150 feet apart. Full suspension would be required for any logs yarded through these corridors.

Firewood. Dead and down hardwoods or conifers could be made available for firewood collection if snag and down wood requirements are already met for the land allocation in which the project is located. Collection by hand within 200 feet of roads would be permitted. Specific areas for firewood collection would be identified by resource area specialists and site-specific PDFs would be stipulated for each designated firewood collection area.

Activity Fuel Disposal. Where biomass extraction is not warranted, fuel disposal methods to be considered would include lop and scatter, hand-pile and burn, or understory burn. In some instances, the resultant fuel hazard may be low, resulting in no fuel hazard reduction treatment. The overall objective would be to return fuel loading and arrangement to levels characteristic of a low and mixed severity fire regime.

Mechanical Mastication. A mechanical masticator would be utilized to grind, chip, and shred vegetation on site. Whenever feasible or warranted by resource concerns, equipment selected to carry out this task is designed to minimize ground disturbance (e.g., with rubber tracks rather than rubber-tire vehicles or metal tracks and articulating booms). Multiple cutting attachments would be used to adapt to the fuel type and terrain. The masticated vegetation will be broadcast across the project area, leaving an altered fuel type that does not reduce the quantity of fuels in the short-term, but rearranges them on the ground where they are more manageable in the event of wildfire and which hastens decay in the long-term. Ladder fuels would be reduced to ground fuel to minimize the risk of crown fire. The average depth of masticated material would be less than 4 inches, in order to control erosion and suppress vegetative resprouting.

Prescribed Fire

Hand piling and Burning. Woody material such as limbs, stems, cut boles and other slash 1 to 7 inches in diameter and greater than 2 feet in length would be placed in piles and then covered (if needed) with polyethylene plastic or alternate material (Photo 2-5). Piles would be placed outside the drip lines of leave trees and away from large logs or stumps. Hand piles within riparian reserves would be located in accordance with the PDFs. Piles would be burned after they have cured or dried when the risk of fire spread (scorch or mortality) to nearby residual trees and shrubs is minimized; and environmental and air quality conditions are conducive to burning.



Photo 2-5. Hand piles in a treatment unit

Understory Burning. Understory burning is used to reduce dead and down woody material, shrubs, and small trees in the understory, and live and dead branches close to the ground (Photo 2-6). This condition results in a low- to moderate-intensity ground fire that consumes surface fuel but not the canopy. Understory burning is conducted primarily during the spring and fall months when fuel, weather, and soil conditions permit. Low-intensity understory burning following the initial fuel reduction helps to maintain desired fuel conditions.



Photo 2-6. Understory burning in an oak woodland

Access for Treatments

Road Maintenance and Renovation. Maintenance and renovation may be needed on pre-existing designated roads that access treatment areas. These roads have received periodic maintenance. The road would be made suitable for wood product hauling by removing vegetation growing into the road, repairing and/or installing ditches/waterbars/dips, and blading the road surface. This maintenance and renovation would be consistent with periodic maintenance activities on designated roads that BLM and/or road right-of-way grantees typically perform to reduce sedimentation and erosion from these features.

Reconstruction of Previously Used Roads. Reconstruction would occur on existing road prisms that were previously blocked, closed, or decommissioned, or are overgrown, and have not received periodic road maintenance. The road/route would be made suitable for wood product hauling by removing vegetation growing into the road, repairing and/or installing ditches/waterbars/dips, and blading the road/route surface. After use, the road would be decommissioned by ripping, water barring, seeding, mulching and blocking. If needed for multiple operating seasons, the road would be waterbarred and blocked at the entrance, prior to the wet season, to control erosion and access until final decommissioning.

Landing Use and Construction. Landing construction may be needed where removal of wood products is proposed. Utilization of previous landings or disturbed areas would occur when feasible to avoid the construction of new landings or additional disturbance. All new landings constructed under this pEA would be temporary and would be constructed to allow operators temporary access to treatment areas. All landings would be located on stable areas outside of riparian zones and each landing would be less than 1 acre in size. After use, the landing would be decommissioned by ripping, water barring, seeding, and/or mulching and blocking of access points into the landing. If needed for multiple operating seasons, the landing would be mulched, prior to the wet season, to control erosion until final decommissioning.

Temporary Road Construction. A temporary road is an access road constructed to meet or exceed minimum design standards on undisturbed terrain. Construction would involve clearing, grubbing, removing, and disposing of vegetation and debris from within the boundary of an established clearing. Work would also include construction of a minimum-width subgrade by excavating, placing embankment, leveling, grading, and out-sloping. Road location, construction and maintenance would follow the PDFs in this document. Temporary roads would not exceed 0.5 mile in length in order to minimize effects associated with these features. Temporary roads would not occur in threatened and endangered species habitat. After use, the road would be decommissioned by ripping, water barring, seeding, mulching and blocking. If needed for multiple operating seasons, the road would be waterbarred and blocked at the entrance, prior to the wet season, to control erosion and use until final decommissioning.

APPENDIX D - ISSUES DISMISSED FROM DETAILED ANALYSIS

Issues Not Present or Not Affected

The following issues were dismissed from further analysis because they are not present within the project area or are present but not affected to a degree requiring detailed analysis. These issues are not discussed in the pEA. The rationale for dismissal is provided in Table D-1.

Table D-1. Dismissal Rationale

Issue	Dismissal Rationale
Environmental Justice	Treatments are dispersed across the landscape with no population disproportionately affected; where these populations exist, there will likely be a beneficial impact by protecting public safety.
Farmlands (Prime and Unique)	Not present on BLM-managed lands.
Geology	Treatments are not expected to impact subsurface resources.
Livestock Grazing	Permittees would be notified prior to implementation, which would allow permittees to move livestock out of the implementation area. Any damage (accidental or intentional) to fences, cattleguards etc. would be immediately repaired.
Mineral Resources	Proposed action would not impact mineral resources.
Rangeland Health Standards	The Proposed Action would not occur on rangelands and therefore Rangeland Health Standards would not apply.
Socioeconomics	Treatments would protect public safety and provide more economic opportunities (e.g. jobs, forest products) and there is widespread support for the Proposed Action.
Wild Horse and Burro Management Areas	The BLM only identified one road near an HMA near a USFS-managed HMA that occurred in forest and woodlands, therefore the likelihood of impacting wild horses and burros is extremely low.
Wilderness	Designated Wilderness and Wilderness Study Areas are excluded from the Proposed action.

Issues Considered but Not Fully Analyzed

Table D-2 identifies issues the BLM considered but did not analyze in full detail, often because the project’s design or implementation of PDFs would eliminate or reduce effects on the resource. An explanation of the BLM’s decision to not fully analyze this issues is below.

Table D-2. Issues Considered But Not Fully Analyzed

Issue
Air Quality/Greenhouse Gas Emmissions
Lands/Realty
Special Designations (e.g., ACEC, NCA, Wild and Scenic Rivers)
Travel Management
Visual Resources
Water Resources

D.1 Air Quality/Greenhouse Gas Emmissions

Air quality in a given location is determined by the concentration of various pollutants and particulates in the atmosphere. National Ambient Air Quality Standards (NAAQS) have been established by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act Amendments (CAAA). In addition to the NAAQS, an exemption in the CAAA allows the California Air Resources Board (CARB) to apply its own air quality regulations referred to as California Ambient Air Quality Standards CAAQS) provided that state standards protect public health and welfare at least as strictly as federal law and are necessary to meet compelling and extraordinary circumstances. CARB maintains a list of the NAAQS and CAAQS on their website at: <https://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm>

Under the CAAA, areas not in compliance with a criteria pollutant standard can be declared *nonattainment* areas by USEPA or the appropriate state or local agency. In order to reach *attainment*, NAAQS may not be exceeded more than once per year. A *nonattainment* area can reach *attainment* when NAAQS have been met for a period of 10 consecutive years. During this time period, the area is in *transitional attainment*, also termed *maintenance*.

Hazard removal treatments under the Proposed Action has the potential to occur in 38 counties throughout California. Of these 38 counties, 17 are in attainment for all criteria pollutants. and all counties within the action area are in attainment for the lead (Pb), Nitrogen Dioxide (NO₂), and Sulfur Dioxide (SO₂). Detailed information about the nonattainment or maintenance designations for the remaining counties is contained in the EPA's Green Book, available online at: <https://www.epa.gov/green-book>

Federal projects, including projects authorized by the federal government and conducted by third parties, must conform to CAAA requirements if they may constitute a significant new source of air pollution. In nonattainment or maintenance areas, this means conducting a conformity determination unless direct or indirect emissions will not exceed de minimis levels. The EPA has published their de minimis tables online at: <https://www.epa.gov/general-conformity/de-minimis-tables>

Effects from Manual and Mechanical Treatments. The use of hand-held equipment, as well as driving on unpaved roads to and from the treatment site, would generate small amounts of

particulate matter (PM). Power equipment and machinery exhaust would emit carbon monoxide (CO), SO₂, NO₂, volatile organic compounds (VOCs), and other trace amounts of air pollutants. However, based on conservative air emissions factors developed by the South Coast Air Quality Management District (SCAQMD) (available at: <http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/off-road-mobile-source-emission-factors>), the mechanical equipment used in these treatments would need to be in operation for thousands of hours before *de minimis* thresholds would be exceeded. Given the small scale and localized nature of most hazard removal treatments, it is extremely unlikely that manual or mechanical treatments would approach these thresholds.

Effects from Prescribed Fire Treatments. The most predominant atmospheric effect of prescribed fire is smoke. In addition to affecting the visual characteristics of an area, smoke can also affect the health of humans, plants, and wildlife that come into contact with smoke. The total volume of smoke produced from a prescribed fire depends primarily on the amount of fuel consumed and the temperature of the burn. Factors influencing smoke production include fuel type, fire behavior, fuel moisture, particle size, particle arrangement, and fuel weight per unit area. Carbon dioxide (CO₂) and water vapor make up the majority of emissions (approximately 90 percent) from prescribed fire. However, smaller quantities of CO, PM₁₀, PM_{2.5}, and VOCs are also produced (Battye & Battye 2002). Combustion of woody debris greater than 3 inches in diameter can produce approximately 190 pounds of CO for every 2,200 pounds of fuel (Battye & Battye 2002). Consequently, over 2.3 million pounds of fuel would be required for a prescribed burn to have the potential to exceed *de minimis* thresholds for CO. Similarly, combustion of woody debris greater than 3 inches in diameter would produce 35 pounds of PM_{2.5} for every 2,200 pounds of fuel. Consequently, over 8.8 million pounds of fuel would be required to exceed *de minimis* thresholds for PM_{2.5}, even in a serious nonattainment area. Given the small scale and localized nature of most hazard removal treatments, it is extremely unlikely that hazard removal treatments would consume this amount of fuel.

Based on the approximations above, criteria pollutant emissions associated with the Proposed Action would be substantially below *de minimis* thresholds. While the use of heavy equipment (e.g., tree cutters, skidders, cable yarders, haul trucks, etc.) would result in the emission of criteria pollutants, impacts to air quality were not analyzed in further detail due to the dispersed nature of the Proposed Action and incorporation of PDFs requiring compliance with air quality standards, regulations, policies, and guidelines specified by the CAAA, the California Clean Air Act, the CARB, regional Air Quality Management Districts (AQMD) / Air Pollution Control Districts (APCDs), municipal air pollution requirements and BLM Handbooks. Additionally, PDF AQ-2 would require use of a BLM-approved Prescribed Fire Plan prior to ignition of any prescribed fire. Under this PDF, air emissions would be managed by timing and atmospheric dispersal per the approved Prescribed Fire Plan, which would be reviewed and approved by NPS, USFS, and/or BLM managers, to ensure no adverse impact on Class I air quality areas. Finally, PDF AQ-4 ensures that the BLM and its collaborators will adhere to fuel standards for diesel fuel emissions established by the CARB, AQMDs, and APCDs for all on-road and off-road vehicles and

equipment involved in projects. Implementation of PDFs AQ-1 through AQ-4 would reduce impacts to less than significant levels.

Greenhouse Gas Emissions. Under the Proposed Action, use of heavy equipment for treatment activities (e.g., tree cutters, skidders, cable yarders, haul truck, etc.) would result in greenhouse gas emissions (GHG) (i.e., carbon dioxide [CO₂]). Additionally, the use of prescribed fire would also result in the release of GHGs. Overall, with the implementation of appropriate treatments, it is expected that there would be a long-term reduction of potential GHG emissions through the avoidance of large wildfires and the overall improvement forest health, resulting in the continued sequestration of carbon in live, healthy trees.

Site-specific prescriptions will incorporate input from adjacent landowners, local residents, and State agencies with regard to alleviating or mitigating symptoms of climate change. Since these treatments are only within 200 feet of critical infrastructure and maintain the existing vegetative species diversity, the only climate change adaptation that is feasible is to maintain forest health and resiliency to disturbances

D.2 Lands/Realty

The general area for implementation of projects under this pEA covers lands managed by the BLM in the NorCal and CenCal Districts. Specifically, this pEA analyzes these activities within 200 feet of critical infrastructure (e.g., roads, private property, recreation areas, energy/water infrastructure, etc.). Lands within the project area include a “checker board” of federal, state, county, and private ownerships, as well as larger contiguous blocks of BLM-managed public lands, totaling approximately 551,000 acres under the administration of the BLM.

The BLM’s Lands/Realty Program manages a wide range of public land transactions, such as purchases and acquisitions, sales and exchanges, withdrawals, leases and permits, and ROW authorizations. ROWs are granted on a non-exclusive basis and include standard terms and conditions requiring the holder to comply with federal, state and local laws, including those for the protection of sensitive resources. Implementation of the Proposed Action may temporarily interfere with a ROW holder’s ability to access their valid, existing right. However, interruptions would be temporary. Further, with the incorporation of PDF LR-1 through LR-10, treatments would be coordinated with ROW holders. No transfers, conversions, or modifications of existing ROWs or land use authorizations or changes to acquired lands are proposed under the pEA.

Implementation of the Proposed Action would also have the potential to result in damage to private property, or injury or death to the public due to felling and removing hazard vegetation adjacent to critical infrastructure. However, PDFs SAFE-1 through SAFE-5 requiring the implementation of all appropriate safety measures (e.g., signs, road guards, protecting improvements, and fire safety measures) to reduce the level of potential impacts to less than significant. Therefore, impacts to Lands/Realty were considered but not being carried forward for detailed analysis in the pEA.

PDFs relevant to lands/realty are listed below.

General: GEN-1

Lands and Realty: LR-1 through LR-11

Safety: SAFE-1 through SAFE-5

D.3 Special Designations

Specially designated areas include a variety of types of areas that have received recognition or designation because they possess unique or important resource values. Relevant examples of BLM-managed specially designated areas include components of the BLM National Landscape Conservation System (NLCS) and areas of critical environmental concern (ACECs). NLCS lands include National Monuments, National Conservation Areas, Wild and Scenic Rivers (WSRs) and Forest Reserves. These areas may have been designated by Presidential Proclamation, an Act of Congress, or by the BLM through its land use planning process.

Area of Critical Environmental Concern (ACEC)

An Area of Critical Environmental Concern is defined in the Federal Land Policy and Management Act (FLPMA) (Public Law 94-579, Section 103[a]) as an area on BLM-managed lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, geologic, paleontological, or scenic values, to fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.

National Conservation Area (NCA)

BLM Manual 6220-*National Monuments, National Conservation Areas, and Similar Designations* defines a National Conservation Area (NCA) as an area designated by Congress, generally, to conserve, protect, enhance, and properly manage the resources and values for which it was designated for the benefit and enjoyment of present and future generations.

National Monument (NM)

BLM Manual 6220-*National Monuments, National Conservation Areas, and Similar Designations* defines a National Monument (NM) as an area designated by the president of the United States by proclamation pursuant to the Antiquities Act of 1906 for the protection of objects of historical or scientific interest, or by Congress for the conservation, protection, restoration, or enhancement of the resources, objects, and values for which it was designated.

Forest Reserve

BLM Manual 6220-*National Monuments, National Conservation Areas, and Similar Designations* defines a Forest Reserve. Area designated by Congress to conserve and study the land, fish, wildlife, and forests occurring on such land, which providing public recreation and other management needs. The BLM currently manages one forest reserve: Headwaters, California.

Wild and Scenic Rivers (WSR)

The National Wild and Scenic Rivers System was created by Congress in 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Act is notable for safeguarding the special character of these rivers, while also recognizing the potential for their appropriate use and development.

Designated segments need not include the entire river and may include tributaries. For federally administered rivers, the designated boundaries generally average one-quarter mile on either bank in the lower 48 states.

Rivers are classified as wild, scenic, or recreational.

- Wild River Areas – Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- Scenic River Areas – Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- Recreational River Areas – Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Table D-3 (provided at the end of this appendix) lists the special designations that contain forest and woodland types that overlap with the project area, the amount of overlap, the reason for their designation and existing management prescriptions relevant to the proposed actions. Within these areas, however, hazard removal and vegetation management would be limited to within 200 feet of critical infrastructure with no more than 20 percent of any particular watershed treated over a 10-year period. The acres potentially treated within a special designation would vary significantly because the amount of forest and woodland habitat and amount of critical infrastructure varies from area to area.

Projects implemented in special designations will be subject to the protections contained in the applicable laws, regulation, and Resource Management Plans. For example, projects within a National Monument must be consistent with the Presidential Proclamation establishing the monument and any protections developed in the RMP. Analysis of impacts to biological, cultural and recreational resources within these areas are discussed in Section 4 of this pEA. Impacts to Special Designations were considered but not analyzed in further detail because the removal of hazards or thinning trees near infrastructure would not alter the values of any designation. If, through preparation of a DNA, the BLM determines that a proposed project will impact the values of a Special Designation beyond the impacts analyzed in this EA, it will prepare additional NEPA analysis before implementing the project. Implementation of PDFs G-1 through G-4 would reduce impacts to less than significant levels.

D.4 Travel Management

Travel management is a comprehensive approach to the administration of travel and transportation networks of roads, primitive routes, trails and areas for both motorized and non-motorized uses. Travel management planning includes the inventory and mapping, route designations, and other measures necessary for providing access to and across public lands for a variety of uses. Many BLM offices have already completed Transportation Management Plans that classify public lands as either closed, limited, or open for motorized vehicle use. The “limited” category is further broken down as being limited either “to existing roads and trails” or “to designated roads and trails.” Many of these plans also address whether, and under what conditions, commercial or competitive vehicle events are allowed.

Travel Management was considered but not analyzed in further detail because no new permanent roads or trails are proposed. Only expansion of existing roads or trails or temporary roads would be constructed, if needed. Impacts to access and existing travel management routes would be similar to impacts to Recreation, which is fully analyzed in Section 4.10. In addition, changes to existing Travel Management Plans or development of new Travel Management Plans for areas where one does not exist is beyond the scope of this analysis.

D.5 Visual Resources

Through its visual resource management (VRM) classification, the BLM ensures that the scenic values of public lands are considered before authorizing uses that may result in adverse visual impacts. The visual resources and aesthetics information classes below provide a baseline for analyzing potential impacts of the Proposed Actions.

Management objectives for the VRM classifications:

- Class I Objective: “To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.”
- Class II Objective: “To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.”
- Class III Objective: “To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.”
- Class IV Objective: “To provide for management activities, which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.”

VRM classes and their associated resource management objectives apply to all BLM-managed lands. For this pEA, VRM Class I lands (e.g. Wilderness) and Wilderness Study Areas are excluded from the action area. In addition, it was assumed that future treatments will occur primarily on VRM Class III and Class IV lands due to the existing built environment associated with critical infrastructure.

Impacts to Visual Resources were considered but not analyzed in further detail because the effects of treatments on visual resources would be temporary and would only last until the reestablishment of vegetation on the treatment site, typically one or two growing seasons. In addition, contrast ratings (BLM 1986) would be conducted prior to implementation to indicate the degree of contrast between the proposed project and the characteristic landscape; and to determine if additional measures are required (either to meet the VRM Class or, if met, to prevent unnecessary or undue degradation) beyond the design features included in the pEA. PDFs (Appendix B) would incorporate visual design considerations as a reasonable attempt to meet the Visual Resource Management (VRM) class objectives for the area and minimize the visual impacts of the project.

PDFs relevant to visual resources are listed below.

General: GEN-2

Visual Resource Management: VRM-1 through VRM-8

D.6 Water Resources

Water resources across central and northern California within the project area for the Proposed Action vary widely, from smaller streams and vernal pools to larger rivers and lakes. In northern California within the project area, major lakes include Clear Lake, Goose, Clair Engle, Shasta, and Honey Lakes. Major rivers in the northern part of the project area include the Klamath, Trinity, Pit, Sacramento, Eel, Russian, and Feather Rivers. In central California within the project area, major lakes include Buena Vista. Major rivers in central California include Mokelumne, Stanislaus, Merced, Owens, San Joaquin, San Luiz, Salinas, Kings, and Kern Rivers. Wetlands occurring throughout the project area are typically associated with shorelines of lakes, oceans, and rivers, and include estuarine & marine wetlands, with mostly freshwater emergent wetlands not adjacent to forest and woodlands and smaller patches of freshwater forested/shrub wetland (USFWS 2018aa).

As discussed in Section 2.2.1 of the pEA, critical infrastructure for this project includes roads, energy infrastructure, recreation areas, water facilities, historic features, and private property. The treatment acres for these areas vary significantly at the watershed level, because the relative number of critical infrastructure features varies greatly. Impacts to water resources may vary depending on the method of vegetation management and/or hazard removal employed. However, potential impacts from the Proposed Action have been avoided, minimized, and mitigated through the establishment of PDFs for this project (Appendix B).

While the entire project area encompasses 551,000 acres across 336 HUC-10 watersheds, the maximum treatment acres within a single watershed could range from less than an acre to up to 8,500 acres over the course of the entire program. Typically, annual treatment acres would range from 2,500 to 20,000 acres. There are only 10 watersheds where the maximum potential treatment area is 5% or more of the watershed. The vast majority of watersheds have a maximum potential treatment area less than 2% of the watershed. Due to the scale of the Project Area, the number of years required to implement, and the total number of HUC-10 watersheds included, the scale of individual treatments areas are small facets of these watersheds.

The No Action alternative is not anticipated to impact water resources. Individual trees falling over are unlikely to cause a measurable change within a watershed. For example, a dead tree falling over and disturbing a streambank or introducing woody debris into a stream is unlikely to change stream hydrology or impact water temperature. Hazard tree removal occurring under the No Action alternative is likely to cause only localized impacts, and is not likely to be large enough or frequent enough within a particular watershed to impact characteristics of water resources present there.

For both the No Action and the Proposed Action Alternatives, groundwater and floodplains will not be impacted. The methods of hazard removal in the No Action alternative are not the type that would impact groundwater or floodplains. The methods of hazard removal and vegetation management in the Proposed Action are not the type of disturbances that would create conditions impactful to groundwater, and no changes in impervious surfaces or construction are proposed meaning no impacts to floodplains will occur.

Under the Proposed Action, only streams have the potential to be affected by the Proposed Action, as this is the critical infrastructure type which often intersects with them. The Proposed Action would have no impacts to drinking water or groundwater. No work would occur in wetlands, vernal pools, or in streams, and these water resources would therefore not be affected due to the implementation of PDFs and/or the project's design. There would be no culvert replacements.

Under the Proposed Action, potential impacts from sedimentation and riparian zones are discussed elsewhere in this document. Issues of sedimentation are analyzed with Soils (Compaction, Erosion and Sedimentation) and streams with sediment as the cause of 303d listing are summarized in Section 3.4.4 of the pEA. Riparian zones are analyzed with Vegetation and Native Plants in Section 4.4.2 of the pEA.

Potential impacts to streams that would be mitigated by PDFs include: changes to riparian cover (to include thermal characteristics and nutrient inputs from litter); pollutants in water (e.g. oil or gasoline from mechanized equipment); and changes in floodplain characteristics. Of all the critical infrastructure features, it is most likely that roads would have the most impact on streams. Intersections of roads and streams is the area of greatest risk for negative impacts. However, no new roads are planned under the Proposed Action – the only roads that will be added to existing critical infrastructure are temporary ones. Any mechanized thinning or vegetation removal must occur 50 feet from ephemeral or intermittent streams and 150 feet from perennial streams (ME-1213). Thinning in riparian areas occurring by hand must be only for non-riparian tree species less than 7 inches in diameter. Trees cut in this way must be piled at least 50 feet from ephemeral and intermittent streams and 150 feet from perennial streams for future burning (ME-18).

The Proposed Action has several minor to insignificant indirect benefits to water resources. These include minor increases in instream flow or soil moisture due to reduced evapotranspiration once vegetation is removed, and reduction of the likelihood of stand-replacing fire with the removal of hazard trees and vegetation thinning.

Taken together, the potential impacts of each individual treatment under the Proposed Action is not expected to have a discernable impact on watersheds as a whole, especially when combined with the PDFs to minimize impacts to water resources.

All potential impacts to surface waters from the Proposed Action are indirect, and these are discussed under Vegetation and Soils in Chapter 3, mostly having to do with sedimentation and erosion. Water Resources were therefore considered but not analyzed in further detail because effects of both the No Action and Proposed Action alternatives will have no impact on water resources.

Prior to any implementation of the Proposed Action by Field Offices, the BLM will inventory the area proposed for treatment for sensitive water resources that will be avoided through design or mitigated through PDFs. For example, wetland and other sensitive water resources will be identified, flagged, and avoided during project implementation.

PDFs relevant to water resources are listed below.

General: GEN-1, GEN-2, GEN-3, GEN-4

Roads and Landings: RL-1, RL-2, RL-3, RL-4, RL-5, RL-7, RL-11, RL-14, RL-15

Hauling: H-2, H-4

Water Drafting: WD-1 through WD-14

Mechanized Equipment: ME-2, ME-3, ME-13, ME-14, ME-15, ME-16, ME-17, ME-18

Cable Yarding: CY-1, CY-2, CY-3, CY-4, CY-5

Fuels and Prescribed Fire: FIRE-1, FIRE-2, FIRE-3, FIRE-4, FIRE-8, FIRE-9, FIRE-10, FIRE-11, FIRE-12, FIRE-13, FIRE-14

Wildlife: WILD-1, WILD-2, WILD-3

Lands and Realty: LR-5

Hazardous Materials: HM-2, HM-3

Table D-3. Special Designations Data

Unit Name	Acres of Unit (BLM Only)	Acres of Overlap with Forest and Woodland (BLM Only)	Resources for which the unit was designated/managed for (i.e. objects of the monument, relevant and important criteria for ACECs, outstandingly remarkable values for Wild and Scenic Rivers, etc.)	Special Management
h Valley	1,091	102	Botanical	
migrant Trails	1,667	49	Historical	
ount Dome	1,510	103	Botanical	
ountain Peaks	3,760	370	Botanical	
d Growth Juniper	3,046	12	Botanical	
ankee Jim	1,708	89	Cultural	
tte Creek	2,308	2,239	Threatened and Endangered Species habitat	LSR (NWFP ROD, C-9)
der Creek	4,144	152	Botanical	LSR (NWFP ROD, C-9)
lham Buttes	2,619	2,597	Botanical	LSR (NWFP ROD, C-9)
qua Buttes	1,110	1,108	Botanical	LSR (NWFP ROD, C-9)
cks Creek	7,377	7,290	Watershed, Old-growth Forests	LSR (NWFP ROD, C-9)
anila Dunes	134	31	Protection and Interpretation of Natural Values	
uth Fork Eel River	7,098	99	Watershed protection	Spotted Owl seasonal res
ue Ridge	3,181	1,042	Threatened and Endangered Species habitat	
rus Canyon	3,761	91	Botanical	
skine Creek	3,019	36	Geologic formations, botanical	
opper Mountain	2,029	198	Threatened and Endangered Species habitat	
aweah	26,878	9,031	Botanical, cultural resources	
ate Cypress	2,308	253	Botanical	
ornetta	884	99	Threatened and Endangered Species habitat	OJ-VEG-1 page 2-3 CCI native vegetation. OJ-VE integrity of native vegeta result of human activities CCNM RMP: Tiered ada
ngle Lake Basin	30,403	5,598	Cultural, historic, fish and wildlife resources, and scenic	ELFO RMP: 2.12.5.2. T be impacted by vegetatio Bullet point # 2 of the R
san River	2,344	1,701	Historic, biological, geological values, fish, wildlife, and scenic	ELFO RMP: 2.12.5.3. T be impacted by vegetatio Bullet point # 3 of the R
illow Creek	2,152	26	Cultural, historic, biological, geological, fish, wildlife, and scenic	ELFO RMP: 2.12.5.4. T be impacted by vegetatio Bullet point # 4 of the R
noche/Coalinga	44,873	689	Threatened and Endangered Species habitat, cultural and paleontological	
ear Creek Serpentine	30,208	4,301	Serpentine soils	
aquin Rocks	7,301	879	Special status species habitat (including Threatened and Endangered species habitat), cultural	

Table D-3. Special Designations Data

Unit Name	Acres of Unit (BLM Only)	Acres of Overlap with Forest and Woodland (BLM Only)	Resources for which the unit was designated/managed for (i.e. objects of the monument, relevant and important criteria for ACECs, outstandingly remarkable values for Wild and Scenic Rivers, etc.)	Special Management
Attolle Beach	632	136	Threatened and Endangered Species habitat	Spotted owl seasonal res
Bill Creek	105	81	Old-growth forest	LSR (NWFP ROD, C-9
Blacker Cypress	139	59	Botanical	
Clear Creek/Sacramento River Island	91	80	Botanical	
Clear Creek	563	79	Wildlife, fisheries, cultural	
Clears of Butte Creek	2,874	2,591	Cultural	
Conny Creek	269	102	Wildlife, Threatened and Endangered Species habitat	
Crocker-Hughes/Sacramento River/Bend	18,396	7,920	Botanical	
Crocker-Hughes and Klamath Rivers	1,208	346	Riparian, fisheries	
Crocker-Hughes Drive	468	458	Cultural	
Crocker-Hughes Serpentine	5,750	1,298	Biological	
Crocker-Hughes River	1,788	139	Biological	
Crocker-Hughes Flat	742	519	Biological	
Crocker-Hughes Flat/Indian Hill	317	253	Paleontological	
Crocker-Hughes Manzanita	273	165	Geologic features, botanical	
Crocker-Hughes Tertiary Oxisol Soil	92	14	Geologic features	
Crocker-Hughes Salamander	2,179	843	Wildlife	
Crocker-Hughes River	3,523	1,111	Riparian	
Crocker-Hughes Manzanita	131	119	Botanical	
Crocker-Hughes North Fork Cosumnes	1135	499	Natural, scenic	
Crocker-Hughes Hill	3,271	994	Biological, Threatened and Endangered Species habitat	
Crocker-Hughes Hills	9,855	4,327	Botanical	
Crocker-Hughes Pond	54	47	Threatened and Endangered Species habitat	
Crocker-Hughes Forest	241	237	Biological resources	
Crocker-Hughes Creek Corridor	9,398	1,719	Riparian, dispersed recreation, cultural	
Crocker-Hughes Roughs	6,254	5	Botanical	
Crocker-Hughes Dars	1,553	998	Biological, scenic	
Crocker-Hughes Valley	3,451	444	Botanical	
Crocker-Hughes Noxville	4,250	664	Cultural, biological	

Table D-3. Special Designations Data

Unit Name	Acres of Unit (BLM Only)	Acres of Overlap with Forest and Woodland (BLM Only)	Resources for which the unit was designated/managed for (i.e. objects of the monument, relevant and important criteria for ACECs, outstandingly remarkable values for Wild and Scenic Rivers, etc.)	Special Management
Northern California Chaparral	10,477	16	Botanical	
Coronetta	882	99	Biological - T & E	OJ-VEG-1 page 2-3 CCNM native vegetation. OJ-VEG-1 integrity of native vegetation result of human activities. CCNM RMP: Tiered adaptive
Headwaters Forest Reserve	7,472	7,447	Marbled Murrelets, Northern Spotted Owls, Old Growth Redwood Forests	No cutting in old-growth. Given the public sentiment allowing for local public
California Coastal National Monument	449	63	Visual, botanical, cultural, biological	See AU-VEG-1 in CCNM
Cascade-Siskiyou National Monument	5,302	1,361	Cultural and historic, geological, botanical, wildlife	
Serranosa Snow Mountain National Monument	133,590	15,763	Cultural and historic, geological, botanical, wildlife	
California Coastal National Monument	1,653	173	Visual, botanical, cultural, biological	See AU-VEG-1 in CCNM
King Range National Conservation Area	13,318	14,302	Recreation, wildlife, watersheds, sustainable use	
Wild and Scenic River	4,917	14	Fish, recreation	
Unity River	5,911	5,071	Fish	
Perched Wild and Scenic River	3,807	1,123	Cultural and historic, geological, vegetation, recreation, wildlife	
North Fork American Wild and Scenic River	3,924	3,201	Cultural, fish and wildlife, scenic, recreation, vegetation	
Columnne River	313	115	Cultural and historic, geological, recreation, fish and wildlife	

APPENDIX E - BIOLOGICAL TABLES

Table E-1. Federally-Listed Wildlife and Plant Species and Critical Habitat Present in the Action Area with a No Effect ESA Determination

Federally Listed Wildlife & Critical Habitat	Scientific Name	Effect Determination	Federal Status	Rationale for Effect Determination
Wildlife				
Blunt-nosed leopard lizard	<i>Gambelia sila</i>	NE	FE	outside of project area
Oregon spotted frog	<i>Rana pretiosa</i>	NE	FT	outside of project area
Southern mountain yellow-legged frog	<i>Rana muscosa</i>	NE	FE	outside of project area
Yosemite toad	<i>Anaxyrus canorus</i>	NE	FT	no BLM land
Lost River sucker	<i>Deltistes luxatus</i>	NE	FE	More than 1 mile from BLM land
Shortnose sucker	<i>Chasmistes brevirostris</i>	NE	FE	More than 1 mile from BLM land
California freshwater shrimp	<i>Syncaris pacifica</i>	NE	FE	outside of project area
Carson wandering skipper	<i>Pseudocopa eodes eunus obscurus</i>	NE	FE	outside of project area
Kern primrose sphinx moth	<i>Euproserpinus euterpe</i>	NE	FT	outside of project area
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	NE	FT	outside of project area
Vernal pool tadpole shrimp	<i>Lepidurus packardii</i>	NE	FE	outside of project area
Giant kangaroo rat	<i>Dipodomys ingens</i>	NE	FE	outside of project area
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	NE	FE	outside of project area
Wolverine	<i>Gulo gulo luscus</i>	NE	PT	no BLM land
Vernal pool fairy shrimp - critical habitat	<i>Branchinecta lynchi</i>	NE	FT	outside of project area
Vernal pool tadpole shrimp - critical habitat	<i>Lepidurus packardii</i>	NE	FE	outside of project area
Plants				
Beach layia	<i>Layia carnosa</i>	NE	FE	outside of project area
Calistoga popcornflower	<i>Plagiobothrys strictus</i>	NE	FE	outside of project area
Ione buckwheat	<i>Eriogonum apricum</i>	NE	FE	outside treatment areas
Ione manzanita	<i>Arctostaphylos myrtifolia</i>	NE	FT	outside treatment areas
McDonald's rockcress	<i>Arabis macdonaldiana</i>	NE	FE	outside of project area
Slender Orcutt grass	<i>Orcuttia inaequalis</i>	NE	FT	outside of project area
Succulent owl's-clover	<i>Castilleja campestris</i> ssp. <i>succulent</i>	NE	FT	outside of project area
Western lily	<i>Lilium occidentale</i>	NE	FE	Not on BLM land
Yreka phlox	<i>Phlox hirsute</i>	NE	FE	Not on BLM land
Fleshy owl's-clover - critical habitat	<i>Castilleja campestris</i> ssp. <i>succulent</i>	NE	FT	outside of project area
Hoover's spurge - critical habitat	<i>Chamaesyce hooveri</i>	NE	FT	outside of project area
San Joaquin Orcutt grass - critical habitat	<i>Orcuttia inaequalis</i>	NE	FT	outside of project area
Slender Orcutt grass - critical habitat	<i>Orcuttia tenuis</i>	NE	FT	outside of project area

Sources: CDFW 2018 and USFWS species profiles.

NE: No effect, FE: Federally endangered, FT: Federally threatened

Table E-2. Federally-Listed Wildlife Species and Critical Habitat Present in the Action Area with a Not Likely to Adversely Affect ESA Determination

Common Name	Scientific Name	Effect Determination	Federal Status	Critical Habitat	Rationale for Effect Determination
Herptiles					
California red-legged frog	<i>Rana draytonii</i>	NLAA	FT	Yes	PDFs will avoid and minimize impacts to NLAA
Birds					
California condor	<i>Gymnogyps californianus</i>	NLAA	FE	Yes	PDFs will avoid and minimize impacts to NLAA
Least Bell's vireo	<i>Vireo bellii pusillus</i>	NLAA	FE	No	PDFs will avoid and minimize impacts to NLAA
Marbled murrelet	<i>Brachyramphus marmoratus</i>	NLAA	FT	Yes	PDFs will avoid and minimize impacts to NLAA
Northern spotted owl	<i>Strix occidentaliscaurina</i>	NLAA	FT	Yes	PDFs will avoid and minimize impacts to NLAA
Southwestern willowflycatcher	<i>Empidonax trailliiextimus</i>	NLAA	FE	Yes	PDFs will avoid and minimize impacts to NLAA
Western yellow-billed cuckoo	<i>Coccyzus americanus</i>	NLAA	FT	Yes	PDFs will avoid and minimize impacts to NLAA
Invertebrates					
Shasta crayfish	<i>Pacifastacus fortis</i>	NLAA	FE	No	PDFs will avoid and minimize impacts to NLAA
Valley elderberry longhorn beetle	<i>Desmocerus californicusdimorphus</i>	NLAA	FT	No	PDFs will avoid and minimize impacts to NLAA
Fish					
Chinook salmon - Central Valley spring-run ESU	<i>Oncorhynchus tshawytscha</i>	NLAA	FT	Yes	PDFs will avoid and minimize impacts to NLAA
Chinook salmon - Sacramento River winter-run ESU		NLAA	FE	Yes	PDFs will avoid and minimize impacts to NLAA
Chinook salmon - California Coastal ESU		NLAA	FT	Yes	PDFs will avoid and minimize impacts to NLAA
Coho salmon - southern Oregon/northern California ESU	<i>Oncorhynchus kisutch</i>	NLAA	FT	Yes	PDFs will avoid and minimize impacts to NLAA
Coho salmon - Central California Coastal ESU		NLAA	FE	Yes	PDFs will avoid and minimize impacts to NLAA
Steelhead - Central Valley DPS	<i>Oncorhynchus mykiss</i>	NLAA	FT	Yes	PDFs will avoid and minimize impacts to NLAA
Steelhead - northern California DPS		NLAA	FT	Yes	PDFs will avoid and minimize impacts to NLAA
Steelhead - south central California DPS		NLAA	FT	Yes	PDFs will avoid and minimize impacts to NLAA
Steelhead - central California Coastal DPS		NLAA	FT	Yes	PDFs will avoid and minimize impacts to NLAA
Mammals					
Gray wolf	<i>Canis lupus</i>	NLAA	FE	No	PDFs will avoid and minimize impacts to NLAA

Sources: CDFW 2018 and USFWS species profiles.

NLAA: May affect, not likely to adversely affect, FE: Federally endangered, FT: Federally threatened

Table E-3. Federally-Listed Plant Species Present in the Action Area with a Not Likely to Adversely Affect ESA Determination

Common Name	Scientific Name	ESA Effect Determination	Federal Status	Rationale for ESA Effect Determination
El Dorado bedstraw	<i>Galium californicum</i> ssp. <i>sierrae</i>	NLAA	FE	PDFs will avoid and minimize impacts to NLAA
Gentner's fritillary	<i>Fritillaria gentneri</i> ,	NLAA	FE	PDFs will avoid and minimize impacts to NLAA
Layne's butterweed	<i>Senecio layneae</i>	NLAA	FT	PDFs will avoid and minimize impacts to NLAA
Pine Hill ceanothus	<i>Ceanothus roderickii</i>	NLAA	FE	PDFs will avoid and minimize impacts to NLAA
Pine Hill flannelbush	<i>Fremontodendron californicum</i> ssp. <i>decumbens</i>	NLAA	FE	PDFs will avoid and minimize impacts to NLAA
Red Hills vervain	<i>Verbena californica</i>	NLAA	FT	PDFs will avoid and minimize impacts to NLAA
San Benito evening-primrose	<i>Camissonia benitensis</i>	NLAA	FT	PDFs will avoid and minimize impacts to NLAA
San Joaquin adobe sunburst	<i>Pseudobahia peirsoni</i>	NLAA	FT	PDFs will avoid and minimize impacts to NLAA
San Joaquin woollythreads	<i>Monolopia congdonii</i>	NLAA	FE	PDFs will avoid and minimize impacts to NLAA
Springville clarkia	<i>Clarkia springvillensis</i>	NLAA	FT	PDFs will avoid and minimize impacts to NLAA
Stebbins' morning-glory	<i>Calystegia stebbinsii</i>	NLAA	FE	PDFs will avoid and minimize impacts to NLAA

Sources: CDFW 2018 and USFWS species profiles.

NLAA: May affect, not likely to adversely affect, FE: Federally endangered, FT: Federally threatened

Table E-4. List of BLM Sensitive Wildlife Species in Project Area (not including federally listed species in other tables)

Common Name	Scientific Name	California Status	Project Area Acres
Amphibians			
California Giant Salamander	<i>Dicamptodon ensatus</i>	CDFW SSC	65
Foothill yellow-legged frog	<i>Rana boylei</i>	SC, CDFW SSC, BLM	9,625
Kern Canyon slender salamander	<i>Batrachoseps simatus</i>	T	6
Limestone salamander	<i>Hydromantes brunus</i>	T, BLM	58,669
Pacific tailed frog	<i>Ascaphus truei</i>	CDFW SSC	1,851
Red-bellied newt	<i>Taricha rivularis</i>	CDFW SSC	793
Relictual slender salamander	<i>Batrachoseps relictus</i>	CDFW SSC	2,953
Shasta salamander	<i>Hydromantes shastae</i>	T, BLM	125
Southern torrent salamander	<i>Rhyacotriton variegatus</i>	CDFW SSC	2,365
Tehachapi slender salamander	<i>Batrachoseps stebbinsi</i>	T, BLM	213
Western spadefoot toad	<i>Spea hammondi</i>	CDFW SSC, BLM	N/A
Yellow-blotched salamander	<i>Ensatina eschscholtzii croceator</i>	CDFW WL, BLM	N/A
Reptiles			
California mountain kingsnake	<i>Lampropeltis zonata</i>	BLM	N/A
Coast horned lizard	<i>Phrynosoma blainvillii</i>	CDFW SSC	98
Northern California legless lizard	<i>Anniella pulchra</i>	CDFW SSC	378
Southern Sierra legless lizard	<i>Anniella campi</i>	CDFW SSC	277
Southwestern pond turtle	<i>Actinemys marmorata pallida</i>	BLM	N/A
Two-striped gartersnake	<i>Thamnophis hammondi</i>	CDFW SSC	53
Western pond turtle	<i>Emys marmorata</i>	CDFW SSC	1,967
Fish			
Clear lake hitch	<i>Lavinia exilicauda chi</i>	T, BLM	N/A
Pacific lamprey	<i>Entosphenus tridentatus</i>	CDFW SSC, BLM	22
Red Hills roach	<i>Lavinia symmetricus</i> subsp. 3	CDFW SSC, BLM	82
Rough sculpin	<i>Cottus asperimus</i>	T, BLM	N/A
San Joaquin roach	<i>Lavinia symmetricus</i> subsp. 1	CDFW SSC	18
Bats			
Fringed myotis	<i>Myotis thysanodes</i>	BLM	N/A
Long-eared myotis	<i>Myotis evotis</i>	BLM	N/A
Pallid bat	<i>Antrozous pallidus</i>	CDFW SSC, BLM	1,399
Small-footed myotis	<i>Myotis ciliolabrum</i>	BLM	N/A

Table E-4. List of BLM Sensitive Wildlife Species in Project Area (Continued)

Common Name	Scientific Name	California Status	Project Area Acres
Spotted bat	<i>Euderma maculatum</i>	CDFW SSC, BLM	60
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	CDFW SSC, BLM	6,940
Western mastiff bat	<i>Eumops perotis californicus</i>	CDFW SSC, BLM	280
Western red bat	<i>Lasiurus blossevillii</i>	CDFW SSC	1
Yuma myotis	<i>Myotis yumanensis</i>	BLM	N/A
Predators			
American badger	<i>Taxidea taxus</i>	CDFW SSC	698
Fisher (West Coast DPS)	<i>Pekania pennanti</i>	CDFW SSC, BLM	6,406
Humboldt marten	<i>Martes caurina humboldtensis</i>	CDFW SSC	2,870
Mountain lion	<i>Puma concolor</i>	CDFW FP	N/A
Sierra Nevada red fox	<i>Vulpes vulpes necator</i>	CDFW T	3,146
Small Mammals			
Big-eared kangaroo rat	<i>Dipodomys venustus elephantinus</i>	CDFW SSC	240
Nelson's antelope squirrel	<i>Ammospermophilus nelsoni</i>	T, BLM	74
Oregon snowshoe hare	<i>Lepus americanus klamathensis</i>	CDFW SSC	2,700
Pygmy rabbit	<i>Brachylagus idahoensis</i>	CDFW SSC, BLM	77
San Joaquin pocket mouse	<i>Perognathus inornatus</i>	BLM	N/A
Sierra Nevada mountain beaver	<i>Aplodontia rufa californica</i>	CDFW SSC	547
Sonoma tree vole	<i>Arborimus pomo</i>	CDFW SSC	1,484
Tulare grasshopper mouse	<i>Onychomys torridus tularensis</i>	CDFW SSC, BLM	12
Western white-tailed jackrabbit	<i>Lepus townsendii townsendii</i>	CDFW SSC	9
Raptors			
Bald eagle	<i>Haliaeetus leucocephalus</i>	E, BGEPA, BLM	1,572
Burrowing owl	<i>Athene cucularia</i>	CDFW SSC, BLM	5
California spotted owl	<i>Strix occidentalis occidentalis</i>	CDFW SSC, BLM	N/A
Golden eagle	<i>Aquila chrysaetos</i>	CDFW FP, BGEPA, BLM	166
Great gray owl	<i>Strix nebulosa</i>	E	3,152
Northern goshawk	<i>Accipiter gentilis</i>	CDFW SSC, BLM	2,106
Swainson's hawk	<i>Buteo swainsoni</i>	CDFW SSC, BLM	68

Table E-4. List of BLM Sensitive Wildlife Species in Project Area (Continued)

Common Name	Scientific Name	California Status	Project Area Acres
<i>Migratory Birds</i>			
Bank swallow	<i>Riparia riparia</i>	T, BLM	2,696
Black swift	<i>Cypseloides niger</i>	CDFW SSC	48
California black rail	<i>Laterallus jamaicensis coturniculus</i>	T, BLM	1,078
Greater sandhill crane	<i>Grus canadensis tabida</i>	T, BLM	85
Purple martin	<i>Progne subis</i>	CDFW SSC	6
Tricolored blackbird	<i>Agelaius tricolor</i>	CE, BLM	137
Yellow rail	<i>Coturnicops noveboracensis</i>	CDFW SSC	23
Yellow warbler	<i>Setophaga petechia</i>	CDFW SSC	37
Yellow-breasted chat	<i>Icteria virens</i>	CDFW SSC	40
<i>Terrestrial Mollusks</i>			
Big Bar hesperian snail	<i>Vespericola pressleyi</i>	BLM	N/A
Hirsute Sierra sideband snail	<i>Monadenia mormonum hirsute</i>	BLM	N/A
Hooded lancetooth	<i>Ancotrema voyanum</i>	BLM	N/A
Keeled sideband snail	<i>Monadenia circumcarinata</i>	BLM	N/A
Siskiyou shoulderband snail	<i>Monadenia chaceana</i>	BLM	N/A
Tehama chaparral snail	<i>Trilobopsis tehamana</i>	BLM	N/A
Tuolumne sideband snail	<i>Monadenia tuolumneana</i>	BLM	N/A

Sources: CDFW 2018, BLM California Sensitive Species List.

Notes: California State Status: T = Threatened, E = Endangered, CE = Candidate Endangered, SC = State Candidate

CDFW: SSC = Species of Special Concern, WL = Watch List, FP = Fully protected, BLM = BLM sensitive species
 N/A indicates there is no data available in the CNDDDB geospatial dataset.

Table E-5. List of BLM Sensitive Plant Species in Project Area

Common Name	Scientific Name	CA Status	Rare Plant Rank	Project Area Acres
adobe-lily	<i>Fritillaria pluriflora</i>		1B.2	81
Ahart's buckwheat	<i>Eriogonum umbellatum</i> var. <i>ahartii</i>		1B.2	176
Ahart's paronychia	<i>Paronychia ahartii</i>		1B.1	47
alkali mariposa-lily	<i>Calochortus striatus</i>		1B.2	0
Ash Creek ivesia	<i>Ivesia paniculata</i>		1B.2	27
Ash Valley milk-vetch	<i>Astragalus anxius</i>		1B.3	33
Baja navarretia	<i>Navarretia peninsularis</i>		1B.2	15
Baker's navarretia	<i>Navarretia leucocephala</i> ssp. <i>bakeri</i>		1B.1	2
beaked clarkia	<i>Clarkia rostrata</i>		1B.3	84
beaked tracyina	<i>Tracyina rostrata</i>		1B.2	38
bent-flowered fiddleneck	<i>Amsinckia lunaris</i>		1B.2	185
big-scale balsamroot	<i>Balsamorhiza macrolepis</i>		1B.2	51
bluff wallflower	<i>Erysimum concinnum</i>		1B.2	129
blushing wild buckwheat	<i>Eriogonum ursinum</i> var. <i>erubescens</i>		1B.3	1
Boggs Lake hedge-hyssop	<i>Gratiola heterosepala</i>	E	1B.2	15
Bolander's horkelia	<i>Horkelia bolanderi</i>		1B.2	1,295
Butte County checkerbloom	<i>Sidalcea robusta</i>		1B.2	13
Butte County golden clover	<i>Trifolium jokerstii</i>		1B.2	0
calico monkeyflower	<i>Diplacus pictus</i>		1B.2	135
California alkali grass	<i>Puccinellia simplex</i>		1B.2	128
Calistoga ceanothus	<i>Ceanothus divergens</i>		1B.2	8
Callahan's mariposa-lily	<i>Calochortus syntrophus</i>		1B.1	0
Cantelow's lewisia	<i>Lewisia cantelovii</i>		1B.2	155
Canyon Creek stonecrop	<i>Sedum obtusatum</i> ssp. <i>paradisum</i>		1B.3	49
chaparral harebell	<i>Campanula exigua</i>		1B.2	6
chaparral sedge	<i>Carex xerophila</i>		1B.2	6
coast lily	<i>Lilium maritimum</i>		1B.1	12
Cobb Mountain lupine	<i>Lupinus sericatus</i>		1B.2	73
Colusa layia	<i>Layia septentironalis</i>		1B.2	354
Congdon's lomatium	<i>Lomatium congdonii</i>		1B.2	754
deep-scarred cryptantha	<i>Cryptantha excavata</i>		1B.1	4
delicate bluecup	<i>Githopsis tenella</i>		1B.3	47
Diablo Range hare-leaf	<i>Lagophylla diabolensis</i>		1B.2	451
dissected-leaved toothwort	<i>Cardamine pachystigma</i> var. <i>dissectifolia</i>		1B.2	10
drymaria-like western flax	<i>Hesperolinon drymarioides</i>		1B.2	31
dwarf soaproot	<i>Chlorogalum pomeridianum</i> var. <i>minus</i>		1B.2	16
early jewelflower	<i>Streptanthus vernalis</i>		1B.2	1

Table E-5. List of BLM Sensitive Plant Species in Project Area (Continued)

Common Name	Scientific Name	CA Status	Rare Plant Rank	Project Area Acres
El Dorado County mule ears	<i>Wyethia reticulata</i>		1B.2	67
ephemeral monkeyflower	<i>Erythranthe inflatula</i>		1B.2	8
Freed's jewelflower	<i>Streptanthus brachiatus</i> ssp. <i>hoffmanii</i>		1B.2	23
glandular western flax	<i>Hesperolinon adenophyllum</i>		1B.2	479
Greata's aster	<i>Symphotrichum greatae</i>		1B.3	1
green jewelflower	<i>Streptanthus hesperidis</i>		1B.2	228
Greene's mariposa-lily	<i>Calochortus greenei</i>		1B.2	135
Greene's narrow-leaved daisy	<i>Erigeron greenei</i>		1B.2	97
Greenhorn fritillary	<i>Fritillaria brandegeei</i>		1B.3	2
Hall's harmonia	<i>Harmonia hallii</i>		1B.2	59
Hall's rupertia	<i>Rupertia hallii</i>		1B.2	6
Hall's tarplant	<i>Deinandra halliana</i>		1B.1	12
Heckner's lewisia	<i>Lewisia cotyledon</i> var. <i>heckneri</i>		1B.2	65,952
Hernandez spineflower	<i>Chorizanthe bilboa</i> var. <i>immemora</i>		1B.2	12
Hoffman's bristly jewelflower	<i>Streptanthus glandulosus</i> ssp. <i>Hoffmanii</i>		1B.3	57
Howell's thelypodium	<i>Thelypodium howellii</i> ssp. <i>howellii</i>		1B.2	18
Indian Valley Brodiaea	<i>Brodiaea rosea</i>	E	1B.1	56
Indian Valley bush-mallow	<i>Malacothamnus aboriginum</i>		1B.2	16
Jepson's milk-vetch	<i>Astragalus rattanii</i> var. <i>jepsonianus</i>		1B.2	38
Jepson's onion	<i>Allium jepsonii</i>		1B.2	3
Kaweah monkeyflower	<i>Erythranthe norrisii</i>		1B.3	12
Keck's checkerbloom	<i>Sidalcea keckii</i>		1B.1	10
Kellog's buckwheat	<i>Eriogonum kelloggii</i>	E	1B.2	43
Kelso Creek monkeyflower	<i>Erythranthe shevockii</i>		1B.2	13
Kern River evening-primrose	<i>Camissonia integrifolia</i>		1B.3	10
Kings River buckwheat	<i>Eriogonum nudum</i> var. <i>regirivum</i>		1B.2	25
Koch's cord moss	<i>Entosthodon kochii</i>		1B.3	23
Konocti manzanita	<i>Arctostaphylos manzanita</i> ssp. <i>elegans</i>		1B.3	227
Kruckeberg's jewelflower	<i>Streptanthus morrisonii</i> ssp. <i>kruckebergii</i>		1B.2	33
Lassen paintbrush	<i>Castilleja lassenensis</i>		1B.3	27
late-flowered mariposa-lily	<i>Calochortus fimbriatus</i>		1B.3	4
Layne's ragwort	<i>Packera layneae</i>	R	1B.2	40
legenere	<i>Legenere limosa</i>		1B.1	5
Lemmon's jewelflower	<i>Caulanthus lemmonii</i>		1B.2	29
Lemmon's milk-vetch	<i>Astragalus lemmonii</i>		1B.2	61
lens-pod milk-vetch	<i>Astragalus lentiformis</i>		1B.2	10
Lewis Rose's ragwort	<i>Packera Eurycephala</i> var. <i>lewisrosei</i>		1B.2	65
Mad River fleabane daisy	<i>Erigeron maniopotamicus</i>		1B.2	11

Table E-5. List of BLM Sensitive Plant Species in Project Area (Continued)

Common Name	Scientific Name	CA Status	Rare Plant Rank	Project Area Acres
Madera leptosiphon	<i>Leptosiphon serrulatus</i>		1B.2	157
Mariposa clarkia	<i>Clarkia biloba ssp.australis</i>		1B.2	239
Mariposa cryptantha	<i>Cryptantha mariposae</i>		1B.3	3,278
marsh microseris	<i>Microseris paludosa</i>		1B.2	68
Mason's neststraw	<i>Stylocline masonii</i>		1B.1	13
Menzies' wallflower	<i>Erysimum menziesii</i>	E	1B.1	0
Modoc bedstraw	<i>Galium glabrescens ssp. modocense</i>		1B.2	4
Modoc County knotweed	<i>Polygonum polygaloides ssp. esotericum</i>		1B.3	6
Mojave tarplant	<i>Deinandra mohavensis</i>	E	1B.3	18
Morrison's jewelflower	<i>Streptanthus morrisonii ssp. morrisonii</i>		1B.2	435
Mosquin's clarkia	<i>Clarkia mosquinii</i>		1B.1	5
mouse buckwheat	<i>Eriogonum nudum var. murinum</i>		1B.2	12
Mt. Diablo phacelia	<i>Phacelia phacelioides</i>		1B.2	2
Napa bluecurls	<i>Trichostema ruygtii</i>		1B.2	19
Nissenan manzanita	<i>Arctostaphylos nissenana</i>		1B.2	67
northern clarkia	<i>Clarkia rostrata</i>		1B.3	3
orange lupine	<i>Lupinus citrinus var. citrinus</i>		1B.2	33
Owens Valley checkerbloom	<i>Sidalcea covillei</i>	E	1B.1	0
Pacifica gilia	<i>Gilia capitata ssp. pacifica</i>		1B.2	432
pale-yellow layia	<i>Layia heterotricha</i>		1B.1	13
Panoche pepper-grass	<i>Lepidium jaredii ssp. album</i>		1B.2	0
pappose tarplant	<i>Centromadia parryi ssp. parryi</i>		1B.2	1
Parry's horkelia	<i>Horkelia parryi</i>		1B.2	189
Patterson's navarretia	<i>Navarretia tehamense</i>		1B.3	2
Pierpoint Springs dudleya	<i>Dudleya cymosa ssp. costatifolia</i>		1B.2	11
pink creamsacs	<i>Castilleja rubicundula var. rubicundula</i>		1B.2	129
Piute cypress	<i>Hesperocypars nevadensis</i>		1B.2	47
Piute Mountains jewelflower	<i>Streptanthus cordatus var. piutensis</i>		1B.2	23
Piute Mountains navarretia	<i>Navarretia setiloba</i>		1B.1	8
playa phacelia	<i>Phacelia inundata</i>		1B.3	35
prostrate buckwheat	<i>Eriogonum umbellatum var. ahartii</i>		1B.2	22
prostrate vernal pool navarretia	<i>Navarretia prostrata</i>		1B.1	45
Pulsifer's milk-vetch	<i>Astragalus pulsiferae var. pulsiferae</i>		1B.2	341
purple-stemmed checkerbloom	<i>Sidalcea malviflora ssp. purpurea</i>		1B.2	50
Raiche's manzanita	<i>Arctostaphylos stanfordiana ssp.raichei</i>		1B.1	297
Rawhide Hill onion	<i>Allium tuolumnense</i>		1B.2	288
rayless layia	<i>Layia discoidea</i>		1B.1	83
Red Hills cryptantha	<i>Cryptantha spithamaea</i>		1B.3	189

Table E-5. List of BLM Sensitive Plant Species in Project Area (Continued)

Common Name	Scientific Name	CA Status	Rare Plant Rank	Project Area Acres
Red Hills ragwort	<i>Senecio clelandii</i> var. <i>heterophyllus</i>		1B.2	38
Red Hills soaproot	<i>Chlorogalum grandiflorum</i>		1B.2	472
Red Mountain stonecrop	<i>Sedum laxum</i> ssp. <i>eastwoodiae</i>		1B.2	9
red-flowered bird's-foot-trefoil	<i>Acmispon rubriflorus</i>		1B.1	14
Rincon Ridge ceanothus	<i>Ceanothus confusus</i>		1B.1	79
rose-flowered larkspur	<i>Delphinium purpusii</i>		1B.3	76
San Benito fritillary	<i>Fritillaria viridea</i>		1B.2	134
San Benito Onion	<i>Allium howellii</i> var. <i>sanbenitense</i>		1B.3	2
San Benito pentachaeta	<i>Pentachaeta exilis</i> ssp. <i>aeolica</i>		1B.2	158
San Joaquin spearscale	<i>Extriplex joaquinana</i>		1B.2	42
Sanford's arrowhead	<i>Sagittaria sandfordii</i>		1B.2	5
Santa Lucia dwarf rush	<i>Juncus luciensis</i>		1B.2	7
Santa Ynez groundstar	<i>Ancistrocarphus keilii</i>		1B.1	82
saw-toothed lewisia	<i>Lewisia serrata</i>		1B.1	529
Scadden Flat checkerbloom	<i>Sidalcea stipularis</i>	E	1B.1	3,588
Schoolcraft's wild buckwheat	<i>Eriogonum microthecum</i> var. <i>schoolcraftii</i>		1B.2	129
Scott Mountain bedstraw	<i>Galium serpenticum</i> ssp. <i>scotticum</i>		1B.2	36
Scott Valley phacelia	<i>Phacelia greenei</i>		1B.2	2
Sequoia gooseberry	<i>Ribes tulareense</i>		1B.3	91
serpentine cryptantha	<i>Cryptantha dissita</i>		1B.2	195
serpentine daisy	<i>Erigeron serpentinus</i>		1B.3	5
shaggyhair lupine	<i>Lupinus spectabilis</i>		1B.2	272
Sharsmith's western flax	<i>Hesperolinon sharsmithiae</i>		1B.2	487
Shasta chaenactis	<i>Chaenactis suffrutescens</i>		1B.3	21
Shasta clarkia	<i>Clarkia borealis</i> ssp. <i>arida</i>		1B.1	2
Shasta huckleberry	<i>Vaccinium shastense</i> ssp. <i>shastense</i>		1B.3	24
Shevock's copper moss	<i>Mielichhoferia shevockii</i>		1B.2	16
shining navarretia	<i>Navarretia nigelliformis</i> ssp. <i>radians</i>		1B.2	396
Shirley Meados star-tulip	<i>Calochortus westonii</i>		1B.2	47
short-leaved evax	<i>Hesperevax sparsiflora</i> var. <i>brevifolia</i>		1B.2	65
showy golden madia	<i>Madia radiata</i>		1B.1	24
Sierra blue grass	<i>Poa sierrae</i>		1B.3	70
silky cryptantha	<i>Cryptantha crinita</i>		1B.2	4
Siskiyou clover	<i>Trifolium siskiyouense</i>		1B.1	27
slender-stemmed monkeyflower	<i>Erythranthe filicaulis</i>		1B.2	164
Small's southern clarkia	<i>Clarkia australis</i>		1B.2	187
Snow Mountain buckwheat	<i>Eriogonum nervulosum</i>		1B.2	201
Socrates Mine jewelflower	<i>Streptanthus brachiatus</i> ssp. <i>brachiatus</i>		1B.2	59

Table E-5. List of BLM Sensitive Plant Species in Project Area (Continued)

Common Name	Scientific Name	CA Status	Rare Plant Rank	Project Area Acres
Sonoma beardtongue	<i>Penstemon newberryi</i> var. <i>sonomensis</i>		1B.3	22
spiny-sepaed button-celery	<i>Eryngium spinosepalum</i>		1B.2	299
Stanislaus monkeyflower	<i>Erythranthe marmorata</i>		1B.1	879
Stebbins' harmonia	<i>Harmonia stebbinsii</i>		1B.2	7
sticky pyrrocoma	<i>Pyrrocoma lucida</i>		1B.2	192
Stony Creek spurge	<i>Euphorbia ocellata</i> ssp. <i>rattanii</i>		1B.2	55
striped adobe-lily	<i>Fritillaria striata</i>	T	1B.1	19
supple daisy	<i>Erigeron supplex</i>		1B.2	13
Susanville beardtongue	<i>Penstemon sudans</i>		1B.2	313
swamp harebell	<i>Campanula californica</i>		1B.2	15
talus fritillary	<i>Fritillaria falcata</i>		1B.2	2
Tehama County western flax	<i>Hesperolinon tehamense</i>		1B.3	25
Tejon poppy	<i>Eschscholzia lemmonii</i> ssp. <i>kernensis</i>		1B.1	5
The Cedars buckwheat	<i>Eriogonum cedrorum</i>		1B.3	28
The Cedars fairy-lantern	<i>Calochortus raichei</i>		1B.2	104
The Cedars manzanita	<i>Arctostaphylos bakeri</i> ssp. <i>Sublaevis</i>	R	1B.2	982
Three Peaks jewelflower	<i>Streptanthus morrisonii</i> ssp. <i>elatus</i>		1B.2	146
three-fingered morning-glory	<i>Calystegia collina</i> ssp. <i>tridactylosa</i>		1B.2	5
Toren's grimmia	<i>Grimmia torenii</i>		1B.3	208
tree-anemone	<i>Carpenteria californica</i>	T	1B.2	106
Tuolumne button-celery	<i>Eryngium pinnaticsectum</i>		1B.2	407
Tuolumne fawn lily	<i>Erythronium tuolumnense</i>		1B.2	6
twisted horsehair lichen	<i>Bryoria spiralisfera</i>		1B.1	5
veiny monardella	<i>Monardella venosa</i>		1B.1	20
western Heermann's buckwheat	<i>Eriogonum heermannii</i> var. <i>occidentale</i>		1B.2	11
white-flowered rein orchid	<i>Piperia candida</i>		1B.2	437
white-stemmed clarkia	<i>Clarkia gracilis</i> ssp. <i>Albicaulis</i>		1B.2	60
Whitney's farewell-to-spring	<i>Clarkia amoena</i> ssp. <i>whitneyi</i>		1B.1	22
woolly balsamroot	<i>Balsamorhiza lanata</i>		1B.2	74
yellow-lip pansy monkeyflower	<i>Diplacus pulchellus</i>		1B.2	249

Source: CDFW 2018, CNPS 2018.

Notes: California Rare Plant Rank

1A = Plants presumed extinct in California

1B.1 = Plants rare in California and elsewhere; seriously threatened in California

1B.2 = Plants rare in California and elsewhere; fairly threatened in California

1B.3 = Plants rare in California and elsewhere; not very threatened in California

2B.1 = Plants rare in California, but more common elsewhere; seriously threatened in California

2B.2 = Plants rare in California, but more common elsewhere; fairly threatened in California

2B.3 = Plants rare in California, but more common elsewhere; not very threatened in California

California State Status T = Threatened. E = Endangered. R = Rare

Table E-6. Rare (S1 and S2) Vegetation Communities in the Project Area

Special Status Vegetation Communities	Acres within Project Area
<i>S1 Communities</i>	
Great Valley Valley Oak Riparian Forest	65
Ponderosa Dune Forest	8
<i>S2 Communities</i>	
California Walnut Woodland	37
Coastal Douglas Fir Western Hemlock Forest	5
Great Valley Cottonwood Riparian Forest	40
Great Valley Mixed Riparian Forest	232
Northern Interior Cypress Forest	1,593
Southern Interior Cypress Forest	45
Southern Mixed Riparian Forest	26
Total Acreage of S1 and S2 Communities	2,051

Source: CDFW 2018.

Table E-7. Examples of Invasive Plants Relevant to Proposed Action, with State Ratings and Typical Habitat in California

Common Name (Scientific Name)	CDFA Rating	Cal-IPC Rating	Occurrence in Forests & Woodlands	Habitat Notes
Russian knapweed (<i>Acroptilon repens</i>)	Noxious	Moderate		Fields, rangeland, cultivated sites, orchards, vineyards, roadsides, ditch banks, and disturbed, unmanaged places
Tree-of-heaven (<i>Ailanthus altissima</i>)	Noxious	Moderate	✓	Wide range of habitat from urban landscapes to woodlands
Red brome (<i>Bromus madritensis</i> ssp. <i>rubens</i>)		High		Disturbed and undisturbed areas; along roadsides and railroads; rangeland, pastures, and cultivated fields
Downy brome, cheatgrass (<i>Bromus tectorum</i>)	C	High	✓	Croplands, especially winter wheat and alfalfa; common in sagebrush and bunchgrass communities, extending to higher-elevation juniper, pinyon-juniper, and pine woodlands
Italian thistle (<i>Carduus pycnocephalus</i>)	Noxious	Limited		Meadows, pastures, and ranges, roadsides, and disturbed wildland areas
Diffuse knapweed (<i>Centaurea diffusa</i>)	Noxious	Moderate	✓	Cultivated / agricultural land, disturbed areas, managed grasslands, rail and roadsides, natural grasslands, dry forests, riverbanks
Yellow starthistle (<i>Centaurea solstitialis</i>)	Noxious	High	✓	Roadsides, wildlands, pastures, and waste areas
Canada thistle (<i>Cirsium arvense</i>)	Noxious	Moderate		Cultivated / agricultural land, roadsides, prairies and pastures streamside grasslands, and rangeland, railway embankments, and lawns
Bull thistle (<i>Cirsium vulgare</i>)	Noxious	Moderate	✓	Disturbed areas such as pastures, overgrazed rangelands, recently burned forests and forest clearcuts, and along roads, ditches, and fences; undisturbed grasslands, meadows, and forest openings
Scotch broom (<i>Cytisus scoparius</i>)	Noxious	High	✓	Coastal areas, urban/ peri-urban areas, disturbed areas, rail and roadsides, managed and semi-natural forests, plantations, orchards, tundra, grasslands, riverbanks, and wetlands
Medusahead (<i>Elymus caput-medusae</i> [<i>Taeniatherum caput-medusae</i>])	Noxious	High		Cultivated / agricultural land, disturbed areas, managed and natural grasslands, shrublands, rail and roadsides
Leafy spurge (<i>Euphorbia virgata</i> [<i>Euphorbia esula</i>])	Noxious	High	✓	Coastal areas, urban/ peri-urban areas, disturbed areas, rail and roadsides, managed and natural forests and grasslands, managed plantations and orchards, deserts, riverbanks, and wetlands
Halogeton (<i>Halogeton glomeratus</i>)	Noxious	Moderate		Salt marshes, disturbed areas, shrublands, deserts and arid regions, managed grasslands, intensive livestock production systems, urban/peri-urban areas, and rail and roadsides
Dyer's woad (<i>Isatis tinctoria</i>)	Noxious	Moderate		Disturbed and undisturbed sites; common along roadsides, fencerows, ditch banks, in pastures, rangeland, natural areas, and field crops

Table E-7. Examples of Invasive Plants Relevant to Proposed Action, with State Ratings and Typical Habitat in California (Continued)

Common Name (Scientific Name)	CDFA Rating	Cal-IPC Rating	Occurrence in Forests & Woodlands	Habitat Notes
Purple loosestrife (<i>Lythrum salicaria</i>)	Noxious	High		Disturbed wetland habitats, such as stream and river banks, edges of ponds, lakes, and reservoirs, flooded areas, ditches and roadsides; pristine wetland areas, including marshes, wet prairies, meadows, pastures, and bogs
Scotch thistle (<i>Onopordum acanthium</i>)	Noxious	High		Cultivated/ agricultural land, disturbed areas, managed and natural grasslands, wastelands, wet meadows, gravelly riverbanks and well-drained sandy or gravelly soils, urban/ peri-urban areas, and rail and roadsides
Russian thistle (<i>Salsola tragus</i>)	C	Limited		Disturbed areas, such as along highways and fencelines, in vacant lots, field and vegetable crops, poorly tended landscapes
Mediterranean sage (<i>Salvia aethiopsis</i>)	Noxious	Limited		Degraded big sagebrush communities, rangeland, disturbed sites, pastures, roadsides, and occasionally dryland crops
Mediterranean grass (<i>Schismus arabicus</i> and <i>S. barbatus</i>)		Limited		Disturbed and undisturbed coastal regions, shrublands, and desert
Salt cedar, tamarisk (<i>Tamarix ramosissima</i>)	Noxious	High		Stream banks, lake and pond margins, springs, canals, ditches, and some washes, where surface or subsurface water is available for most of the year; disturbed sites, including burned areas

Sources: (Jim Young 2006; DiTomaso et al. 2007; USNISC 2008; Orloff et al. 2008; USFS 2014; Wenning 2014; CABI 2015b, 2015a, 2016, 2017, 2018b, 2018a; University of California 2016; Stapleton & Orloff 2017; Cal-IPC 2018).

Note: This table provides only some examples of invasive plants that might impact or be impacted by the Proposed Action. Each FO maintains its own list of priority invasive plants that will be evaluated as part of treatment planning.

APPENDIX F - ACRONYMS AND GLOSSARY OF TERMS

%	percent
ACEC	Area of Critical Environmental Concern
APE	Area of Potential Effect
BLM	Bureau of Land Management
BMP	Best Management Practice
BP	before present
California EPA	California Environmental Protection Agency
Cal-IPC	California Invasive Plant Council
CalTrans	California Department of Transportation
CCMA	Clear Creek Management Area
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CenCal	Central California
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH	critical habitat
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO ₂	carbon dioxide
CWA	Clean Water Act
CWHRS	California Wildlife Habitat Relationship System
dbh	diameter breast height
DNA	Determination of NEPA Adequacy
DR	Decision Record's
EA	Environmental Assessment
ERMA	Extensive Recreation Management Area
FE	Federally endangered
FLPMA	Federal Land Policy and Management Act
FO	Field Office
FONSI	Finding of No Significant Impact
FT	Federally threatened
GHG	greenhouse gas
HHZ	high hazard zone
HUC 10	Hydrological Unit Code 10
IM	Instruction Memorandum
LWC	lands with wilderness characteristics
MCA	Medieval Climatic Anomaly
NCO	Nevada-California-Oregon
NEPA	National Environmental Policy Act
NorCal	Northern California
NRHP	National Register of Historic Places
OHV	Off-Highway Vehicle
PAR	Pesticide Activity Report
PCYC	Potential Classification Yield Classification
PDF	project design feature
pEA	Programmatic Environmental Assessment

PFYC	Potential Fossil Yield Classification
PRPA	Paleontological Resources Preservation Act
PUP	Pesticide Use Proposal
RCD	Resource Conservation District
RMP	Resource Management Plan
ROW	right-of-way
SMZ	Streamside Management Zones
SRMA	Special Recreation Management Area
SSC	species of special concern
SWRCB	State Water Resources Control Board
TCP	Traditional Cultural Property
TMTF	Tree Mortality Task Force
UC Davis	University of California at Davis
USC	U.S. Code
USDA NRCS	U.S. Department of Agriculture-National Resources Conservation Service
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
WMA	Weed Management Area
WSA	Wilderness Study Area

GLOSSARY OF TERMS

Adverse Effect: Occurs when an undertaking may directly or indirectly alter the characteristics of a historic property that qualify it for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative also need to be considered.

Area of Critical Environmental Concern: An Area of Critical Environmental Concern is defined in the Federal Land Policy and Management Act (FLPMA) (Public Law 94-579, Section 103[a]) as an area on BLM-managed lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, geologic, paleontological, or scenic values, to fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.

Area of Potential Effect: The geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

Authorized Officer: The BLM official who has been delegated authority to approve an action and is responsible for issuing a decision to implement a proposed action.

CenCal: Includes the Bakersfield, Central Coast, Motherlode and Ukiah BLM Field Offices.

Critical Infrastructure: Assets that are essential for the functioning of a society and economy. General types for this pEA include roads, energy infrastructure, recreation areas, water facilities, historic features, and private property, as described in Table 2-1.

Cultural Resources: Synonymous with the term "cultural property". Any prehistoric or historic-period district, site, building, structure, or object, regardless of whether the cultural resource or cultural property is eligible for or included in the National Register of Historic Places maintained by the Secretary of the Interior. Also includes isolates.

Decision Record: The BLM document associated with an EA that describes the action to be taken when the analysis supports a finding of no significant impact.

Determination of NEPA Adequacy (DNA): An interim step in the BLM's internal analysis process that concludes that a proposed action is adequately analyzed in an existing NEPA document (an EIS or EA). Where applicable, the determination also addresses conformance with an approved land use plan.

Direct Effects: ". . . those effects which are caused by the action and occur at the same time and place" (40 CFR 1508.8(a)).

Ephemeral Stream: A stream that flows only in direct response to precipitation, and whose channel is at all times above the water table.

Hydric Soil: a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

HUC 10: The Pfafstetter Coding System delineates drainage areas (watersheds) in a hierarchical fashion, with "level 1" watersheds at continental scales, subdivided into smaller level 2 watersheds, which are divided into level 3 watersheds, and so on. The average size of HUC10

watersheds in California is 110,000 acres. The fifth field watershed scale is also analogous to the hydrologic unit code “10”, which is just another term used to define the same watershed boundary (HUC10).

Forest: an area dominated by coniferous tree species that have commercial value for lumber with at least 10 percent tree cover. Areas with less than 10 percent tree cover that may contain conifers are typed as either grasslands or shrublands.

Forest Reserve: BLM Manual 6220-*National Monuments, National Conservation Areas, and Similar Designations* defines a Forest Reserve as an area designated by Congress to conserve and study the land, fish, wildlife, and forests occurring on such land, which providing public recreation and other management needs. The BLM currently manages one forest reserve: Headwaters, California.

Historic Property: Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe that meet the National Register criteria.

Indian Tribe: Any Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges to exist as an Indian tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994 (25 U.S.C. 479a.).

Indirect Effects: Effects that “...are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on water and air and other natural systems, including ecosystems” (40 CFR 1508.8(b)).

Intermittent Stream: Seasonal stream; a stream that flows only at certain times of the year when it receives water from springs or from some surface source, such as melting snow in mountainous areas.

National Conservation Area: BLM Manual 6220-*National Monuments, National Conservation Areas, and Similar Designations* defines a National Conservation Area (NCA) as an area designated by Congress, generally, to conserve, protect, enhance, and properly manage the resources and values for which it was designated for the benefit and enjoyment of present and future generations.

National Monument: BLM Manual 6220-*National Monuments, National Conservation Areas, and Similar Designations* defines a National Monument (NM) as an area designated by the president of the United States by proclamation pursuant to the Antiquities Act of 1906 for the protection of objects of historical or scientific interest, or by Congress for the conservation, protection, restoration, or enhancement of the resources, objects, and values for which it was designated.

National Register of Historic Places: The official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Park Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.

Native American: Any individual descended from a native group of the Americas, including Aleuts, Eskimos, and American Indians who may also be members of federally recognized tribes or American Indian and Alaska Native organizations.

NorCal: Includes the Applegate, Arcata, Eagle Lake and Redding BLM Field Offices.

Paleontological Resource: Any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth except for — (A) any materials associated with an archaeological resource (as defined in section 3(1) of the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470bb(1)); (B) any cultural item (as defined in section 2 of the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001)); or (C) resources determined in writing by the authorized officer to lack paleontological interest or not provide information about history of life on earth, based on scientific and other management considerations.

Perennial Stream: A stream that flows continuously. Perennial streams are generally associated with the water table in the localities through which they flow.

Project Area: Overall area of consideration that was reviewed for the development of the Hazard Removal and Vegetation Management Project.

Project Design Features: Actions designed to reduce or eliminate potential effects from project activities.

Rare Soils: soil series that are present in less than 1,000 hectares (approximately 2,471 acres) of total area throughout the U.S. (Amundson, Guo, & Gong, 2003).

Section 106 National Historic Preservation Act: Requires each Federal agency to identify and assess the effects of its actions on historic properties. The responsible Federal agency must consult with appropriate State and local officials, Indian tribes, applicants for Federal assistance, and members of the public and consider their views and concerns about historic preservation issues when making final project decisions. The BLM California handles its Section 106 responsibilities through a National Programmatic Agreement and Statewide Protocol Agreement.

Stand: An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition to make it distinguishable from the forest in adjoining areas.

Stand Composition: The presence and abundance of trees, shrubs, herbs, and grasses.

Stand Density: An expression of the number and size of trees on a forest site. May be expressed in terms of numbers of trees per acre, basal area, stand density index, or relative density index.

Stand Structure: The vertical and horizontal arrangement of live and dead trees, including downed woody material, and the understory species composition of shrubs, hardwoods, and grasses.

Thinning: Cuttings made in immature stands in order to stimulate the growth of the trees that remain and to increase the total yield of useful material from the stand.

Treatment Area: Describes where action is proposed, such as units where forest thinning is proposed and where road construction or road improvements are proposed.

Woodland: an area dominated by either hardwoods or non-commercial coniferous tree species

(e.g. gray pine, foothill pine) with at least 10 percent tree cover. Areas with less than 10 percent tree cover that may contain hardwoods or conifers are typed as either grasslands or shrublands.

APPENDIX G - REFERENCES

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